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# Digital marketing practices, content management strategies and employee marketing engagement: Basis for green branding framework

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## Abstract

This study investigated the development of a Green Branding Framework for Higher Education Institutions (HEIs) through an examination of digital marketing practices, content management strategies, and employee marketing engagement. The research evaluated specific digital marketing practices, including social media marketing, email marketing, and search engine optimization. Content management strategies were analyzed by assessing HEI strategy communication, content production, content distribution, and promotion. Employee marketing engagement was examined through the lens of employee advocacy, green behavior, and empowerment and participation. Employing a descriptive research design, data were collected via digital survey questionnaires from 312 full-time administrators, staff, and faculty members across five HEIs. The study utilized Spearman rho to determine the significant relationship, and all analyses were performed using the SPSS version 28 to assess the objectives. The findings revealed that there is general agreement from the respondents on the digital marketing practices currently in use. Also, the respondents showed agreement significantly on the content management strategies used by Higher Education Institution (HEI) in all the examined dimensions. Further, the study demonstrated a general level of agreement among respondents regarding the organization's employee marketing engagement. Likewise, highly significant relationships between the three main areas of investigation, notably the strong correlation between social media marketing and both content distribution and promotion, and employee green behavior were discovered. The resulting Green Branding Framework effectively integrates these elements, offering a strategic approach for HEIs to enhance sustainability initiatives and improve their competitive positioning.

**Keywords:** green branding, Higher Education Institutions (HEIs), digital marketing practices, content management strategies, employee marketing engagement, sustainability, social media marketing, content distribution and promotion, green behavior

## Digital marketing practices, content management strategies and employee marketing engagement: Basis for green branding framework

### 1. Introduction

Green branding, the strategic integration of environmental considerations into an institution's identity and communications, is increasingly significant within the competitive landscape of higher education institutions (HEIs). Distinct from traditional branding focused on academic prestige or career outcomes, green branding highlights an institution's commitment to sustainability, ecological responsibility, and environmental stewardship. It can foster stakeholder engagement by aligning institutional values with community priorities (Roy, 2023), potentially strengthening relationships and collaborative sustainability efforts.

Despite growing recognition of its importance, the current implementation of green branding in HEIs often lacks a cohesive, strategic framework. While institutions increasingly leverage digital platforms, integrate sustainability into curricula, and foster environmental responsibility (Yaping et al., 2023), a comprehensive model specifically tailored to HEIs remains elusive. Existing literature highlights successful initiatives (Roy, 2023) but points to a critical gap: the lack of an integrated approach that synergistically combines key operational areas. This study addresses this gap by examining the interplay between **digital marketing practices**, **content management strategies**, and **employee marketing engagement** as foundational components for a scalable green branding framework in the HEI context. Digital marketing practices adapt traditional marketing for modern digital customers using tools like social media, email, and SEO to create customer-centric strategies enabling online commerce and comparison. Content management strategies involve the strategic communication, production, distribution, and promotion of content to shape stakeholder perceptions, build trust, and enhance an HEI's green brand image by showcasing sustainability efforts. Employee marketing engagement is the active involvement and authentic advocacy of employees in promoting the organization's brand, particularly its sustainability initiatives and eco-conscious image, through their participation and behavior.

The impetus for this research stems from a direct professional experience within an HEI, transitioning from leading sustainability initiatives to heading content marketing. This unique vantage point reveals a disconnect: while substantial sustainability efforts underway, potentially enhancing institutional reputation, attracting values-driven students, and contributing to a sustainable future, their strategic connection to branding and marketing has never been fully established or leveraged. Recognizing this missed opportunity underscores the rationale for developing a practical framework. This study, therefore, seeks to provide HEIs with an evidence-based roadmap for integrating sustainability into their core brand identity and communication strategies by analyzing the interplay of digital marketing, content management, and employee engagement. The significance of this study lies in its potential to guide HEIs in leveraging green branding to enhance their reputation, attract students, and contribute to a more sustainable future.

**Objectives of the Study** - This research aimed to assess digital marketing practices, content management strategies, and employee marketing engagement as foundational elements for developing a Green Branding Framework in Higher Education Institutions (HEIs). Specifically, the study sought to evaluate digital marketing practices, including social media marketing, email marketing, and search engine optimization; determined the content management strategies by examining the communication of HEI strategy, content production, content distribution, and promotion; described employee marketing engagement, focusing on employee advocacy, green behavior, and empowerment and participation; tested the significant relationships between digital marketing practices, content management strategies, and employee marketing engagement; and developed a comprehensive Green Branding Framework for HEIs that integrates these elements to foster a culture of sustainability and enhance the organization's competitive advantage in the market.

## 2. Methods

**Research Design** - This study employed a descriptive research design to elucidate the characteristics of a defined subject or group. Specifically, the research delineated respondents' assessments of digital marketing practices, content management strategies, and employee marketing engagement. The researcher gathered information from the respondents by providing survey questionnaires digitally. This descriptive kind of research was helpful in collecting the respondents' data efficiently.

**Participants of the Study** - The population of the study consisted of full-time administrators, staff and faculty members within the administrative and academic units of a private Higher Education Institutional system, specifically five of its schools located in the CALABARZON, NCR and Visayas regions. The HEIs were considered based on past and existing sustainability initiatives. The population sizes of the HEIs were: HEI1=503; HEI2=265; HEI3=191; HEI4=193; and, HEI5=501, totaling 1,653. From this pool, a representative sample size of 312 was determined using the Raosoft sample size generator, allowing for a 5% margin of error and a 95% confidence level. The study focused on full-time administrators, staff and faculty members. The rationale for choosing these groups is grounded in the expectation that they generally have longer tenures within their respective institutions compared to other employee categories. This extended service implies they are likely more familiar and knowledgeable about the ongoing digital marketing and content management initiatives employed by their school. Furthermore, they would have had more opportunity to observe or participate in the engagement of employees in marketing the school to its wider community, providing richer, experience-based data. Employing administrators and full-time faculty as the core respondent group aligns with the study's goals, as this demographic is most likely to have firsthand experience with institutional marketing initiatives. Their involvement provides a robust foundation for exploring how academic and administrative units collaboratively contribute to enhancing the school system's presence and outreach.

**Instruments of the Study** - The study utilized a self-made survey questionnaire from different literature readings, as the research instrument to help appropriately measure the variables of the study. The questionnaire consisted of 45 items, designed to measure digital marketing practices, content management strategies, and employee marketing engagement within Higher Education Institutions, specifically focusing on their green branding initiatives. The questionnaire is divided into four parts, each addressing a specific dimension of the research topic. Digital marketing practices in this study focused on the utilization of social media, email marketing, and Search Engine Optimization (SEO) to promote sustainability initiatives. Questions are informed by the works of Cone Communications (2017), Confetto et al. (2023), Lee et al. (2016), Ktisti et al. (2022), Papadas et al. (2019), Marolt et al. (2022), Brügger et al. (2021), Chaffey et al. (2017), Sharma (2023), Wong et al. (2023), Capper (2023), and Harbi et al. (2022), probing the effectiveness of these channels in communicating environmental values, engaging target audiences, and driving eco-conscious behavior. Notably, the works of Confetto et al. (2023) and Papadas et al. (2019) are referenced multiple times in this section, highlighting their significance in understanding digital marketing practices for sustainability.

Content management strategies focused on how HEIs communicate their sustainability strategy, content production, and, content distribution and promotion. This section, referred to the researches of Sharma (2023), Cheung et al. (2020), Zerfass et al. (2018), and Papadas et al. (2019), discussing the alignment of messaging across channels, the quality and diversity of content, and the strategic use of distribution platforms to maximize reach. Notably, the research of Papadas et al. (2019) was referenced across multiple parts of the questionnaire, underscoring its broad relevance to green branding practices. In Employee marketing engagement, the focus was the role of employees as advocates for green initiatives, green behavior modelling, and, empowerment and participation. Questions in this section were guided by research from Sharma (2023), Yang et al. (2018), Rodrigues et al. (2023), Confetto et al. (2023), Ishaque et al. (2022), Dasanayaka et al. (2023), Zappalà et al. (2023), Brügger et al. (2021), Gómez-Aguilella (2024), Chen et al. (2022) and Kyriacou et al. (2023). The items gauged employees' knowledge and willingness to share information about sustainability efforts, their participation in green behavior modeling, and their sense of empowerment to contribute to the organization's

green goals. The works of Dasanayaka et al. (2023) and Zappalà et al. (2023) provided deep insight into understanding employee engagement in sustainability initiatives.

The questionnaire variables were assessed using a five-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5). These items were incorporated in the initial survey instrument. The study placed emphasis on procedures for data collection, including the study's objective, questionnaire administration, and ethical considerations. The confidentiality of all participants was strictly maintained. Participation in this research is entirely voluntary, and respondents are free to withdraw at any time without prejudice. By administering this questionnaire to a diverse sample of HEI personnel, the study aims to gather robust data that informed the development of a comprehensive green branding framework. The findings will shed light on the current state of digital marketing, content management, and employee engagement in HEIs as they pertain to sustainability goals. Additionally, the research identified areas for improvement and provide actionable recommendations for enhancing green branding efforts in the higher education sector.

Table 1 displays the results of Cronbach's Alpha for the adapted survey questionnaire. Based on the results, the survey instrument on Digital Marketing Practices, Content Management Strategies and Employee Marketing Engagement demonstrates exceptional reliability, with an overall Cronbach's Alpha value of (0.975), indicating that the calculated alpha coefficients affirm the reliability of all questions measuring the variables, as they consistently exceed the value of 0.70, as posited by George and Mallery (2003).

**Table 1**

*Reliability Summary Table*

Indicators	Cronbach Alpha	Remarks
Digital Marketing Practices, Content Management Strategies and Employee Marketing Engagement: Basis for Green Branding Framework Per Variable	.975	Excellent
Digital Marketing Practices	.952	Excellent
Social Media	.854	Good
Email Marketing	.915	Excellent
Search Engine Optimization	.896	Good
Content Management Strategies	.957	Excellent
Communication of HEI Strategy	.866	Good
Content Production	.915	Excellent
Content Distribution and Promotion	.918	Good
Employee Marketing Engagement	.944	Excellent
Employee Advocacy	.818	Good
Green Behavior Modeling	.853	Good
Empowerment and Participation	.954	Excellent

*George and Mallery (2003) provide the following rules of thumb: " \_ > .9 – Excellent, \_ > .8 – Good, \_ > .7 – Acceptable, \_ > .6 – Questionable, \_ > .5 – Poor, and \_ < .5 – Unacceptable"*

Notably, individual constructs show excellent to good reliability, supporting strong construct validity. Digital Marketing Practices were noted Excellent at (0.952), and affirmed by Social Media at (0.854), Email Marketing at (0.915) and Search Engine Optimization at (0.896). Content Management Strategies were noted Excellent at (0.957), and confirmed by Communication of HEI Strategy at (.866), Content Production at (0.915) and Content Distribution and Promotion at (0.918). Lastly, Employee Marketing Engagement was noted Excellent at (0.944), and affirmed by Employee Advocacy at (0.818), Green Behavior Modeling at (0.853) and Empowerment and Participation at (0.954). These results indicate sub-constructs also demonstrate good to excellent reliability. Notable are Email Marketing (0.915), Content Production (0.915), Content Distribution and Promotion (0.918), and Empowerment and Participation (0.954). Inter-item correlation matrices reveal strong relationships among items within constructs, further supporting the instrument's internal consistency and validity. Thus, the researcher can now proceed to the actual survey using the aforementioned instrument.

**Data Gathering Procedure** - The study utilized a convenience purposive sampling process to select respondents from the entire population of employees in the Higher Education Institution. Full-time employees,



comprising of administrators, staff and faculty, in HEIs that have sustainability initiatives, had an equal chance to participate in the survey. This approach ensured a representative sample that are qualified to respond to the research questionnaire and can address the objectives of the research. The researcher initiated the data gathering process by sending a formal request to participate in the survey to various HEIs' representatives via email. The request included a brief introduction of the research topic, the purpose of the study, copy of the approved questionnaire and ethical considerations. Upon receiving approval and endorsement, the researcher proceeded with the data collection. Respondents were invited to participate in the study via email. The invitation included a brief explanation of the study's purpose, the importance of their participation, and assurances of confidentiality and anonymity. Respondents were provided with a link to a digital questionnaire, hosted on Google Forms. Only questionnaires that were fully accomplished were included in the data analysis and interpretation. This ensured the reliability and validity of the collected data. Responses were compiled and stored in a secure database for analysis.

**Data Analysis** - The study employed various statistical tools to analyze the data. Weighted mean and rank were used to assess digital marketing practices in terms of social media marketing, email marketing, and search engine optimization; to determine the content management strategies in terms of communication of HEI strategy, content production, content distribution and promotion; and to describe the employee marketing engagement in terms of employee advocacy, green behavior, and, empowerment and participation. This presented a comprehensive analysis of the central tendency (Bennett et al.,2020) and dispersion of each variable while simultaneously accounting for both the relative significance of each metric and the overall performance of each variable. Result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Since the data was derived come from multiple distinct HEI groups resulting in a multimodal distribution, the Spearman rho was used as part of the non-parametric tests (Al, 2023a) to determine the significant relationship and measure the strength and direction of the relationship between the variables, even when the data is not normally distributed. All analyses were performed using SPSS version 28.

**Ethical Considerations** - In adherence to rigorous ethical standards, all data collected during this research were used exclusively for scholarly purposes, ensuring the preservation of research integrity and quality. Prior to data collection, formal permission was sought from the relevant HEI authorities to guarantee the preparedness of target respondents. Respondent confidentiality and anonymity were upheld by omitting the collection of personally identifiable information in the questionnaires. This was indicated in the first part of the questionnaire to inform all the respondents of the intent of the researcher regarding the issue. Participation was voluntary, allowing respondents the freedom to decline or withdraw at any stage without consequence. Utmost care was taken to safeguard the well-being and security of all participants, ensuring that no harm or distress is caused during the course of the research. Primary and secondary research data were stored and secured and confidential information were destroyed and disposed of securely.

### 3. Results and discussion

**Table 2**

*Summary Table of Digital Marketing Practices*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Social Media Marketing	4.08	Agree	1
Email Marketing	3.87	Agree	3
Search Engine Optimization	3.99	Agree	2
Composite Mean	3.98	Agree	

*Legend: 4.50-5.00=Strongly Agree; 3.50-4.49=Agree; 2.50-3.49=Neutral; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 2 presents the composite mean of the digital marketing practices variables, where respondents agree across all variables at 3.98. Social media marketing ranked highest (4.08), search engine optimization followed (3.99) and email marketing ranked the lowest (3.87). The results suggest that the respondents, on average, "Agree" more strongly with the effectiveness or implementation of social media marketing practices than email

marketing practices. Social media marketing is agreed to be a more effective platform for sustainability communication, and respondents see it as enabling HEIs to engage stakeholders through real-time interaction and community-building. Its wide reach, viral sharing, and visually engaging content enhance visibility and participation in green initiatives, fostering a strong connection with audiences (Nhuong et al.,2024; Maundu, 2020). On the other hand, email marketing may suffer from inbox clutter, where recipients tend to overlook or delete emails without opening them. Coupled with the challenge of creating consistently relevant and compelling content, this approach can result in significantly lower engagement compared to social media's interactive nature (Bottom Line Marketing, 2023).

**Table 3***Summary Table of Content Management Strategies*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Communication of HEI Strategy	4.08	Agree	1
Content Production	3.99	Agree	2
Content Distribution and Promotion	3.95	Agree	3
Composite Mean	4.01	Agree	

*Legend: 4.50-5.00=Strongly Agree; 3.50-4.49=Agree; 2.50-3.49=Neutral; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 3 presents the composite mean of content management strategies variables, where respondents agree across all variables at 4.01. Communication of HEI strategy ranked highest (4.08), content production followed (3.99) and content distribution and promotion ranked the lowest (3.95). Communication of HEI Strategy ranks highest as it serves as the foundation of content management in green branding. Salem (2020) indicates that effective content management allows HEIs to clearly articulate their sustainability principles, engage stakeholders, and stand out competitively. While described as essential for reach and impact (Ismail,2021), effective content distribution and promotion require strategically selecting appropriate channels based on audience demographics and preferences (Cheung et al.,2020) and utilizing various platforms and tactics like social media, paid advertising, or influencer marketing (Cheung et al.,2020; Tsimonis et al.,2014). Complexity and resource requirements of this execution phase might lead to the slightly lower rank than the other two variables. Content distribution and promotion fundamentally rely on having a clear strategy to communicate and high-quality, engaging content to distribute. It could be perceived as a subsequent, dependent step, potentially ranking slightly lower in priority compared to establishing the core strategy and creating the content itself.

**Table 4***Summary Table of Employee Marketing Engagement*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Employee Advocacy	4.00	Agree	2
Green Behavior	4.05	Agree	1
Empowerment and Participation	3.77	Agree	3
Composite Mean	3.94	Agree	

*Legend: 4.50-5.00=Strongly Agree; 3.50-4.49=Agree; 2.50-3.49=Neutral; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 4 presents the composite mean of the employee marketing engagement (EME) variables, where respondents agree across all variables at 3.94. Green behavior ranked highest (4.05), followed by employee advocacy (4.00) and empowerment and participation ranked the lowest (3.77). The results suggest that the respondents, on average, "Agree" more strongly on the employee marketing engagement on green behavior than empowerment and participation. Green behavior ranks highest due to its alignment with influential factors such as leadership modeling and rewards-based strategies, while empowerment and participation rank lowest due to deficiencies in feedback mechanisms and perceived input value. Chen et al. (2022) highlighted that leadership significantly shapes employee attitudes and behaviors. Dasanayaka et al. (2023) indicated that when leaders actively model green behavior, communicate its importance, and employ green transformational leadership styles, they effectively inspire and motivate employees to emulate these behaviors and achieve green goals.

The study by Rodrigues et. al. (2023) and Welmilla et al. (2020) pointed out that empowerment and

participation entails employees feeling empowered to contribute ideas, participate in decision-making, and take ownership. Achieving this deep sense of shared purpose and investment across a workforce may be inherently more challenging than encouraging specific actions (Green Behavior) or acting as advocates (Employee Advocacy), potentially explaining its lower relative ranking, despite still falling within the "Agree" range.

The Spearman's Rank Order Correlation analysis reveals significant associations among digital marketing practices, content management strategies, and employee marketing engagement. Digital marketing practices demonstrate a strong positive correlation with content management strategies, with content distribution and promotion exhibiting the highest relationship with social media marketing ( $\rho=.815$ ,  $p<.001$ ). The result suggests that the strategic utilization of social media platforms significantly enhances content reach and promotion, underscoring the importance of a well-integrated, synergistic framework in which digital marketing initiatives are seamlessly aligned with the strategic communication, production, and dissemination of content within Higher Education Institutions (HEIs). Salem (2020) underscored that social media platforms enable HEIs to share sustainability narratives through interactive formats such as storytelling, user-generated content, and engagement campaigns, reinforcing the idea that the effectiveness of social media marketing depends on the institution's ability to distribute and promote meaningful content, ensuring a strong synergy between content strategy and social media execution. Similarly, among digital marketing practices and employee marketing engagement, social media marketing presents the strongest correlation with green behavior ( $\rho=.760$ ,  $p<.001$ ), whereas email marketing shows the weakest relationship with employee advocacy ( $\rho=.458$ ,  $p<.001$ ). The findings highlight the pivotal role of social media in shaping key dimensions of employee engagement that prioritizes and advances environmental stewardship, with a pronounced impact on the green behaviors within the HEIs.

Kurniawati et al. (2022) highlighted the role of social media platforms in promoting institutional messaging about sustainability on social media that resonates with employees, influencing their behaviors and reinforcing their participation in green initiatives. Additionally, content management strategies significantly impact employee engagement, with content distribution and promotion displaying the highest correlation with green behavior ( $\rho=.760$ ,  $p<.001$ ), while content production has the weakest association with empowerment and participation ( $\rho=.500$ ,  $p<.001$ ). The findings indicate that the strategic dissemination of content plays a critical role in strengthening employees' commitment to sustainable practices within the HEI. Furthermore, while all facets of content management exhibit a significant relationship with employee engagement, the approaches employed in content distribution and promotion demonstrate the most pronounced influence on shaping employees' pro-environmental behaviors. Welmilla et al. (2020) highlighted the power of employee advocacy in amplifying green branding efforts. Employees, when engaged, serve as brand ambassadors by sharing sustainability stories through internal communication channels and social media.

The results suggest that digital marketing practices, particularly social media marketing, are highly effective in enhancing both content management strategies and employee marketing engagement. Similarly, content management strategies—especially content distribution and promotion—play a critical role in fostering employee engagement. Green behavior consistently emerges as the variable most strongly correlated across all dimensions, underscoring its importance in aligning organizational practices with sustainability goals.

Table 5 presents the relationship between digital marketing practices and content management strategies, highlighting the strength and significance of their correlations. The results indicate a highly significant correlation across all variables, with p-values less than 0.001. Social media marketing demonstrates strong positive relationships with communication of the higher education institution (HEI) strategy ( $\rho=.786$ ), content production ( $\rho=.778$ ), and content distribution and promotion ( $\rho=.815$ ). Similarly, email marketing is significantly correlated with communication of HEI strategy ( $\rho=.737$ ), content production ( $\rho=.717$ ), and content distribution and promotion ( $\rho=.747$ ). Likewise, search engine optimization (SEO) shows strong relationships with communication of HEI strategy ( $\rho=.739$ ), content production ( $\rho=.735$ ), and content distribution and promotion ( $\rho=.783$ ). Results indicate that social media, email marketing, and SEO can

strengthen HEI content management, more so in reach and promotion. The highly significant relationship between social media marketing and content distribution highlights the need for HEIs to align social media and content strategy teams. HEI social media platforms amplify institutional messages and broadens reach, and investing in social media expertise, creating platform-specific content tailored to audience preferences may improve visibility, enhance branding, support student recruitment, and strengthen stakeholder engagement, maximizing the overall effectiveness of digital marketing efforts. Cheung et al. (2020) supported that HEIs can effectively amplify, thereby distribute and promote their sustainability content and messaging through various digital channels, including social media marketing, paid advertising, and influencer collaborations. The platforms serve as key vehicles for delivering relevant and engaging content to target audiences. Maundu (2020) mentioned how digital marketing allows real-time tracking and adaptation of content strategies, ensuring that promotional efforts remain effective and relevant.

**Table 5***Relationship Between Digital Marketing Practices and Content Management Strategies*

Variables	rho	p-value	Interpretation
Social Media Marketing			
Communication of HEI Strategy	.786**	<.001	Highly Significant
Content Production	.778**	<.001	Highly Significant
Content Distribution and Promotion	.815**	<.001	Highly Significant
Email Marketing			
Communication of HEI Strategy	.737**	<.001	Highly Significant
Content Production	.717**	<.001	Highly Significant
Content Distribution and Promotion	.747**	<.001	Highly Significant
Search Engine Optimization			
Communication of HEI Strategy	.739**	<.001	Highly Significant
Content Production	.735**	<.001	Highly Significant
Content Distribution and Promotion	.783**	<.001	Highly Significant

Legend: Significant at  $p\text{-value} < 0.01$

**Table 6***Relationship Between Digital Marketing Practices and Employee Marketing Engagement*

Variables	rho	p-value	Interpretation
Social Media Marketing			
Employee Advocacy	.593**	<.001	Highly Significant
Green Behavior	.760**	<.001	Highly Significant
Empowerment and Participation	.566**	<.001	Highly Significant
Email Marketing			
Employee Advocacy	.458**	<.001	Highly Significant
Green Behavior	.660**	<.001	Highly Significant
Empowerment and Participation	.462**	<.001	Highly Significant
Search Engine Optimization			
Employee Advocacy	.498**	<.001	Highly Significant
Green Behavior	.697**	<.001	Highly Significant
Empowerment and Participation	.528**	<.001	Highly Significant

Legend: Significant at  $p\text{-value} < 0.01$

Table 6 presents the strong relationship between various digital marketing practices and employee marketing engagement. Social media marketing exhibits a highly significant correlation with employee advocacy ( $\rho = .593, p < .001$ ), green behavior ( $\rho = .760, p < .001$ ), and empowerment and participation ( $\rho = .566, p < .001$ ). Similarly, email marketing also shows a highly significant relationship with all three engagement variables, though with slightly lower correlation coefficients: employee advocacy ( $\rho = .458, p < .001$ ), green behavior ( $\rho = .660, p < .001$ ), and empowerment and participation ( $\rho = .462, p < .001$ ). Search engine optimization (SEO) also demonstrates moderate to strong correlations with employee advocacy ( $\rho = .498, p < .001$ ), green behavior ( $\rho = .697, p < .001$ ), and empowerment and participation ( $\rho = .528, p < .001$ ). The results suggests that the HEI's social media activities have a strong link with the propensity of its employees to engage in green behaviors. This could signify that institutional messaging about sustainability on social media resonates with employees and

influences their actions, or perhaps employees who are already environmentally conscious are more engaged with the HEIs social media presence regarding sustainability. Strategically, this highlights an opportunity for HEIs to leverage social media not merely for external branding but also as a potent internal communication channel to cultivate and reinforce a culture of sustainability and encourage desired green behaviors among the workforce. Welmilla et al. (2020) supports the highly significant correlation between social media marketing and employee green behavior emphasizing that employees who are engaged with their institution's sustainability efforts act as authentic brand ambassadors. The study further shows that employee-generated content on social media is perceived as more credible and trustworthy than traditional marketing messages. This suggests that employees who are already environmentally conscious are more likely to interact with and contribute to their HEI's social media presence on sustainability, reinforcing the bidirectional relationship between social media engagement and green behavior.

**Table 7**

*Relationship Between Content Management Strategies and Employee Marketing Engagement*

Variables	rho	p-value	Interpretation
Communication of HEI Strategy			
Employee Advocacy	.590**	<.001	Highly Significant
Green Behavior	.734**	<.001	Highly Significant
Empowerment and Participation	.523**	<.001	Highly Significant
Content Production			
Employee Advocacy	.547**	<.001	Highly Significant
Green Behavior	.672**	<.001	Highly Significant
Empowerment and Participation	.500**	<.001	Highly Significant
Content Distribution and Promotion			
Employee Advocacy	.607**	<.001	Highly Significant
Green Behavior	.760**	<.001	Highly Significant
Empowerment and Participation	.600**	<.001	Highly Significant

Legend: Significant at  $p\text{-value} < 0.01$

Table 7 presents the relationship between content management strategies and employee marketing engagement, revealing highly significant correlations across all variables. The communication of the Higher Education Institution (HEI) strategy demonstrates a moderate to strong relationship with employee advocacy ( $\rho = .590, p < .001$ ), green behavior ( $\rho = .734, p < .001$ ), and empowerment and participation ( $\rho = .523, p < .001$ ). Content production also shows a highly significant relationship with employee advocacy ( $\rho = .547, p < .001$ ), green behavior ( $\rho = .672, p < .001$ ), and empowerment and participation ( $\rho = .500, p < .001$ ). Content distribution and promotion exhibit the strongest correlations, particularly with green behavior ( $\rho = .760, p < .001$ ), followed by employee advocacy ( $\rho = .607, p < .001$ ) and empowerment and participation ( $\rho = .600, p < .001$ ). The results indicate that the manner in which sustainability-related content is disseminated and promoted within the HEI is significantly associated with employees adopting green behaviors. It emphasizes the critical role of internal communication and strategic content dissemination in translating institutional green objectives into tangible employee actions. Strategically, the results imply that HEIs seeking to enhance employee green behavior should prioritize the development and implementation of effective internal content distribution and promotion strategies, ensuring that messages about sustainability are clear, engaging, and reach employees through appropriate channels. Cheung et al. (2020) mentioned that strategic content distribution is crucial for effectively conveying green branding messages within HEIs and highlighted that accessible, engaging sustainability content across multiple platforms enhances employee adoption of green behaviors. Additionally, Dasanayaka et al. (2023) suggested that leadership-driven sustainability initiatives, including communication, training, and incentives, foster a culture of environmental responsibility. Consistent, strategic messaging strengthens behavior change, reinforcing the role of content dissemination in embedding sustainability into institutional practices and employee routines.

***Proposed Green Branding Framework***

Based on the study's findings, the researcher developed a framework that illustrates the interrelationships

between Digital Marketing Practices, Content Management Strategies, and Employee Marketing Engagement, and how these elements collectively contribute to the development of a Green Branding Framework for Higher Education Institutions (HEIs). Anchored in the research objectives, it underscores the strategic integration of these elements to institutionalize sustainability, fortify brand positioning, and establish a competitive edge in the academic sector.

The relationships among the three variables of the study are presented in Figure 1. The proposed Green Branding Framework for Higher Education Institutions (HEIs) integrates digital marketing practices, content management strategies, and employee marketing engagement to create a culture of sustainability and improve brand image. This framework highlights the interconnectedness of these elements and provides actionable guidelines for institutions aiming to achieve competitive advantages in the education market.

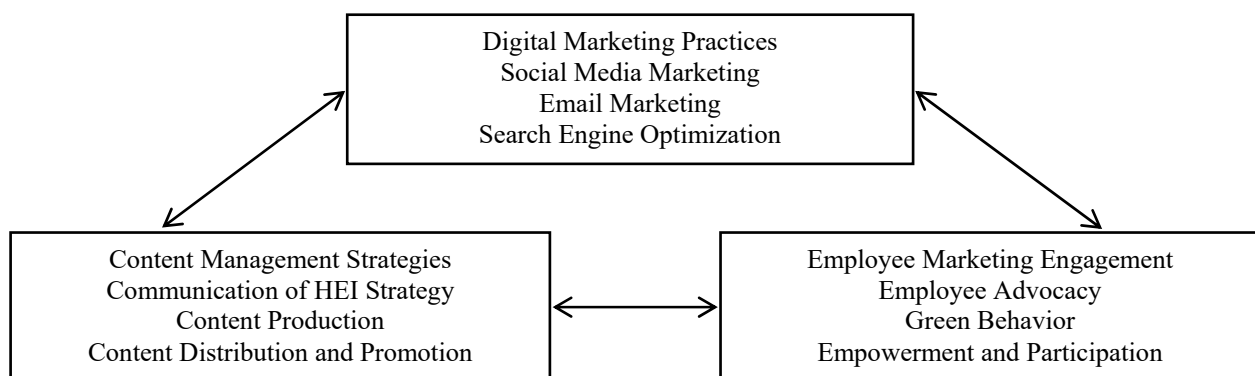


Figure 1. Proposed Green Branding Framework

The framework incorporates digital marketing practices, which include social media marketing, email marketing, and search engine optimization (SEO), all of which play pivotal roles in enhancing the visibility and reach of HEIs' sustainability initiatives. The framework also incorporates content management strategies that encompass the communication of HEI strategy, content production, and content distribution and promotion. For example, consistent messaging about environmental sustainability contributes to solid brand perception, with content distribution and promotion aligning employee actions with sustainability goals. Lastly, the framework encompasses employee marketing engagement. Its dimensions such as empowerment and participation, employee advocacy, and green behavior, create an internal culture of sustainability, transforming employees into effective brand ambassadors for green branding efforts.

The interconnectedness among key variables within the Green Branding Framework provides a visualization of their dynamic relationships. Digital marketing practices, the variables placed at the top, influences both content management strategies and employee marketing engagement. This influence is denoted through double-headed arrows, signifying mutual interaction. Situated below digital marketing practices is content management strategies, which demonstrates relationships with both digital marketing practices and employee marketing engagement. Additionally, there is a double-headed arrow connecting employee marketing engagement, highlighting their bidirectional relationship and mutual reinforcement. Further, the findings of the research highlight distinct relationships among variables, suggesting their roles as possibly independent and dependent factors. Digital marketing practices and content management strategies act as independent variables, driving outcomes such as social media marketing's influence on content distribution. Green behavior, a variable of employee marketing engagement, emerge as a dependent variables, shaped by the effective execution of these strategies. This dynamic interplay underscores the causal and relational significance of these variables.

The researcher stresses that the subject of the study, Higher education institutions (HEIs), face unique challenges in aligning their brand identity with evolving societal values, particularly in sustainability. Green

branding—a novel yet essential framework—integrates environmental stewardship into institutional branding, distinguishing HEIs from competitors focused solely on prestige or career outcomes. This approach fosters stakeholder engagement and positions HEIs as leaders in sustainability education. As global demand for ethical practices grows, green branding becomes a strategic necessity, bridging sustainability goals with competitive differentiation in the educational sector.

In its turn, HEIs can deploy the Green Branding Framework strategically to achieve core objectives: **Cultivating a Culture of Sustainability:** By focusing on EME, particularly Green Behavior and Empowerment/Participation, HEIs can embed sustainability into their core operations. Effective internal communication via content management and leveraging digital platforms (especially social media) to promote green initiatives internally can significantly influence employee behavior. Leadership commitment and integrating green practices into daily routines are crucial.

**Building a High Brand Image:** Consistent communication of sustainability strategy and initiatives through quality content production builds a positive brand perception regarding environmental responsibility. Employee advocacy, where employees share information and act as ambassadors, further enhances brand reputation and credibility. Authentic engagement is key, potentially more impactful than incentives. **Achieving Competitive Advantage:** Integrating digital marketing (like SEO for visibility) and content management allows HEIs to clearly articulate their unique sustainability commitment, differentiating them in the education market. Engaging stakeholders effectively through tailored digital content and demonstrating genuine commitment through employee actions can attract environmentally conscious students, staff, and partners, providing a competitive edge. Effective use of social media, in particular, enhances visibility and stakeholder engagement. The Green Branding Framework serves as a guiding structure for the research and for HEIs interested in furthering their green branding initiatives, illustrating the dynamic relationships between its variables. By achieving the outlined research objectives, the framework aims to provide a strategic foundation for developing a robust Green Branding Framework that aligns with the sustainability goals of higher education institutions.

#### **4. Conclusions and recommendations**

The study shows that there is general agreement from the respondents on the digital marketing practices currently in use. The respondents showed agreement significantly on the content management strategies used by Higher Education Institution (HEI) in all the examined dimensions. Respondents demonstrated a general level of agreement among respondents regarding the organization's employee marketing engagement. The results show high significant relationships between digital marketing practices, content management strategies, and employee marketing engagement. A comprehensive Green branding Framework for HEIs has been developed to foster a pervasive culture of sustainability within the institution and simultaneously enhance its competitive advantage in the increasingly environmentally conscious market.

Administration and HEI leadership may strengthen sustainability goals, and HEI marketing into segmented lists for targeted green content. For those in charge of communications in the HEI, they may optimize digital platforms, especially social media, for broad reach and encourage employee advocacy to promote the HEI's green content. To encourage engagement, the HEI may embed sustainability culturally through access to platforms for participation, use of internal communication, and include sustainability in its mission. Likewise, the proposed Green Branding framework may be utilized by administration and HEI leadership team, strategic planning units and strategic communications units to cultivate a sustainability culture that will encourage employee engagement, green behavior, and empowerment through effective internal communication and leadership commitment. Future studies may extend the framework's applicability to corporate or non-profit sectors, examining contextual factors across regions or cultures. Integrating variables like stakeholder engagement or AI-driven tools, and analyzing external influences such as policies or societal trends, may enhance understanding of green branding. These efforts can refine the framework and advance sustainable branding strategies across diverse industries.

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# Occupational safety and health on employees' safety behavior and organizational commitment among Agri-tourism farm sites in Central Luzon Region: Basis of sustainable strategic plan for safe and committed human resource

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## ***Abstract***

One of the significant responsibilities of the hospitality and tourism industry including Agri-Tourism farm sites is the occupational health and safety of its stakeholders. Notwithstanding the existence of statutory and regulatory requirements and framework to ensure the safety and welfare of the employees, data regarding occupational safety and health here in the Philippines are limited. Due to labor-intensive characteristics of the Agri-tourism farm sites with the combination of agriculture and tourism activities, it is imperative to exert effort to integrate occupational safety and health programs and enhance the safety behavior and organizational commitment among employees. A descriptive correlational research design was utilized to investigate the relationship of occupational safety and health program implementation to the employees' safety behavior and organizational commitment. Data were gathered from 243 employees from 24 DOT-accredited Agri-tourism farm sites in the Central Luzon Region that have been operational for a minimum of one year are the respondents. The study found that most employees in Agri-tourism farm sites are young, male, inexperienced, and occupy frontline or rank-and-file positions with limited formal education. Despite this, they are equipped with knowledge and training, enabling them to comply with safety regulations and demonstrate a proactive safety approach through training participation and teamwork. Employees show strong organizational commitment, driven by a sense of belonging and loyalty influenced by benefits such as training, professional development, and career growth opportunities. A significant relationship exists between occupational safety and health programs, employees' safety behavior (safety compliance), and organizational commitment (affective). To address these findings, a sustainable strategic plan has been proposed to improve safety, foster employee well-being, and enhance commitment through targeted programs and continuous safety monitoring.

**Keywords:** Agri-tourism farm sites, occupational safety and health, safety behavior, organizational commitment, Central Luzon

## **Occupational safety and health on employees' safety behavior and organizational commitment among Agri-tourism farm sites in Central Luzon Region: Basis of sustainable strategic plan for safe and committed human resource**

### **1. Introduction**

One of the significant responsibilities of the hospitality and tourism industry including Agri-Tourism farm sites is the occupational health and safety of its stakeholders. Workplace should prioritize the health and safety of its employees. The Republic Act No. 11058 or Occupational Health and Safety Implementing Rules and Regulations state that workplace safety and health standards must be a component of nation-building. To ensure the health and safety of the employees in all establishments, projects and sites, and other work environments including Agri-Tourism farm sites, it will encourage stringent but flexible, inclusive, and gender-sensitive procedures. According to the International Labor Organization, 2.93 million workers pass away annually from illnesses and accidents connected to their jobs. It is also reported that 395 million workers are temporarily or permanently incapacitated due to work-related accidents and diseases. According to the Philippine Statistics Authority's Integrated Survey on Labor and Employment, the Philippines recorded 23,906 occupational accidents and 27,636 occupational injuries across all industries in the year 2021. Work-related accidents occurred in 4,186 of the 38,305 companies with 20 or more employees, representing approximately 10.9 percent. By region, Central Luzon reported the second highest cases of work-related injuries of about 14.3 percent or 1,729 cases. Based on the comprehensive review of occupational safety and health data, 17 of 18 workers do not have acceptable working conditions and are exposed to hazards that predispose them to occupationally related diseases and injuries (Lu, 2022). The above data implies that there are still challenges in terms of safeguarding the welfare of the employees locally and internationally.

Despite the abundance of research on Agri-Tourism farm sites, little is known about occupational safety and health in this industry. Rather than the hospitality and tourism sector, most of the current research on occupational health and safety focuses on sectors like construction and healthcare (Wong et al., 2020). Despite the development of statutory and regulatory requirements and framework to ensure the safety and welfare of the employees, data regarding occupational safety and health here in the Philippines are limited (Lu, 2022). There are number of studies that identified the challenges faced by Agri-Tourism farm sites in effective implementation of occupational safety and health programs, including inadequate financial and material resources, workforce shortages, absence of training and formal guidance, and limitations in terms of cultural and regional aspects (Lee et al., 2020; Kim et al., 2019; Garcia et al., 2021). Due to labor-intensive characteristics of the Agri-tourism farm sites with the combination of agriculture and tourism activities, it is imperative to exert effort to integrate occupational safety and health programs and enhance the organizational commitment of employees towards safety.

Occupational safety and health can be described as both a right and a responsibility. It can be defined as a comprehensive field intended to safeguard the well-being and protection of workers across diverse work environments. It primarily aims to eliminate or significantly reduce work-related fatalities, injuries, and illnesses (Wahana et al., 2021). On the other hand, safety behavior refers to the actions and attitudes of workers that are directly related to maintaining safety standards, which can be effectively cultivated through the establishment of appropriate work practices. It reflects the outcomes of sound management policies, effective work control, thorough understanding of job tasks, comprehensive hazard assessments, and various personal factors. Consequently, an individual's behavior is inclined towards adopting safety measures, thereby minimizing the likelihood of accidents (Hermanto et al., 2023).

The occupational safety and health program implementation was assessed in terms of training, psychology,

organization, and environment; and the safety behavior including safety compliance and safety participation are both patterned after the study of Elziny et al.,(2020) entitled “The Influence of Safety Culture on Hotel Employees' Safe Behavior during the Crisis of Covid-19”. Likewise, organizational commitment that was assessed in terms of affective, normative, and continuous is patterned after the study of Fantahun et al., (2023) entitled “Organizational commitment and associated factors among health professionals working in public hospitals of southwestern Oromia, Ethiopia”. The current study is essential to ensuring that occupational safety and health programs are implemented in Central Luzon Region hospitality and tourism enterprises in accordance with regulations that eventually influence the employees' behavior and their organizational commitment.

The connection between occupational safety and health (OSH) initiatives and employees' safety behaviors is essential for cultivating a safe and efficient workplace. This relationship illustrates how organizational efforts to prioritize OSH can profoundly affect and improve employees' compliance with safety protocols and practices. According to the result of the study of Elziny et al.,(2020), strong occupational safety and health culture is crucial in influencing the employees' safety behavior. The findings revealed that when organizations implement safety measures, employees are likely to adopt and adhere to the practices. Ismail's study (2020) demonstrates that implementing comprehensive safety management systems significantly enhances safety performance by reducing workplace accidents and fostering proactive safety behaviors among employees, resulting in a safer and more productive work environment. Moreover, based on the conclusion of Li et al., (2022), employees who are satisfied with the health and safety of their workplace can develop their emotional attachment and commitment to the organization. Organizational commitment, crucial for job performance and success, is positively influenced by occupational health and safety practices including safety procedures and organizational safety support (Kaynak et al., 2020). The independent variable in this study is occupational safety and health, while the dependent variables are employees' safety behavior and organizational commitment. According to Elziny et al.,(2020), safety culture influences employees' safety behavior by shaping their attitudes, perceptions, and actions towards safety practices. Additionally, research indicates that a strong health and safety culture can enhance employee commitment by fostering a sense of responsibility, accountability, and ownership.

The study's findings will contribute significantly to the development of a sustainable strategic plan for safe and committed human resources essential in the holistic implementation of occupational safety and health programs tailored for Agri-tourism farm sites, particularly within the Central Luzon Region. The study's outcomes may prove indispensable for operators and management of Agri-tourism farm sites, providing them with essential guidance in crafting sustainable strategic plans aimed at safeguarding the comprehensive occupational safety and health program for both employees and tourists, and enhancing their safety behavior and organizational commitment. Additionally, entities such as Regional Labor and Employment Office, Regional Tourism Office, safety training providers, academe, and future researchers can gain valuable insights from this research, enabling them to establish guidelines for implementing and overseeing occupational safety and health measures. These guidelines aim not only to influence the safety practices and organizational commitment of the Agri-Tourism farm employees but also to ensure the well-being of tourists and visitors. Based on the results of the study, a sustainable strategic plan for safe and committed human resources was developed that can be used as a guide in enhancing the occupational safety and health in Agri-tourism farm sites in Central Luzon. Also, the study will contribute to filling the literature gaps that can eventually assist future researchers in advancing their study related to occupational safety and health, safety behavior, and organizational commitment specifically in Agri-tourism farm sites. The study encompassed all seven provinces within the Central Luzon Region, namely Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac, and Zambales. It focused on a total of 24 Agri-tourism farm sites accredited by the Department of Tourism (DOT) as of 2024. The participants of the study were employees of these Agri-tourism sites who are 18 years old and above, and who have been employed for a minimum of six months.

**Objectives of the Study** - This study examined the occupational safety and health program implementation, employees' safety behavior, and organizational commitment among DOT-accredited Agri-tourism farm sites in Central Luzon Region. Specifically, this study: (1) determined the occupational safety and health program

implementation of Agri-tourism farm sites in terms of training, psychology, organization, and environment; (2) assessed the level of safety behavior of employees in Agri-tourism farm sites in terms of safety compliance and safety participation; (3) determined the level of employees' organizational commitment in terms of affective, normative and continuance; (4) tested the significant relationship between occupational health and safety practices and (a) employees' safety behavior and (b) organizational commitment; and (5) proposed a sustainable strategic plan for safe and committed human resource for Agri-tourism farm sites in Central Luzon Region.

## 2. Methods

**Research Design** - This study employed a descriptive comparative and correlational research design. Descriptive designs are utilized to characterize people, things, or situations without manipulating any variables. In this design, the researcher observed and measured variables as they naturally occur to describe the features of a population. The goal is to identify and highlight the current issues or concerns facing the population. By analyzing the data, the researcher aimed to understand how various group characteristics and behaviors differ from each other. This approach allows for a comprehensive depiction of the population's attributes and an exploration of relationships between variables, providing insights into the current state of the population under study.

**Participants of the Study** - The study encompassed DOT-accredited Agri-tourism farm sites in the Central Luzon Region that have been operational for a minimum of one year. To select the respondents for this study, the researcher has set specific criteria: (1) employees who have been working for at least six months at an Agri-tourism farm site within the Central Luzon Region, and (2) employees who are 18 years old or older. To determine the number of Agri-tourism destinations in Central Luzon, the researcher utilized the database provided by the Department of Tourism Regional Office. This was done purposely to ensure comprehensive coverage of the region. The study included Agri-Tourism farm sites from various provinces such as Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac, and Zambales. For accurate data on the number of employees at each Agri-tourism farm site, the researcher reached out to the owners and managements of these establishments, yielding to 243 retrieved questionnaires out of 245 target respondents from 24 Agri-Tourism farm sites. The sample size of 243 from a total population of 245 is statistically sound, as it results in a remarkably high coverage rate of approximately 99.18% ensuring that the sample is highly representative of the population. This nearly complete sampling minimizes the margin of error and enhances the reliability of the statistical analyses conducted, allowing for precise estimates of population parameters. Furthermore, the high sample size supports robust inferential statistical techniques, enabling valid conclusions that can be generalized to the entire population. The selection of sample was done using stratified non-proportional allocation where the population is divided into subgroups based on specific characteristics like (1) employees who have been working for at least six months at an Agri-tourism farm site within the Central Luzon Region, and (2) employees who are 18 years old or older. This method ensures that the sample accurately represents the population, allowing for a thorough analysis of occupational safety and health program implementation, employees' safety behavior, and organizational commitment among Agri-tourism farm sites in Central Luzon.

**Data Collection Instrument** - To collect data from the respondents, the researcher employed a survey questionnaire. To meet the objectives of the study, the survey questionnaires have been patterned after two notable studies. The first study by Elziny et al.,(2020), titled "The Influence of Safety Culture on Hotel Employees' Safe Behavior during the Crisis of Covid-19," has informed the variables related to occupational safety and health, and employees' safety behavior. The second study by Fantahun et al. (2023), titled "Organizational Commitment and Associated Factors among Health Professionals Working in Public Hospitals of Southwestern Oromia, Ethiopia," has guided the variables pertaining to organizational commitment.

All modifications to the survey instruments were made to ensure they are suitable for the target respondents. This means that the questionnaire utilized in this study was adopted. This approach ensures that the questions are relevant and tailored to the occupational safety and health program, employees' safety behaviors, and organizational commitment in an Agri-Tourism farm setting, allowing for accurate and meaningful data collection.

The survey questionnaire was composed of five parts:

Part I: Personal Data Consent. This section included a consent form where respondents provide their agreement to participate in the research. It outlines the purpose of the study and the procedures that were followed, ensuring that participants are fully informed about what their involvement entails. The consent form reassures respondents that their responses will be kept confidential and that their participation will not result in any harm. It emphasizes the ethical considerations of the study, ensuring respondents' rights and well-being are protected. Part II: Demographic and Firmographic Profile. This section gathers essential background information about the respondents. The demographic profile includes variables such as age, sex, highest educational attainment, work experience, and job position. The firmographic profile captures information about the organization, including the number of years it has been in operation and the total number of employees. This data is crucial for understanding the context and characteristics of the respondents and their workplaces. Part III: Occupational Safety and Health Program Assessment. This part contained statements designed to evaluate the state of occupational safety and health program implementation within Agri-Tourism farm sites. The assessment covers four key areas: (a) Safety training or the adequacy and effectiveness of safety training provided to employees; (b) Safety psychology or the psychological aspects related to workplace safety, such as stress and mental health support; (c) Safety organization or the organizational structures and policies in place to ensure safety; and (d) Safety environment or the physical work environment and its impact on safety. Respondents rated each statement using a 5-point Likert scale, which provides a quantitative measure of their perceptions and experiences. Part IV: Employees' Safety Behavior Assessment. This section focused on evaluating the safety behavior of employees in Agri-Tourism farm sites. It includes statements that assess two main aspects: (a) Safety compliance or the extent to which employees adhere to safety regulations and procedures; and (b) Safety participation or the degree to which employees actively engage in safety-related activities and initiatives. Like Part III, respondents used a 5-point Likert scale to rate their level of agreement with each statement, allowing for an analysis of safety behavior trends. Part V: Organizational Commitment Assessment. The final section measured the organizational commitment of employees. It comprises statements that assessed three types of commitment: (a) Affective commitment or the emotional attachment and identification an employee have with their organization; (b) Normative commitment or the sense of obligation an employee feels to remain with their organization; and (c) Continuance commitment or the awareness of the costs associated with leaving the organization. Respondents again used a 5-point Likert scale to express their level of agreement with each statement, providing insight into their overall commitment to their organization.

The research instrument underwent a rigorous validation and reliability testing process to ensure its effectiveness and accuracy in measuring the intended variables. Initially, the questionnaire was reviewed in a face-to-face meeting with the research adviser. The purpose of this review was to ensure that the questionnaire items were aligned with the research objectives and that the language used was grammatically correct and clear. This initial validation step was crucial for identifying any major issues and making necessary adjustments early in the process. Following the adviser's review, the questionnaire was validated by an expert panel comprising professionals from the academe and industry, one is the Dean of the School of Tourism and Hospitality Management in College of Sciences, Technology and Communications, and the owners of two (2) DOT accredited Agri-Tourism farm sites in region 2 namely Courage Mt. Integrated Farm and Paradise Agri Tourism Farm. These experts had significant experience and understanding of occupational safety and health, as well as Agri-tourism farm sites. Their feedback was invaluable in ensuring that the questionnaire was relevant, comprehensive, and accurately reflected the practical realities of the industry. The validated questionnaire was then subjected to initial trials. This involved administering the questionnaire to 35 employees of DOT-accredited Agri-tourism farm sites in region 2. These respondents were chosen to provide a preliminary set of data for testing the reliability of the instrument without influencing the actual data gathering phase.

After collecting the initial trial responses, the data was subjected to a reliability test conducted by the university statistician. The internal reliability of the instrument was assessed using Cronbach's Alpha coefficient, a measure of internal consistency. The results indicated high reliability, with coefficients of 0.923 (Excellent) for occupational safety and health, 0.836 (Good) for employees' safety behavior, and 0.968 (Excellent) for

organizational commitment. These results demonstrated that the questionnaire items were consistently measuring the intended constructs. The reliability test was considered a try-out phase, aimed at soliciting feedback on the complexity and clarity of the questionnaire items. The expert panel's comments and suggestions, along with the trial respondents' feedback, were used to refine and revise the final questionnaire. This iterative process ensured that the final instrument was both reliable and user-friendly, enhancing its validity and effectiveness for the main data collection phase. To make sure the study complies with all applicable ethical norms and guidelines, it was reviewed and approved by the ethics committee. The study's objectives, method, research instrument, and possible participant effects were all carefully examined by the university's ethical committee.

**Table 1**

*Reliability Test Result*

Variables	Cronbach's Alpha	Interpretation
Occupational Safety And Health	0.923	EXCELLENT
Training	0.794	Good
Psychology	0.794	Acceptable
Organization	0.861	Good
Environment	0.872	Good
EMPLOYEES SAFETY BEHAVIOR	0.836	GOOD
Safety Compliance	0.815	Good
Safety Practice	0.756	Acceptable
ORGANIZATION COMMITMENT	0.968	EXCELLENT
Affective Commitment	0.909	Excellent
Normative Commitment	0.932	Excellent
Continuance Commitment	0.944	Excellent

**Data Collection Procedure** - The researcher took a hands-on approach in administering the survey questionnaires to ensure a high response rate and accurate data collection. This involves personally visiting Agri-tourism farm sites across Central Luzon and engaging directly with the employees who participated in the study. To facilitate this process, validated printed copies of the survey questionnaires were used. These questionnaires have been meticulously reviewed and approved to ensure clarity, relevance, and ease of understanding. Administering these face-to-face allows the researcher to provide immediate clarifications and ensure that the respondents fully understand the questions. Before distributing the questionnaires, the researcher sought approval and assistance from the owners or managers of the Agri-tourism farm sites. Their support is crucial for gaining access to the employees and ensuring that the data collection process does not disrupt daily operations. This collaboration also helped in building trust with the respondents, encouraging honest and thoughtful participation. To further facilitate smooth data collection, the researcher requested an endorsement from the Department of Tourism Regional Office in Region 3. This endorsement served as an official backing, lending credibility to the study and ensuring that the Agri-Tourism farm sites understood the importance and legitimacy of the research. Upon administering the questionnaires, the researcher provided clear and concise instructions to the respondents. This included an explanation of the study's objectives, the importance of their participation, assurances regarding the confidentiality and anonymity of their responses, as well as managing the English comprehension during the survey. Ensuring that the respondents comprehend these aspects is essential for collecting reliable data. Before the respondents began answering the survey, they were required to provide full consent. This consent process ensures that they are voluntarily participating and fully aware of their rights. Once consent is obtained, the questionnaires were distributed for the respondents to complete. After the respondents have completed the questionnaires, the researcher collected all the answered questionnaires. This was done promptly to minimize any delays in the data analysis phase. The collected data was then meticulously analyzed to draw meaningful conclusions and insights that align with the research objectives.

**Data Analysis** - For the main variables such as occupational safety and health, employees' safety behavior, and organizational commitment, weighted mean and rank were utilized. Spearman's rank correlation coefficient (rho) was utilized to examine significant relationships. All statistical analyses were conducted using SPSS



(Statistical Package for the Social Sciences) version 28. SPSS is a powerful tool for handling and analyzing complex survey data, offering a wide range of statistical tests and graphical representations. To ensure accuracy and reliability in the analysis, the researcher collaborated with the university statistician. The statistician's expertise was invaluable in guiding the choice of appropriate statistical tests, interpreting the results, and ensuring that the analysis meets rigorous academic standards.

**Ethical Consideration** - The researcher is committed to complying with the provisions and guidelines outlined in the Data Privacy Act of the Philippines (RA 10173). This legislation mandates the protection of personal information and ensures that it is handled with the utmost confidentiality and care. Prior to participating in the research, respondents were required to provide their authorized permission. This was facilitated through the "I Agree" clause under the Data Privacy Consent section (Part I) of the survey questionnaire. By agreeing, respondents acknowledge that the researcher has provided sufficient information regarding the study's purpose, procedures, potential risks, and benefits. This consent ensured that respondents are fully aware of their involvement and have made an informed decision to participate freely, without any external coercion or influence. The researcher prioritized and extended privacy-enhancing measures throughout the study. All personal data collected from respondents were kept private and anonymous. This means that any identifying information was removed or obscured to prevent linking data back to individual respondents. Also, all collected data, both digital and physical, were securely stored. Digital data were protected with encryption and access controls, while physical data were kept in locked, secure locations under the responsibility of the researcher. The researcher ensured that all procedures are conducted fairly and impartially for every respondent. This includes treating each participant with respect and ensuring that the research process does not disadvantage or discriminate against anyone. The researcher avoided any language that could be considered discriminatory, derogatory, or offensive. All communication and survey items were carefully worded to respect the dignity and rights of the respondents.

Upon completion of the survey, all data were continued to be treated with confidentiality and privacy. The researcher restricted access to the data only to those individuals who need it for analysis and reporting purposes, such as the researcher, adviser, panelists, and the university statistician. Further anonymize data if used in reports or publications to ensure that individual respondents cannot be identified. Follow strict data retention and disposal policies, ensuring that personal data is securely deleted or destroyed after the study's conclusion, in accordance with relevant legal and ethical guidelines.

### 3. Results and discussion

**Table 2**

*Summary Table of Occupational Safety and Health Program Implementation*

Indicators	Mean	al Interpretation	Rank
Training	4.82	Strongly Agree	2
Psychology	4.61	Strongly Agree	4
Organization	4.81	Strongly Agree	3
Environment	4.86	Strongly Agree	1
OVERALL MEAN	4.77	Strongly Agree	

*Legend: 4.50-5.00=Strongly Agree; 3.50-4.49=Agree; 2.50-3.49=Moderately Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 2 presents the composite mean of 4.77 which indicates that the respondents strongly agreed on the dimensions of occupational safety and health program implementation such as training, psychology, organization, and environment. As revealed by the study, the dimension environment got the highest rank with a weighted mean of 4.86 and verbally interpreted as strongly agree. Also, the dimension training got the second highest rank with weighted mean of 4.82 and verbally interpreted as strongly agree.

Agri-tourism farm sites are compliant to the indicators of environment as dimension of occupational safety and health. The respondents of the study strongly agreed that the Agri-Tourism farm sites are implementing a safe environment by providing personal protective equipment and first aid kits for the employees and visitors to use in

case of emergency. Also, safe signage is evident in the farms. The employees declared that they are responsible for maintaining the cleanliness of the farms. Moreover, the farms are aware of their legal responsibility signified by the awareness and practice of the employees to emergency procedures and the presence of first aiders in the sites. Furthermore, the farms ensure that they have their communications with co-workers when it comes to the safety issues. Most importantly, the Agri-tourism farm sites are agreed to be safe for visitors as they are informing them about potential hazards upon their arrivals.

Zawadka et al. (2022) found that during the COVID-19 pandemic, well-educated and affluent tourists in Poland were drawn to agritourism farms due to their perceived safety, which was reinforced by measures such as PPE provision and strict adherence to health protocols. Similarly, Marin et al. (2021) reported that Italian farmers perceived their own use of PPE and compliance with safety measures as sufficient, indicating a generally positive safety climate in agricultural settings. Mendoza (2022) further emphasized that stakeholders in Mendez, Cavite, strongly agreed on the adoption of sustainable practices that prioritized cleanliness and safety, enhancing the farms' environmental and economic sustainability. Naga (2022) corroborated these findings by showing that agritourism enterprises in South Cotabato diligently complied with both government-mandated and self-imposed health and safety measures during the pandemic. Additionally, Yamagishi et al.,(2024) underscored the importance of implementing safety protocols—such as the provision of PPE and first aid kits—for ensuring a secure environment in Philippine farm tourism. Sroka et al.,(2020) highlighted that in Poland, clear communication of safety guidelines and consistent PPE provision were key to maintaining tourist confidence during pandemic disruptions. However, Ramos et al. (2020) identified that although Latino immigrant workers in Missouri's concentrated animal feeding operations had access to PPE, inconsistent usage indicated a need for enhanced training and clearer communication. The National Children's Center for Rural and Agricultural Health and Safety also stressed that effective safety practices in agritourism should include hazard identification, emergency preparedness, and the provision of PPE and first aid kits to protect both employees and visitors. Altogether, these studies demonstrate that consistent safety measures, employee training, and clear communication are crucial in cultivating safe and attractive agritourism environments across diverse contexts.

On the other hand, dimension psychology got the lowest rank with weighted mean of 4.61 and verbally interpreted as strongly agree. Also, the dimension organization got the second lowest rank with weighted mean of 4.81 and verbally interpreted as strongly agree.

Agri-tourism farm sites emphasize the importance of having a safety management system. The emergency response procedures in the farms are essential in environments where agricultural and tourism activities are the main operations. Environment that possesses diverse hazards like Agri-tourism farms must have their employees aware of emergency response procedures. If the employees are aware of the safety procedures and they are complying according to the initiatives of the farm management, they will develop a safety culture. Safety culture is the shared attitudes and practices in the organization that foster proactive manners of managing accidents. This increases the compliance with occupational safety and health though they don't have the formal and documented safety procedures. However, the employees in Agri-tourism farm sites follow the procedures even if the superiors are not around. This only means that the employees are recognizing the program and aware that they need to keep themselves at work. The participation of the employees in Agri-tourism farm sites are high making them always involved in the decision-making process. This signifies that Agri-tourism farm sites, even though they don't have their formal and documented safety programs, are maintaining the safety of the farms.

These studies collectively emphasize the importance of establishing robust safety management systems, fostering a culture of safety, and ensuring emergency preparedness in both agritourism and agricultural operations. Al Farisi et al. (2022) demonstrated that the application of an Occupational Safety and Health Management System (OSHMS), aligned with ISO standards, effectively mitigates risks through structured planning, seven OSH programs, and a risk mitigation roadmap in a food dairy company. Similarly, Ekmekci et al.,(2024) highlighted that comprehensive occupational health and safety awareness among Turkish farmers, combined with detailed data collection on work conditions, can improve both individual and societal well-being.

Stearns et al.,(2024) argued that crisis communication planning, including guest safety talks and regular review of management plans, is vital for reducing liability and sustaining agritourism operations. Marin et al. (2021) found that while safety perceptions improved among Italian farmers during COVID-19, gaps in communication and worker involvement indicated the need for more tailored safety training and dialogue. Nowacka et al.,(2024) stressed that leadership engagement, employee participation, and routine audits are key to developing sustainable safety cultures in food industry SMEs. Kowalska et al.,(2019) also identified management commitment, regular safety training, and clear communication as critical components for sustaining strong health and safety practices in the food sector. Finally, both Ju (2021) and Trinity (2019) demonstrated that leveraging remote observation technologies and recognizing social influences on behavior can enhance monitoring and compliance with safety protocols in agricultural environments.

**Table 3***Summary Table of Employees' Safety Behavior*

Indicators	Mean	Verbal Interpretation	Rank
Safety Compliance	4.71	Strongly Agree	1.5
Safety Participation	4.71	Strongly Agree	1.5
OVERALL MEAN	4.71	Strongly Agree	

*Legend: 4.50-5.00=Strongly Agree; 3.50-4.49=Agree; 2.50-3.49=Moderately Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 3 presents the composite mean of 4.71 which indicates that the respondents strongly agreed on the dimensions of employees' safety behavior in terms of safety compliance and safety participation.

Safety behavior in labor-intensive Agri-tourism farm sites is crucial due to diverse hazards and risks that the farms inherent. Safety compliance and safety participation are highlighted in farm operations as these ensure the safety of the employees and the visitors. In terms of compliance, employees must attend the safety orientation and training for them to be equipped in managing hazards and risks proactively. The trained employees can be expected to follow safety practices like handling of dangerous materials, using personal protective equipment. Also, compliance to safety behavior can be described when employees are following instructions and procedures, and report observations above unsafe acts and unsafe conditions. Safety compliance can be drawn from highly aware and trained employees in Agri-tourism farm sites.

Ekmekci et al.,(2024) found that 33% of Turkish farmers experienced work-related accidents, with factors such as insufficient PPE and poor transportation safety highlighting the urgent need for comprehensive training and safety measures. Ramos et al.(2021) demonstrated that safety training among young adults in U.S. agricultural programs increased PPE usage and awareness, while also fostering concern for coworkers' safety, showing the positive ripple effect of tailored education. Fagnoli et al.,(2021) showed that during the COVID-19 pandemic, Italian farmers' adherence to safety protocols improved due to management's commitment and effective communication, illustrating the importance of leadership in cultivating a strong safety climate. Yamagishi et al. (2024) stressed that Philippine farm tourism operations must prioritize safety compliance and training to manage diverse hazards, protecting both employees and visitors. These findings consistently demonstrate that a combination of training, clear communication, and leadership support are foundational to improving safety behaviors in agricultural settings. Furthermore, across different contexts, the integration of new technologies and pandemic-related adjustments both reinforced the importance of proactive safety management. Overall, the studies highlight that fostering a culture of safety is dependent on collaboration, continuous education, and accessible safety resources.

In terms of safety participation, employees who are motivated to support their coworkers to maintain safety is highly expected. When it comes to occupational safety and health, it is not only the responsibility of a person but a team. The motivated employees are more likely to support the organization by participating in the development of the safety standards, and voluntarily subjecting themselves to safety discussion. The willingness of the employees in safety initiatives is sometimes influenced by the ways the management introduces safety to them. Safety participation in the Agri-tourism farm sites is connected to their awareness of the consequences of

their inactivity. Safety activity and inactivity matters in any organization including Agri-tourism farm sites.

When the employees feel that their insights are valued and the management is providing necessary resources for safety, employees are more likely to participate (Zohar et al.,2018). Additionally, building trust and communication with the management promotes safety participation. Ramos et al. (2021) highlighted that when workers understand the consequences of unsafe behaviors and management consistently models safety practices, participation in safety initiatives and peer support naturally increase. Zhou et al. (2021) further found that safety participation improves when employees trust their leaders and receive clear, consistent communication about safety priorities, leading to greater willingness to report hazards and assist coworkers. Clarke et al.,(2021) emphasized that open communication and management support foster safety citizenship behaviors, where employees voluntarily engage in proactive safety monitoring and discussions. Pereira et al. (2022) confirmed that employees are more motivated to participate in safety initiatives when they feel their input is valued by supervisors and when teamwork cultivates collective accountability. Moreover, clear communication and shared decision-making were pivotal in encouraging collaborative safety behaviors across teams. These findings illustrate that management commitment, peer support, and participatory approaches are interconnected factors that enhance safety engagement. Workers are more likely to embrace safety practices when they trust leadership and perceive their contributions as meaningful. Overall, cultivating a safety-first mindset in agriculture depends on both leadership actions and the empowerment of employees to actively participate in creating safe workplaces

**Table 4**

*Summary Table on Employees' Organizational Commitment*

Indicators	Mean	Verbal Interpretation	Rank
Affective	4.93	Strongly Agree	1
Normative	4.90	Strongly Agree	1.5
Continuance	4.90	Strongly Agree	1.5
<b>OVERALL MEAN</b>	<b>4.91</b>	<b>Strongly Agree</b>	

*Legend: 4.50-5.00=Strongly Agree; 3.50-4.49=Agree; 2.50-3.49=Moderately Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 4 presents the composite mean of 4.91 which indicates that the respondents strongly agreed on the affective, normative, and continuance as dimensions of employees' organizational commitment.

As revealed by the study, the dimension of affective commitment got the highest rank with weighted mean of 4.93 and verbally interpreted as strongly agree.

Affective commitment refers to the attachment of employees in terms of their emotion, recognition, and engagement with their organization. This commitment influences the employee's loyalty, job satisfaction and the performance in organization. In Agri-tourism farm sites, affective commitment is likely the highest form of commitment due to its nature which is the blending of agriculture and tourism. The working environment fosters strong relationships between employees and their organizations. This type of career directly impacted the success of the organization and the experience of the farm visitors. Also, the employees may develop pride and commitment to the mission of the organization especially if they are true in promoting sustainability and engagement with the community. Most of the farm operations foster a family-like atmosphere resulting in emotional bonds between the stakeholders. A good relationship in Agri-tourism farm sites like teamwork and collaboration are key factors needed in Agri-tourism businesses.

Affective commitment is strengthened when employees and stakeholders are actively engaged in meaningful, ethical, and community-oriented initiatives. The employees who are emotionally satisfied with their organization display a higher level of affective commitment. Catapang et al.,(2024) found that employee involvement in CSR activities within agri-tourism farms in the Philippines enhances intrinsic motivation, job satisfaction, and loyalty, fostering a family-like organizational atmosphere. Similarly, Nguyen et al.,(2023) revealed that CSR practices, including ethical leadership and community engagement in Vietnamese tourism firms, increase employees' pride and emotional attachment to their organizations. Chen et al.,(2022) showed that

tourists' emotional bonds with the environment and activities in Taiwanese organic agricultural tourism foster pro-environmental behaviors and personal well-being, highlighting affective commitment's role in sustainability. Tran et al.,(2024) found that social capital and empowerment in volunteer tourism settings strengthen community engagement and collective sustainability commitment through emotional connections. Cortez et al. (2024) emphasized that employee participation in environmental conservation efforts on Philippine agritourism farms enhances their emotional attachment to their organizations. Furthermore, Olivar et al. (2023) demonstrated that job characteristics such as task significance and autonomy positively influence organizational commitment and job satisfaction, promoting affective commitment among food service employees. Campos (2023) indicated that positive working conditions and recognition improve job satisfaction, which enhances employees' dedication to maintaining quality and sustainability standards in agricultural contexts. Song et al. (2021) highlighted that community involvement and cultural preservation efforts in traditional Chinese villages foster emotional bonds and support sustainable tourism through affective commitment. Kowalska et al.,(2024) found that benefits like work-life balance and personal development opportunities are valued by younger employees, boosting affective commitment in agri-tourism industries. Finally, Suhartanto et al.,(2020) concluded that positive visitor experiences and emotional connections in agritourism settings lead to increased tourist loyalty, underscoring affective commitment's role in customer retention and satisfaction.

On the other hand, the dimension normative commitment got the weighted mean of 4.90 and verbally interpreted as strongly agree and the dimension continuance commitment got the weighted mean of 4.90 with verbal interpretation of strongly agree, which both got the lowest rank in the criteria.

Normative commitment refers to the sense of obligation the employees have in their organization. This is true because of the feeling of the employees about their moral responsibility in their organization. Agri-tourism farm sites are providing training for the employees to acquire specialized skills necessary to their organization. Employees who receive training in both agriculture and tourism may likely develop their sense of obligation to give back the favor to their organization. The employees choose to stay because of the feeling that their organization also prioritizes their personal and professional growth. The nature of Agri-tourism farm sites enhances the normative commitment of employees by a strong organizational commitment. If they are being prioritized by their organization, they will feel belonging making them less likely to decide to leave the company. Also, the close relationship among stakeholders creates a strong emotional pressure to stay. Employees may think that leaving the company may hurt the feelings of their coworkers and managers.

The sense of moral obligation to remain with an organization, plays a critical role in employee retention across various sectors. Normative commitment can be lesser when employees see that their jobs are just temporary and seasonal (Kim et al.,2020). Also, if the organization lacks the structure development plans, employees feel less likely to stay. Pulhin (2021) found that resort employees in CALABARZON exhibit moderate normative commitment, influenced by benefit packages, career development opportunities, and a close-knit work environment that fosters a sense of duty to stay. Similarly, Menes et al.,(2020) demonstrated that a positive ethical climate in hotels enhances normative commitment, as employees feel obliged to uphold ethical standards and reciprocate organizational support. Moreover, Magno et al.,(2021) showed that corporate social responsibility (CSR) initiatives during the COVID-19 crisis enhanced employees' sense of moral responsibility, thereby reinforcing their normative commitment. Viernes et al.,(2020) also highlighted that educational programs integrated into Agri-tourism initiatives promote a culture of learning and community support, deepening employees' duty to contribute to organizational goals. In all cases, opportunities for professional growth, ethical leadership, and organizational support cultivate an environment where employees feel morally bound to remain. This sense of obligation is further reinforced when employees perceive the organization as prioritizing their well-being. Consequently, both formal support mechanisms and relational factors jointly enhance normative commitment. These findings underscore the importance of strategic investments in employee development, ethical practices, and community engagement to foster long-term employee loyalty.

Continuance commitment refers to the organizational commitment when employees are less likely to leave

the organization because of the associated risks and costs including the financial aspects and difficulty in finding new opportunities. In fact, employees in Agri-tourism farm sites may feel committed to stay in their organization because of job security and financial stability. In rural areas where most of Agri-tourism farms are located offers limited alternative job opportunities making employees develop their continuance commitment. It is also true that employees are hesitant to leave the organization because of the perceived expenses in finding new opportunities, relocation, and a challenge in adapting to the new working environment and coworkers.

The perceived costs of leaving an organization, plays a pivotal role in employee retention within rural tourism and agribusiness sectors. When employees feel that they are less opportunities outside their current organization, they are discouraged to leave their job. Pulhin et al.,(2020) found that rural tourism employees in the Philippines remain with their organizations due to limited employment alternatives, financial stability, and familiarity with their work environment. Similarly, Galvez et al.,(2021) demonstrated that employees' strong community ties, few job alternatives, and potential social and financial sacrifices increase their likelihood of staying, reflecting high continuance commitment. Mahmoud et al.,(2020) further emphasized that in rural tourism, economic dependence and financial risks associated with leaving deter resignations, even when emotional attachment to the organization is weaker. Widodo et al.,(2021) also noted that in agritourism, financial stability, community bonds, and the risks of seeking new employment, particularly in seasonal and rural contexts, anchor employees to their current jobs. Lim et al.,(2022) identified that financial security, relocation challenges, and a lack of rural job alternatives substantially strengthen continuance commitment in rural SMEs, including agribusinesses. Across these studies, the perceived personal and financial losses tied to leaving act as powerful deterrents to turnover. Economic and social factors interplay to make job transitions less attractive for rural employees. Consequently, organizations in these sectors benefit from employees' reluctance to leave due to the tangible and intangible sacrifices they would incur. This underscores the critical role of continuance commitment in stabilizing rural workforces through community ties and financial security.

Table 5 presents the result of the test for relationship between occupational safety and health program implementation and employees' safety behavior. The overall analysis indicates that there was a statistically significant relationship between the variables of occupational safety and health including training, psychology, organization, and environment and employees' safety behavior in terms of safety compliance. The p- value of 0.037 is less than the alpha value of 0.05 making the correlation significant. This implies that employees adhere to occupational safety and health program implementation if there are provided safety training for employees, safety psychological supports, structure safety organization, and conducive safety environment for them.

Agri-tourism farms where diverse hazards can be found, require a continuous training program for the employees to be equipped in adhering to safety regulations and protocols. Knowledgeable employees can prevent accidents in the workplace due to safety compliance. Also, employees' attitude is very important in ensuring compliance to safety. If the employees are supported by their organization in terms of their mental health, most likely they will follow instructions as required. It is significant that an organization ensures that their employees are satisfied with their job for them to be motivated to support the occupational safety initiatives of the organization. If they are satisfied, most likely the safety culture of the organization will be developed. Organisations like Agri-tourism farm sites are a good avenue in developing a behavior-based safety management system that encompasses the attitude of the employees towards their safety and safety of their visitors. Another thing that should be considered is to define organizational structure and leadership. Similar to any management system implementation, the management should show leadership. They need to ensure that they buy in so that employees will be motivated to participate. Furthermore, good environmental conditions of the workplace enhance compliance of employees to safety. In this sense, it is important that the management is into ensuring provision of safety equipment that can reduce employee's exposure to hazards.

**Table 5**

*Relationship between Occupational Safety and Health Program Implementation and Employees' Safety Behavior*

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Occupational safety & health on employees' safety behavior & organizational commitment among Agri-tourism

	<i>r-value</i>	<i>p-value</i>	Interpretation
TRAINING			
Safety Compliance	0.093	0.149	Not Significant
Safety Participation	-0.003	0.961	Not Significant
OVERALL MEAN	0.058	0.370	Not Significant
PSYCHOLOGY			
Safety Compliance	0.099	0.124	Not Significant
Safety Participation	-0.018	0.784	Not Significant
OVERALL MEAN	0.030	0.643	Not Significant
ORGANIZATION			
Safety Compliance	-0.036	0.574	Not Significant
Safety Participation	-0.045	0.482	Not Significant
OVERALL MEAN	-0.066	0.308	Not Significant
ENVIRONMENT			
Safety Compliance	0.084	0.195	Not Significant
Safety Participation	0.085	0.187	Not Significant
OVERALL MEAN	0.075	0.244	Not Significant
OVERALL IMPLEMENTATION			
Safety Compliance	.134*	0.037	Significant
Safety Participation	0.049	0.449	Not Significant
OVERALL MEAN	0.071	0.271	Not Significant

\*Correlation is significant at the 0.05 level (2-tailed)

The relationship between occupational safety and health program implementation and employees' safety behavior is supported by research. Zohar et al., (2018) argue that organization's compliance to occupational safety and health doesn't always mean having a safety culture. When the organization overemphasizes the safety compliance without the actual implementation and practices. It is also true that when employees are psychologically committed to the organization, safety behaviors are influenced positively. Moreover, leadership and environmental conditions are important in developing safety culture and compliance in hazardous workplaces (Tappura et al., 2016). The study of Uzuntarla (2020) revealed that efforts in increasing safety awareness can lead to significant adherence to safety protocols.

In contrast, the safety behavior of employees is not determined by safety training, organizational structures, and the environment but also by intrinsic motivators, differences of individuals, and perception of organizational justice. Additionally, the study of Wang et al. (2018) emphasized that fairness and justice within an organization are the strong predictor of compliance rather than safety environment and structural safety program. The employees may comply if they feel that they are valued and respected. Moreover, as stated by Probst et al.,(2020), employees' perception and shared safety beliefs significantly impact their behavior rather than individual elements of safety programs. If the safety culture is weak, the employees may have lesser motivation in complying with safety procedures.

On the other hand, there was statistically no significant relationship between the variables of occupational safety and health including training, psychology, organization, and environment and employees' safety behavior in terms of safety participation. The p- value of 0.449 is greater than the alpha value of 0.05 making the correlation not significant. This implies that employees participate in occupational safety and health program implementation regardless of the provided safety training for employees, safety psychological supports, structure safety organization, and safety environment for them.

The result on occupational safety and health not significantly related to safety participation can be analyzed by direct influence of employee's willingness to be involved in safety-related activities. The conduct of training, when perceived by the employees as additional responsibility, employees may not be engaged. They lack motivation especially when they are not receiving any rewards or incentives from what occupational safety and health related activities that they are doing. Also, if the safety is not clearly included in the safety policies and there is unavailability of the resources for the employees to be compliant, most likely result in reduced interest in

supporting the organization in safety initiatives. The management can ensure that the employees are aware that the occupational safety and health programs are for the safety of everyone, not only for compliance. The implementation of the occupational safety and health programs is dependent on the involvement of the management and their leadership style. Additionally, employees who feel that they are just working temporarily in their organization, their compliance cannot be expected from them and there is reduced personal engagement in concerns related to safety.

**Table 6**

*Relationship between Occupational Safety and Health Program Implementation and Organizational Commitment*

	<i>r-value</i>	<i>p-value</i>	Interpretation
<b>TRAINING</b>			
Affective	0.026	0.691	Not Significant
Normative	0.019	0.769	Not Significant
Continuance	0.066	0.305	Not Significant
OVERALL MEAN	0.036	0.575	Not Significant
<b>PSYCHOLOGY</b>			
Affective	0.089	0.167	Not Significant
Normative	-0.043	0.503	Not Significant
Continuance	-0.003	0.969	Not Significant
OVERALL MEAN	-0.002	0.979	Not Significant
<b>ORGANIZATION</b>			
Affective	0.105	0.101	Not Significant
Normative	-.128*	0.046	Significant
Continuance	-0.026	0.683	Not Significant
OVERALL MEAN	-0.028	0.660	Not Significant
<b>ENVIRONMENT</b>			
Affective	0.104	0.106	Not Significant
Normative	-0.118	0.065	Not Significant
Continuance	-0.087	0.176	Not Significant
OVERALL MEAN	-0.072	0.265	Not Significant
<b>OVERALL IMPLEMENTATION</b>			
Affective	.204**	0.001	Significant
Normative	-0.118	0.065	Not Significant
Continuance	-0.037	0.569	Not Significant
OVERALL MEAN	-0.009	0.884	Not Significant

\*Correlation is significant at the 0.05 level (2-tailed)

Table 6 presents the result of the test for relationship between occupational safety and health program implementation and organizational commitment. The overall analysis indicates that there was a statistically significant relationship between the variables of occupational safety and health including training, psychology, organization, and environment and organizational commitment in terms of affective commitment. The p-value of 0.001 is less than the alpha value of 0.05 making the correlation significant. This implies that employees adhere to occupational safety and health program implementation if they are emotionally attached to their organization.

Occupational safety and health involve conducting training for employees to be competent and build confidence to their roles in Agri-tourism farms. When the organization shows that they are committed to providing training, the employees will perceive this as commitment to their well-being as well. The provision of training signifies not only the employee's safety but also the safety of the visitors in the farms. The emotional connections are developed if the organizations care about the employees. Also, Agri-tourism farms consist of small teams, collaboration and strong emotional relationships are highly developed. When there is a good relationship between employees and the management, psychological safety will be ensured. The implementation of occupational safety and health is enhanced when there is trust and open communication in such a way that employees can raise their concern without any fear to the management in positive and constructive ways. The



management visibility and leadership in the actual implementation of occupational safety and health enhances the commitment of the employees. The management commitment can be deduced from their attendance to training and meeting, provision of resources for the safety protocols to be complied by the employees and implementing rewarding systems for the staff to be motivated. Also, the safety workplace influences the engagement of the employees to participate in occupational safety and health implementation due to the sense of emotional attachment and belonging they have with the organization.

Several studies consistently demonstrate that multiple organizational and psychosocial factors positively influence safety compliance in agricultural enterprises. Agyekum et al.,(2020) found that safety training, organizational commitment, and work environment all had statistically significant positive relationships with safety compliance behavior. In contrast, the study argues that the support and encouragement of leaders which foster a supportive working environment result in emotional attachment. Also, Dollard et al.,(2019) found that occupational safety and health programs alone may not be enough in instilling emotional attachment unless combined with support from co-employees, job security, and work-life balance. Lingard et al. (2018) pointed out that overemphasis on the occupational safety and health program may create a mindset where focus is just for compliance and not genuine organizational commitment. The employees may adhere to safety programs out of obligation rather than commitment. Also, as revealed by the research of Simo et al. (2020), perception about the justice and fairness of the organization is significantly influencing the affective commitment than the safety program alone. The study found that the employees will feel emotionally attached if they feel fair treatment.

The study revealed that there was a statistically significant relationship between the variables of occupational safety and health in terms of organization and organizational commitment in terms of normative. The p- value of 0.046 is less than the alpha value of 0.05 making the correlation significant. This implies that employees adhere to occupational safety and health program implementation if there is emotional attachment to their organization.

Normative commitment is a sense of obligation to stay in the organization by the employees. When Agri-tourism farms promote employees well-being, employees feel indebted to the organization. The management effort in prioritizing the safety of the employees in terms of conducting training and creating a culture of safety can develop the employees' normative commitment. Also, the implementation of consistent and strong occupational safety and health influences the employees to stay because they believe that they are obligated to give back to their organization.

On the other hand, there was statistically no significant relationship between the variables of occupational safety and health including training, psychology, organization, and environment and organizational commitment in terms of normative (p-value=0.065) and continuance (p-value=0.569). This implies that employees are committed affectively to occupational safety and health program implementation.

Normative commitment is about employees' sense of obligation especially when they feel that the organization has invested in them. Occupational safety and health program implementation is not only the way to gain commitment of the staff. Sometimes it is perceived by the employees as just a minimum requirement. The existence of the safety policies and procedures may not be strong enough to trigger moral obligation to create normative commitment. The employees see the importance of having occupational safety and health programs for them and for their visitors, but it is not the exceptional action of the organization.

The result about statistically no significant relationship between occupational safety and health program implementation and continuance improvement can be described as influential to safety compliance but not more on economic-motivated gains for employees. Continuance commitment refers to attachment of the employees to the organization based on perceived costs of leaving. This commitment is not influenced by safety training, psychological support to the employees by the organization, and even strong occupational safety and health programs. The implementation of occupational safety and health may not be perceived as beneficial for them personally but just as fundamental expectations in any workplace. It can enhance the employees' workplace

condition but is not realized to be directly contributing to the economic and practical reasons why employees are choosing to stay in their organization.

**Strategic Plan for Improving the Occupational Safety and Health, Employees’ Safety Behavior and Organizational Commitment in Agri-Tourism Farm Sites**

Table 7 presents the suggested strategic plan for improving the occupational safety and health, employees’ safety behavior and organizational commitment in Agri-Tourism farm sites. The table includes specific recommendation per key results areas as well as key performance indicators, targets, timeline, and responsible parties.

**Table 7**  
*Strategic Plan for Improving the Occupational Safety and Health, Employees’ Safety Behavior, and Organizational Commitment in Agri-Tourism Farm Sites*

Key Result Area/ Objectives	Strategies/ Activities/ Program	Key Performance Indicators	Target	Timeline	Persons Responsible
<b>Strategic Goal 1: Enhance Occupational Safety and Health Program Implementation</b>					
Safety Training  Objective 1: Designate a Safety Officer/s for Agri-Tourism Farm Site	Determine the suitable candidate/s for designated Safety Officers role  Enroll the employee/s to DOLE-accredited Occupational Safety and Health for Safety Officers training provider  Establish and coordinate the training schedule that will minimize the disruption of the agriculture and/or hospitality operation	Number of certified and designated Safety Officer/s per Agri-tourism Farm Site	At least one designated and certified Safety Officer per Agri-Tourism farm sites by the end of the second quarter.	<b>Q1</b>	Farm Managers/Owner, HR Representatives, Department of Tourism-Regional Office
Objective 2: Enhance the competencies of the designated Safety Officer/s through localized occupational safety and health training modules specific for Agri-tourism farm sites	Develop training modules focusing on farm-specific contents like Agri-tourism hazards, animal safety, farm safety, equipment safety, and visitor safety  Conduct onsite and hands-on training workshops in identifying, assessing, and controlling farm-specific risks	Occupational Safety and Health training for Safety Officer/s completion rate	100% of designated Safety Officers completed the specialized training modules by the first 6 months	<b>Q2</b>	Farm Managers/Owner, External OSH Consultant/Training Providers, DOLE Representatives
Objective 3: Develop a monthly occupational safety and health meeting and continuous learning opportunities that foster a strong safety culture in Agri-tourism farms	Organize a monthly safety meeting for the designated Safety Officers to discuss safety matters like new policies, challenges encountered in the implementation, updates, and learnings obtained from the challenges  Provide access to free online safety resources for Safety Officers to engage in continuous learning  Promote team-based learning for Safety Officers by sharing knowledge and strategies with each other and have strong support system	Safety Officers monthly attendance in safety meetings	100% of designated Safety Officers participated in monthly safety discussion	<b>Q2</b>	Farm Managers/Owner, External OSH Consultant/Training Providers, DOLE Representatives, Safety Officers
Safety Psychology  Objective 4: Encourage Agri-tourism farm employee involvement in safety decision-making processes	Establish and conduct regular quarterly safety forums where employees are encouraged to discuss concerns, suggestions, and improvements related to safety  Create physical and digital suggestions boxes where employees are encouraged to share and submit their ideas for improving safety protocols    Organize a focus group well represented by the different departments to review safety policies and issues, and making them active in	Employees attendance and involvement in safety decision-making meeting and feedback sessions	100% of employees’ attendance in quarterly safety decision-making meeting	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers, HR Officers

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participating to decision-making					
Safety Psychology	Conduct a workshop about safety leadership including Hazard Identification, Risk Assessment and Control (HIRAC)	Number of employees trained in safety leadership and decision-making	All employees trained in safety leadership and decision-making by the end of the second quarter within the first year of implementation.	<b>Q2</b>	Farm Managers/Owner, Team Leaders, Safety Officers, HR Officers
Objective 5: Empower Agri-tourism farm employees through the conduct of training about safety leadership and decision-making	Develop a peer safety mentorship program or body-body system where experienced employees paired with new hires or less experienced employees Conduct simulation or role-playing exercises to stimulate real safety scenario for the employees to enhance their skills in decision-making				
Safety Psychology	Share safety meeting minutes and outcomes to employees by posting the key points and decision made on a shared platform or bulletin board	Employees satisfaction with safety decision-making transparency measured through the conduct of quarterly surveys	85% employee's satisfaction scores from the survey	<b>Q4</b>	Farm Managers/Owner, Team Leaders, Safety Officers, HR Officers
Objective 6: Increase visibility in safety decision-making to build employees trust and engagement in Agri-tourism farms	Conduct a monthly feedback and update sessions for the employees to be updated on how their feedbacks and suggestions are being utilized in the safety planning Encourage open-door policy for the employees to discuss any safety-related concerns directly to their team leaders or safety committee				
Safety Psychology	Select employees to act as "Safety Ambassador" who lead specific safety initiatives and engage other employees in safety discussions	Number of employees engaged and participative in employee-led safety discussion and training.	All employees attended and participated in the safety discussion and training	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers, HR Officers
Objective 7: Foster a collaborative environment that values the safety contributions of the Agri-tourism farm employees	Encourage employee-led safety training sessions where they can share their insights and discussion about best safety practices Celebrate and recognize employees with significant safety contribution in monthly safety meetings				
Safety Organization	Identify and select representatives from different department to be part of the OSH committee to ensure broad representation including the farm owners, and representatives from different department	Establishment of dedicated occupational safety and health committee within the organization	Officially designated Safety and Health Committee with their clear roles and responsibilities within the first quarter of implementation	<b>Q1</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officers
Objective 8: Establish a dedicated occupational safety and health committee to enhance program implementation and monitoring in Agri-tourism farms	Conduct introductory meeting to set the program objectives, and outline the members' roles and responsibilities				
Safety Organization	Draft the roles and responsibilities of the OSH committee members including their specific duties in conducting risk assessments, promoting safety policies, and incident investigations.	Completion and adoption of OSH committee roles and responsibilities framework and job description	Ensure that the members of the OSH committee understand and are trained in their specific roles and responsibilities within the first month of formation.	<b>Q2</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officers
Objective 9: Define the roles and responsibilities of the occupational safety and health committee of Agri-tourism farms	Provide initial training for OSH committee members to equip with the necessary knowledge and skills on standards, policies, responsibilities, investigations, and reporting system  Establish a regular meeting to ensure ongoing engagement and effectiveness of the committee				
Safety Organization	Define safety goals which is SMART	Approval and	100% compliance	<b>Q2</b>	Farm

Objective 10: Establish and communicate clear goals and protocols for the occupational safety and health committee of Agri-Tourism farms	including proactive and reactive measures and indicators collaboratively Develop engaging materials to communicate safety protocols and procedures and ensure availability in common areas where employees can be utilized Conduct informational sessions and distribute materials to ensure that Agritourism farm employees understand the goals and their role in safety	dissemination of clear goals and protocols to all farm employees	score in safety audit and inspection conducted internally by Agri-tourism farm managers and leaders by the end of second quarter.		Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officers
Safety Organization Objective 11: Monitor and review the effectiveness of the occupational safety and health committee of Agri-Tourism farms	Conduct a committee self-assessment about their goals, accomplishments, and areas for improvement twice a year or as necessary Gather anonymous employee feedback to assess their satisfaction and feedback for committee continuous improvements Conduct an annual management review and goal-setting session to set new targets and adjust the focus based on the past employees' feedback	Evaluation of the effectiveness of the occupational safety and health committee through reporting on meeting attendance, resolve safety issues, and employees' satisfaction	85% satisfaction rate with the effectiveness of the OSH committee among employees annually	<b>Q2-4</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officers
Safety Environment Objective 12: Ensure visitors are informed of potential hazards upon registration in Agri-Tourism farms	Develop hazard information materials such as posters, brochures, and digital displays that outline the potential hazards associated in Agri-Tourism farm sites Train the registration coordinator and receptionist on how to communicate hazard information effectively to farm visitors Install safety signage near hazard prone areas and reinforcing the information provided during registration throughout the stay of the visitors in the farm	Number of visitors received safety information upon registration	All visitors are informed about the potential hazards like river crossings, animal feeding, slippery pathways within the first month of implementation	<b>Q1</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, Registration Coordinator/ Receptionists
Safety Environment Objective 13: Develop and implement a standardized visitor safety orientation procedure	Develop a checklist for registration coordinator and receptionists to ensure that all potential and relevant hazards are covered during the orientation for visitors Implement a feedback system collecting feedback from visitors on the orientation process to identify focal points for improvement Regularly review checklist and update based on new hazards identified or feedback received from visitors	Development and implementation of a standardized orientation procedures through registration coordinator and receptionist's adherence to the safety checklist briefing	Attendance for safety briefing conducted by the responsible employees every batch of visitors	<b>Q1</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, Registration Coordinator/ Receptionists
Safety Environment Objective 14: Monitor and evaluate the effectiveness of visitor hazard communication	Document data on any visitor-related incidents to the specific identified hazards to assess the effectiveness of the visitor hazard communication Analyze visitor feedback to evaluate data about their hazards understanding and awareness after the safety briefing upon registration  Adjust and refine the communication strategies based on the incident data and feedback from the visitors	Reduction in visitor-related safety incidents involving hazards in Agri-tourism farms	25% reduction in visitor-related incidents within the first year of program implementation	<b>Q2</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair
Safety Environment	Establish a safety champion program	Participation rate	100%	<b>Q3</b>	Farm

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Objective 15: Empower employees to take active roles in safety discussion	with designated employees to lead discussions, encourage participation, and serve as points of contact for safety concerns Conduct training sessions to develop employees' communication skills for discussing safety-related topics confidently and effectively Establish recognition and rewards program where employees are recognized for their significant contribution to safety discussions	of employees in safety discussions and toolbox talks	participation of employees in safety discussions and toolbox talks by the end of the first year of program implementation		Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair and Members, HR Officers
Safety Environment	Conduct feedback survey after each monthly meeting to measure the effectiveness of safety discussion and gather suggestions for improvement Analyze the feedback result quarterly to identify patterns and focal points for improvement regarding safety communication Implement continuous improvement measures by refining discussion frameworks and communication practices to ensure effective and engaging discussions	Employee satisfaction with safety communication determined through post-discussion surveys	85% or higher satisfaction rate of employees with safety communication by the end of the first year of program implementation	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair and Members, HR Officers
Objective 16: Evaluate and improve the effectiveness of safety discussion regularly	Conduct unannounced safety inspection in different workplaces weekly to monitor compliance to safety procedures Establish immediate feedback mechanism on observes unsafe acts or unsafe conditions, and remind employees about the SOPs when there are deviations Implement a monitoring system of employees' compliance monthly and discuss scores in regular team meetings	Number of safety inspection monthly and percentage response based on the compliance assessment to safety procedures	Conduct compliance inspection on a weekly basis or once a week; provide 100% feedback/action based on the result of the inspection to employees involved by the end of each month	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair
Safety Compliance	Develop a safety recognition program for compliance to recognize the employees who consistently complying with safety procedures, highlighting "Safety Star" employees each quarter Implement peer recognition initiatives where employees are encouraged to nominate employees who demonstrate strong safety practices Create a visual recognition boards where awarded employees are posted in a common area to promote safety compliance culture	Number of employees recognized for consistent safety compliance	All employees are recognized for consistent demonstration of compliance to safety procedures on a quarterly basis	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officer
Objective 18: Increase employees' awareness on the importance of safety compliance through recognition programs	Assess employees' compliance to safety procedures and overall effectiveness of the existing safety training program Update the existing training program materials and standard operating procedures (SOPs) to address the focal points for improvement identified during the safety audits and inspection  Provide regular compliance report to the management or owners of Agri-tourism farms to align on future initiatives	Frequency of compliance audit and inspection reports	Two (2) times a year conduct of safety compliance assessment	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officer
Safety Compliance	Assess employees' compliance to safety procedures and overall effectiveness of the existing safety training program Update the existing training program materials and standard operating procedures (SOPs) to address the focal points for improvement identified during the safety audits and inspection  Provide regular compliance report to the management or owners of Agri-tourism farms to align on future initiatives	Frequency of compliance audit and inspection reports	Two (2) times a year conduct of safety compliance assessment	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officer
Objective 19: Assess and refine safety compliance effort through continuous evaluation	Assess employees' compliance to safety procedures and overall effectiveness of the existing safety training program Update the existing training program materials and standard operating procedures (SOPs) to address the focal points for improvement identified during the safety audits and inspection  Provide regular compliance report to the management or owners of Agri-tourism farms to align on future initiatives	Frequency of compliance audit and inspection reports	Two (2) times a year conduct of safety compliance assessment	<b>Q3</b>	Farm Managers/Owner, Team Leaders, Safety Officers/Safety Committee Chair, HR Officer

Safety Participation	Conduct toolbox talks at shift start or after breaks to maximize the attendance of employees from different shifts	Number of employees attended the scheduled safety meetings and toolbox talks	All employees attended the safety meetings by the end of the first year of program implementation	<b>Q2</b>	Team Leaders, Safety Officers/Safety Committee Chair
Objective 20: Increase the accessibility and interest of employees to safety meetings	Offer multiple meeting sessions to accommodate different schedules and allow attendance of all farm employees Distribute brief and clear summary of the key points covered during safety meetings and toolbox talks				
Safety Participation	Train team leaders and supervisors on leading engaging and inclusive safety discussions	Understanding and engagement rating reported by employees after safety discussion	90% employee satisfaction rate with the clarity and relevance of safety meetings and toolbox talks by the end of the year	<b>Q2</b>	Team Leaders, Safety Officers/Safety Committee Chair, HR Officer
Objective 21: Improve the employees' understanding of safety discussion by conducting a training on effective communication and engagement techniques	Encourage open-ended discussion to stimulate discussions and make employees more comfortable sharing their insights Conduct post-session feedback survey to measure employees' understanding and improve future discussions				
<b>Strategic Goal 3: Enhance Employees Organizational Commitment</b>					
Affective Commitment	Create and implement a "Helping Hands" initiative where employees are willing volunteer to help and assist other employees especially during peak seasons.	Number of employees encouraged reporting high levels of collaboration and support among coworkers	All employees feel a strong support and collaboration with coworkers by the end of the first year of implementation, measured by engagement surveys	<b>Q4</b>	Farm Managers/Owner, Team Leaders, HR Officers
Objective 22: Encourage a collaborative and supportive workplace	Facilitate monthly team huddles where employees are willingly shares their own experience and challenges to come up with the solutions				
Affective Commitment	Introduce a "Peer-to-Peer Recognition" Program where employees are encouraged to nominate other employees who are willingly helping others in the workplace	Number of recognitions given to employees for teamwork and cooperation	At least 50 recognitions received by the team by the end of the first year of program implementation	<b>Q4</b>	Farm Managers/Owner, Team Leaders, HR Officers
Objective 23: Recognize and reward collaborative behaviors	Provide incentives for teamwork with simple rewards like gifts, farm merchandise, or extra time off to recognize and encourage teamwork in the workplace				
Affective Commitment	Conduct a quarterly "Effective Teamwork" workshop to all employees that include topics on communication, problem-solving, and collaborative skills	Number of employees trained in teamwork and collaboration skills that can be monitored through workshop attendance and number of sessions conducted	All employees completed the specialized workshop to enhance skills in teamwork and collaboration by the end of the first year of program implementation	<b>Q3</b>	Farm Managers/Owner, Team Leaders, HR Officers
Objective 24: Develop skills of employees for effective team collaboration in the workplace	Train employees in conflict management to enhance positive and supportive interactions among employees Encourage cross-training opportunities among employees in agriculture operation and hospitality section to learn various roles that will likely develop empathy, respect, and willingness to help others				
Affective Commitment	Schedule and organize regular team-building activities to foster camaraderie and employees' support	Number of employees participating in farm-organized	All employees participated at least one team-building	<b>Q3</b>	Farm Managers/Owner, Team Leaders, HR
Objective 25:	Encourage employees to engage with				

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Conduct team-building activities to strengthen emotional bond among employees	community service to strengthen commitment to the community and the farm organization	team-building activity within the first year of program implementation	activity within the first year of program implementation		Officers
Normative Commitment Objective 26: Enforce a sense of loyalty and dedication to the mission of the organization	Facilitate review of the organization's mission and emphasize mission-driven orientation to employees highlighting their roles in support to the overall mission Create and implement a "Mission Moments" during staff meeting dedicating a time for them to share success stories aligned with the organization's mission Reinforce the organization's mission by making the core values and organization's mission statement visible to all employees	Number of employees expressing their loyalty to the organization that can be measured through the conduct of annual survey	All employees response positively expressing their loyalty measured through annual survey.	<b>Q3</b>	Farm Managers/Owner, Team Leaders, HR Officers
Normative Commitment Objective 27: Develop a culture of respect and loyalty among employees	Establish a "Loyalty Circle" Program where employees create a small-group discussion about their experiences and insights to reinforce loyalty Develop a recognition program for long service employees who consistently demonstrate loyalty	Number of employees participating in loyalty-building activities	All employees participated at least one loyalty-building activity within the first year of program implementation	<b>Q3</b>	Farm Managers/Owner, Team Leaders, HR Officers
Normative Commitment Objective 28: Establish training and development programs for employees highlighting the value of loyalty	Conduct training about commitment and loyalty including personal and professional growth of the employees Develop and discuss to employees an individual career progression paths that encourage them to stay committed Provide incentives for skill certification or training obtained by employees	Number of employees completed the loyalty-building program through the training and development programs	All employees completed the loyalty-building program through the training and development programs	<b>Q3</b>	Farm Managers/Owner, Team Leaders, HR Officers
Continuance Commitment Objective 29: Improve awareness of employees regarding job stability and career opportunities within the organization	Communicate the updates regarding job stability and business performance to reinforce job security Develop a clear career pathway for all the employees ensuring them that long-term career can be sought within the organization Organize one-on-one session with employees to discuss career growth and plans	Number of employees who perceived that their current organization could provide job stability and opportunities	All employees response positively about their current organization's job stability and career opportunities	<b>Q4</b>	Farm Managers/Owner, Team Leaders, HR Officers
Continuance Commitment Objective 30: Emphasize the organizational benefits and the advantages that the employees may have if they stay in the organization	Review and enhance the competitiveness of the current benefits package and comparing it to similar roles in other organizations within the area Increase employees' awareness on the advantage of working in Agri-tourism farm sites	Percent increase on employees who are satisfied with the current benefits they are gaining from their organization	25% increase in the satisfied employees with the organizational benefits and career development by the end of the first year	<b>Q4</b>	Farm Managers/Owner, Team Leaders, HR Officers
Continuance Commitment Objective 31:	Offer and conduct specialized training program specific to Agri-tourism farm sites like sustainable farming, animal care or visitor interactions to develop	Number of employees who participate in specialized	All employees completed at least one specialized training	<b>Q4</b>	Farm Managers/Owner, Team Leaders, HR

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Develop a role-specific expertise and skills among employees of Agri-Tourism farm sites	expertise and enhance engagement Encourage the employees to undergo cross training to learn different roles in other departments like agriculture and hospitality sections Implement skills certification program to ensure that employees feel valued for their contribution to the organization	training to develop skills specific to their roles in Agri-tourism industry	conducted by the organization within the year	Officers
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#### 4. Conclusions and recommendations

Based on the findings of the study, the following conclusions are drawn: The employees in Agri-tourism farm sites are well-equipped with the knowledge in terms of identifying and mitigating hazards in the workplace and can mitigate it through consistent provision of training which enhances their compliance to safety regulations. The Agri-Tourism farm sites have a developing safe workplace as they maintain the availability of first aid kits and personal protective equipment and keep the employees guided in their clearly defined roles and responsibilities. The employees in Agri-Tourism farm sites demonstrate a safety proactive approach through attendance to safety orientations and training to gain knowledge required by their organization and their support for one another that lead to organizational safety efforts and teamwork. The employees in Agri-Tourism farm sites reflect high organizational commitment shown by the strong sense of belongingness that they feel towards their organization and their loyalty driven by the benefits that they get from their organization such as training, professional development, and career growth opportunities. The financial stability and job security offered by the organization has significantly enhanced the organizational commitment of the employees Occupational safety and health and employees' behavior in terms of compliance are significantly related as well as occupational safety and health programs and organizational commitment. This implies that the more the employees tend to comply with health and safety practices, and the more they tend to be more committed and loyal to their organization, the better the organizational safety and health program in the Agri-Tourism farm sites. A sustainable strategic plan for ensuring safety and fostering committed human resources in Agri-Tourism farm sites plan has been developed and proposed. The plan aims to enhance both the well-being of the employees and organizational commitment by identifying strategies and programs along occupational safety and health programs, safety training, investment of the organization to employees, behavioral-based safety programs, and continuous monitoring of safety compliance.

Based on the findings of the study, the following recommendations are formulated: Agri-Tourism Farm Sites are encouraged to develop and implement policies that promote equal employment opportunities for both men and women. These may include fair recruitment processes, gender-sensitive training, and equitable task assignments. In addition, they may establish employee recognition and reward systems to acknowledge outstanding organizational commitment through incentives, awards, or formal acknowledgments. To ensure a safe and inclusive work environment, farm sites may adopt occupational safety and health (OSH) measures that address gender-specific needs, including the use of gender-sensitive protocols and personal protective equipment (PPE). Emphasis may also be placed on implementing behavior-based safety programs that integrate both technical and behavioral aspects of OSH. Furthermore, establishing open lines of communication for reporting unsafe conditions where management is approachable and responsive can significantly enhance the site's safety culture. The Provincial Labor and Employment Office, in coordination with the Provincial Tourism Office, may promote gender-inclusive policies by introducing gender guidelines, addressing legal gaps, and organizing awareness initiatives. They may also provide guidance and resources for recognizing and appreciating employee contributions related to safety. In partnership with safety training providers, they could diversify training programs to include gender-specific risks and provide content suitable for less-experienced workers. Moreover, they may implement standard procedures for reporting hazards, conduct routine safety inspections, and create reward systems to reinforce OSH compliance. The Regional Labor and Employment Office may take the lead in conducting regular compliance monitoring and safety audits to increase the visibility and consistency of OSH



practices across farm sites. Additionally, they may help establish certification programs to recognize Agri-Tourism establishments with exemplary safety records and partner with these sites to create standardized safety reporting systems. Safety Training Providers may offer customized training tailored to the specific hazards present in Agri-Tourism environments. They may also design training modules that incorporate site-specific reporting procedures and work with tourism and labor agencies to deliver inclusive, gender-sensitive safety instruction suited for workers of all experience levels. Collaboration to promote behavior-based safety approaches may also be considered. The Academe may support OSH awareness by embedding occupational safety and health principles within the curricula of agriculture and hospitality-related academic programs, thereby preparing future industry professionals with a strong foundation in workplace safety. Future Researchers may replicate this study by exploring additional variables such as the long-term impact of OSH programs on employee commitment and well-being. They may also examine the effectiveness of peer vigilance programs in reducing workplace accidents, the influence of OSH initiatives on employee attitudes and behaviors, and how reporting practices relate to safety outcomes. Other potential areas of study include identifying factors that contribute to employee loyalty and organizational commitment in Agri-Tourism settings.

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# Airport infrastructure and passenger satisfaction at Ninoy Aquino International Airport: Basis for action plan

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## Abstract

This study investigates the relationship between airport infrastructure quality and passenger satisfaction at the Ninoy Aquino International Airport (NAIA), the Philippines' central international arrival facility and a critical hub for Southeast Asian travel. Recognizing the increasing global demand for service excellence in air transportation, the study aims to describe passenger profiles in terms of sex, age group, marital status, educational attainment, and frequency of travel; assess airport infrastructure across terminal facilities, accessibility, safety and security, signage and wayfinding, and amenities; and evaluate satisfaction in queue management, comfort during delays, passenger support systems, sustainability initiatives, and staff service efficiency. Utilizing a descriptive-correlational research design, validated survey questionnaires were administered to 385 respondents proportionally distributed across Terminals 1, 2, and 3. Statistical tools such as One-Way ANOVA, independent t-tests, and Pearson r correlation were employed to analyze the data. Findings indicated that demographic variables significantly influence satisfaction levels, with younger travelers favoring speed and automation, while older and married passengers prioritize comfort and support services. A very strong positive correlation between airport infrastructure quality and overall passenger satisfaction was established. Based on these findings, a strategic action plan was proposed targeting improvements in digital connectivity, dining diversity, family amenities, wayfinding systems, multilingual support, and security transparency through biometric innovations. This study contributes to the growing body of knowledge on airport management and hospitality infrastructure by offering a replicable model for passenger-centered service delivery. Its implications extend to policy-making for more sustainable, inclusive, and traveler-centric airport operations, not only for NAIA but also for other emerging airports in Southeast Asia.

**Keywords:** airport infrastructure, passenger satisfaction, service quality, terminal facilities, stakeholder planning, NAIA

## **Airport infrastructure and passenger satisfaction at Ninoy Aquino International Airport: Basis for action plan**

### **1. Introduction**

The global aviation industry has significantly advanced in recent years, driven by increasing air traffic, heightened service expectations, and the accelerated adoption of smart technologies. Major international airports such as Singapore Changi, Incheon, and Heathrow have embraced AI-powered automation, contactless services, and data-driven operational strategies to improve efficiency and passenger experience. In Southeast Asia, emerging economies like Thailand, Malaysia, and Vietnam have prioritized infrastructure modernization to enhance regional connectivity and competitiveness. Within the Philippine context, however, airports continue to face substantial challenges, particularly at Ninoy Aquino International Airport (NAIA)—the country’s principal international gateway. Despite its strategic location and volume of passenger traffic, NAIA is consistently plagued by outdated infrastructure, inefficient terminal operations, and limited technology adoption. These issues are especially pronounced in Terminals 1, 2, and 3, which, although serving distinct airline profiles, all exhibit performance gaps that directly affect the travel experience of passengers passing through Metro Manila.

Current local studies have paid limited attention to the comprehensive assessment of airport infrastructure and its impact on passenger satisfaction. While fragmented research has been conducted on topics such as security screening, airline service, and passenger flow, there remains a gap in literature specifically exploring the infrastructure-performance-satisfaction relationship within NAIA’s multi-terminal setup. Much of the existing empirical data focuses on isolated variables without considering the broader infrastructural ecosystem and its influence on passenger experience. This study is a preliminary inquiry into that overlooked intersection. It aims to systematically evaluate the state of NAIA Terminals 1, 2, and 3 by identifying infrastructure deficiencies and assessing their direct implications on passenger satisfaction. This gap in empirical understanding highlights the urgency of conducting a detailed investigation, which may serve as a springboard for policy reform and long-term development planning in Philippine airport infrastructure.

Three main constructs serve as the backbone of this study: airport infrastructure, passenger satisfaction, and strategic improvement. Airport infrastructure is defined in terms of physical elements such as terminal layout, accessibility, safety protocols, signage, and amenities. Passenger satisfaction refers to the overall assessment made by travelers based on their expectations and actual experience within the airport environment. Strategic improvement pertains to the formulation of data-informed interventions that can optimize airport performance. These three variables are interrelated: infrastructure quality influences the level of satisfaction passengers feel, and both variables shape the foundation for determining appropriate modernization efforts and service upgrades.

To underpin this study, three theoretical models are utilized. The Expectancy-Disconfirmation Theory explains how passenger satisfaction emerges when actual airport experiences either confirm or fall short of expectations formed prior to travel. This theory provides the basis for assessing perceived quality in areas such as queue efficiency, communication, and comfort during disruptions. The Infrastructure Quality Theory emphasizes the importance of facility design, spatial layout, and accessibility in determining service performance and overall user satisfaction. It supports the evaluation of NAIA’s physical infrastructure components—including terminal facilities, safety protocols, and signage systems. Finally, the Airport Innovation Theory highlights how technological integration, such as digital check-in systems and AI-powered wayfinding, enhances operational efficiency and improves the passenger journey. These theories collectively justify the study’s core variables and guide the design of the research instrument.

Recent empirical studies also affirm the importance of each sub-variable in this research. Bakır et al. (2022) found that terminal comfort, availability of seating, and restroom quality are critical in forming positive travel

impressions. Meanwhile, Tsai et. al.,(2011) examined amenities and services, concluding that retail, dining, and waiting areas have a strong effect on the perceived value of the airport experience. These findings validate the use of variables such as terminal facilities, accessibility, safety, signage, and services as reliable indicators for assessing both infrastructure performance and satisfaction outcomes.

The core intention of this study is to examine the existing infrastructure in NAIA Terminals 1, 2, and 3, identify key performance gaps, and determine how this influence overall passenger satisfaction. The research will utilize quantitative data to assess infrastructure across multiple dimensions and correlate it with travelers' reported satisfaction levels. In doing so, the study aims to offer a grounded analysis that can support NAIA's modernization initiatives and address critical service inefficiencies through practical, evidence-based recommendations.

This research is intended to benefit a diverse range of stakeholders. For airport administrators and the Manila International Airport Authority (MIAA), the findings may help refine operational priorities and infrastructure investments. Government bodies such as the Civil Aviation Authority of the Philippines (CAAP) can use the results to enhance national aviation policy. Airlines and service providers may gain insights into traveler needs, leading to improvements in ground services. Passengers—both local and international—will benefit from improvements in comfort, safety, and efficiency. Academic researchers will have access to localized data on the infrastructure-satisfaction nexus within a developing country's aviation context.

The primary output of this study is a strategic action plan designed to address identified gaps in airport infrastructure and service performance. Beyond offering immediate solutions, the study contributes to the larger body of tourism and hospitality knowledge by providing a model for evaluating infrastructure in other developing-country airports. It reinforces the importance of infrastructure investment as a pathway to improving customer satisfaction, airport competitiveness, and national connectivity in the global air transport system.

This study is delimited to Terminals 1, 2, and 3 of NAIA. Terminal 4 is excluded not only due to its distinct operational design and limited capacity—which differ significantly from the other three terminals—but also because it ceased operations during the last quarter of the previous year and is currently undergoing major renovations. The research likewise relies on self-reported perceptions from surveyed passengers, which may be influenced by subjective biases or situational travel experiences. Nonetheless, the data collection was designed to ensure demographic diversity and statistical reliability, allowing the findings to reflect a valid cross-section of current passenger perspectives. While the results are not intended to be generalizable to all Philippine airports, they offer critical insight into the state of the country's largest and busiest aviation hub. Although the study did not formally adopt a service quality framework as its primary theoretical base, its passenger satisfaction indicators were conceptually aligned with the SERVQUAL model. This model outlines five core service quality dimensions—tangibles, reliability, responsiveness, assurance, and empathy—which have been widely applied in both tourism and transportation research. These dimensions served as guiding principles in the design of the research instrument, ensuring that the measurement of satisfaction adhered to established global standards. This methodological positioning reinforces theoretical coherence while accommodating the operational complexities of airport service environments.

**Objectives of the Study** - The research investigates the relationship between airport infrastructure and passenger satisfaction at Ninoy Aquino International Airport (NAIA) and propose a strategic action plan for improvement. In particular, it (1) assesses airport infrastructure in terms of terminal facilities, accessibility, safety and security, signage and way-finding, and amenities and services; and (2) evaluates passenger satisfaction concerning queue management efficiency, passenger comfort during delays and cancellation, passenger support systems, sustainability initiatives, and staff communication and service efficiency. (3) examines the significant relationship between airport infrastructure and overall passenger satisfaction. Lastly, it (4) proposes an action plan based on the result of the study.

## 2. Methods

**Research Design** - This study employs a descriptive-correlational research design, which systematically examines relationships between variables while providing a detailed assessment of NAIA's airport infrastructure and passenger satisfaction. The descriptive component evaluates the current state of NAIA's facilities, accessibility, safety and security, signage, and amenities, while the correlational aspect determines the statistical relationship between infrastructure quality and passenger satisfaction. This design is widely used in aviation and service quality research, ensuring a quantitative, empirical approach to assessing passenger perceptions and experiences. This assesses five key airport infrastructure factors: terminal facilities, accessibility, safety and security, signage and wayfinding, and amenities and services. Terminal facilities are evaluated based on cleanliness, seating availability, restroom adequacy, and overall passenger comfort. Accessibility is assessed in terms of ramps, elevators, inclusive layouts, and ease of movement for passengers with disabilities. Safety and security are measured by analyzing the efficiency of screening processes, professionalism of security personnel, and overall emergency preparedness. Signage and wayfinding are reviewed for clarity, language inclusivity, and navigational effectiveness, while amenities and services are examined based on the quality and variety of food, retail, lounges, and transport connectivity. This investigates whether the quality of NAIA's infrastructure directly influences passenger satisfaction. The study examines whether infrastructure deficiencies contribute to lower satisfaction ratings and identifies key areas for strategic intervention. By utilizing a descriptive-correlational approach, this study ensures an evidence-based framework for improving airport infrastructure and service delivery.

**Participants of the Study** - The participants for this study are passengers who have traveled through Ninoy Aquino International Airport (NAIA) Terminals within the past 12 months. This time frame ensures that the data collected reflects recent passenger experiences under current operational and infrastructural conditions, offering timely and relevant insights for evidence-based decision-making. To qualify, participants must be at least 18 years old and voluntarily agree to participate in the study. These criteria prioritize individuals with firsthand and meaningful experiences of NAIA's facilities and services, enhancing the reliability and validity of the data. To contextualize the data, it is important to emphasize that data collection was conducted during the last quarter of 2024—prior to the official transition to new airport management. This ensures that passenger insights reflect conditions and systems under the former administration. This study includes both domestic and international passengers to represent a wide spectrum of user experiences. To ensure diverse feedback, participants who have interacted with critical services—such as baggage handling, customer service counters, and transportation facilities—are prioritized. This selection strategy allows the research to focus on the operational and experiential aspects of NAIA, identifying key areas for improvement that directly influence passenger satisfaction.

A sample size of 385 respondents was determined using Raosoft's sample size calculator, applying parameters of a 5% margin of error and a 95% confidence level. Stratified sampling is utilized to ensure proportional representation of passengers based on the traffic distribution across NAIA's three primary terminals: Terminal 1, Terminal 2, and Terminal 3. This approach captures the diversity of passenger interactions and experiences across different types of airport operations while maintaining statistical rigor.

NAIA Terminal 4 was excluded from the study to maintain a consistent comparison across terminals with similar operational capacities and infrastructure. Terminal 4 primarily serves low-cost carriers and regional flights with minimal amenities, fewer passenger services, and a unique operational framework that differs significantly from Terminals 1, 2, and 3. Including Terminal 4 could introduce variations that may confound the analysis of infrastructure quality and passenger satisfaction in terminals designed for both domestic and international traffic. By focusing on Terminals 1, 2, and 3, this study ensures that its findings are more applicable to NAIA's modernization efforts without dilution by fundamentally different service structures.

Stratified sampling ensures that data reflects the diversity of passenger experiences at NAIA. By proportionally allocating respondents based on terminal traffic, the study accounts for variations in passenger



needs, preferences, and challenges associated with different terminals. For example, Terminal 1's focus on international traffic may highlight distinct needs for immigration and customs facilities, while Terminal 2's focus on domestic traffic may emphasize efficiency and accessibility. Terminal 3's mixed traffic composition provides a balanced perspective on the integration of services for both types of passengers. This participant selection strategy is directly tied to actionable outcomes. Feedback will inform targeted recommendations for each terminal, allowing NAIA to address specific operational and infrastructure gaps with precision. For instance, insights from international passengers may lead to enhancements in lounges, immigration processing, and retail offerings, while domestic traveler feedback could prioritize streamlining check-in and improving wayfinding systems.

By ensuring statistical reliability and capturing diverse perspectives, this approach aligns with the study's objectives to evaluate passenger satisfaction comprehensively. It also supports the creation of strategic, terminal-specific interventions that address key performance indicators for NAIA's competitiveness. The carefully curated participant base contributes to a nuanced understanding of passenger needs, positioning this research to deliver meaningful improvements in infrastructure and service quality.

**Data Gathering Instrument** - The primary data collection tool for this study is a structured questionnaire, adapted from validated instruments used in previous research on airport infrastructure and passenger satisfaction. The questionnaire is aligned with the study's objectives and NAIA's operational environment, ensuring that responses capture passenger perceptions, infrastructure efficiency, and overall satisfaction levels. While no named service quality model was formally adopted, several satisfaction indicators were informed by globally recognized service delivery dimensions commonly emphasized in transportation and tourism literature. Passenger Comfort During Delays and Cancellations incorporated elements conceptually aligned with emotional care and empathetic service, reflecting best practices in service recovery. These were partly inspired by insights from widely cited models such as SERVQUAL, although SERVQUAL itself was not used as a formal theoretical foundation. The intent was not to adopt the framework in its entirety, but rather to capture critical service behaviors—such as empathy and responsiveness—that are consistent with global service quality literature and relevant to the NAIA passenger experience.

Part I collects demographic and travel-related information, including participants' sex, age, marital status, and frequency of travel. These variables provide essential contextual data for analyzing passenger behavior, preferences, and experiences. By segmenting respondents based on their demographic profiles—such as frequent business travelers, leisure tourists, or occasional flyers—the study can identify trends and variations in passenger satisfaction levels. Part II evaluates the physical infrastructure of NAIA, assessing five key areas: terminal facilities, accessibility, safety and security, signage and wayfinding, and amenities and services. The section includes tangible elements of the passenger environment such as cleanliness, seating comfort, lighting, and restroom availability, which are central to users' perception of facility quality. Accessibility features—such as elevators, ramps, and pathways for persons with reduced mobility—are evaluated to determine adherence to universal design standards. Safety and security measures are assessed in terms of visibility, effectiveness, and traveler confidence, reflecting expectations of assurance. Wayfinding is measured through signage clarity, directional guidance, and ease of navigation, while the amenities and services construct captures the availability, variety, and convenience of retail, food, and passenger support areas (Bakır et al., 2022). Part III measures overall passenger satisfaction, integrating insights from both infrastructure and service experience. Participants evaluate their perceptions of queue management efficiency, reliability of processing, comfort during delays and cancellations, responsiveness of support systems, sustainability initiatives, and staff communication. Several of these indicators reflect foundational elements of effective service delivery, including the consistency and timeliness of assistance, the ability of personnel to communicate clearly under pressure, and the availability of empathetic responses during service disruptions. In particular, the items under *Passenger Comfort during Delays and Cancellations* reflect traveler expectations for care, real-time updates, and physical comfort during unplanned interruptions. Respondents also indicate whether they would recommend NAIA to others and whether the airport aligns with international standards. Collectively, this section offers a comprehensive view of how both

infrastructure and service performance shape the passenger experience.

The development of the questionnaire followed a rigorous validation process to ensure accuracy, relevance, and comprehensiveness. Initial consultations with the research adviser refined its structure, clarity, and alignment with the study's objectives. The first expert, with expertise in aviation safety and regulatory compliance, ensured the instrument aligned with service efficiency and passenger safety standards. The second expert, a professor and international airline crew member, contributed insights on passenger service quality and operational procedures to enhance the survey's effectiveness in measuring satisfaction and efficiency. The third expert, a Domestic Head Cabin Attendant, provided valuable input on passenger comfort, in-flight service expectations, and customer engagement. Their combined expertise strengthened the questionnaire's reliability, clarity, and applicability, making it a robust tool for assessing NAIA Terminals 1, 2, and 3 in terms of infrastructure efficiency and passenger satisfaction. To assess the reliability of the instrument, a pilot study was conducted in Cebu with 30 respondents who met the inclusion criteria of the study. Responses were analyzed using Cronbach's Alpha, a statistical measure of internal consistency. The instrument achieved Cronbach's Alpha values ranging from 0.954 to 0.975, indicating excellent reliability across all sections. These results confirm the questionnaire's effectiveness in collecting consistent and meaningful data on passenger experiences and satisfaction (Bakır et al., 2022).

**Table 1**

*Reliability Test Result*

Indicators	Cronbach Alpha	Remarks
Terminal Facilities	0.968	Excellent
Accessibility	0.956	Excellent
Safety and Security	0.956	Excellent
Signage and Wayfinding	0.956	Excellent
Amenities and Services	0.955	Excellent
Queue Management Efficiency	0.954	Excellent
Passenger Comfort During Delays and Cancellations	0.975	Excellent
Passenger Support System	0.963	Excellent
Sustainability Initiatives	0.965	Excellent
Staff Communication and Service Efficiency	0.960	Excellent

George and Mallery (2003) provide the following rules of thumb: “\_ > .9 – Excellent, \_ > .8 – Good, \_ > .7 – Acceptable, \_ > .6 – Questionable, \_ > .5 – Poor, and \_ < .5 – Unacceptable”

The structured questionnaire serves as more than just a data collection tool; it is a key mechanism for developing actionable recommendations for NAIA. The data gathered helped pinpoint areas needing infrastructure improvement while offering strategic insights into passenger expectations and service gaps. For instance, if accessibility scores are low, this indicates the need for improved facilities for passengers with disabilities. If passengers express dissatisfaction with queue management, the findings will highlight the need for enhanced check-in processes and digital queueing solutions. By systematically addressing passenger priorities and operational gaps, this research ensures that its findings will contribute to evidence-based policies for improving NAIA's competitiveness and aligning its services with international airport standards.

**Data Gathering Procedures** - The primary mode of data collection was an online survey. Respondents were approached in person outside various NAIA Terminals and provided with a QR code for easy access to the survey. Participants were required to be at least 18 years old and to have recent experience with air travel through NAIA Terminals. Before participating, respondents read and agreed to a consent form outlining the study's purpose, voluntary participation, and measures to protect their anonymity and confidentiality. The survey's online nature facilitated convenience and broad accessibility, allowing real-time monitoring of responses. Data were collected over a specified period from November 2024 to January 2025. To ensure a representative view of regular airport operations, data gathering was intentionally scheduled outside of peak holiday periods, such as Christmas and New Year travel surges. Future studies are encouraged to include seasonal comparisons to explore potential fluctuations in passenger satisfaction and service performance during peak travel periods. It is also important to note that the current study did not include direct stakeholder

consultation. While passenger perspectives provided valuable insights, the absence of viewpoints from airport management, frontline personnel, and regulatory agencies such as CAAP represents a methodological limitation. Future research may benefit from conducting focus group discussions with NAIA staff, CAAP officials, and frequent travelers to incorporate operational realities and qualitative perspectives into airport planning and service development.

**Data Analysis** - This study employed a comprehensive range of statistical techniques to assess the relationship between airport infrastructure and passenger satisfaction at Ninoy Aquino International Airport (NAIA). To evaluate the core components of airport infrastructure and passenger satisfaction, Weighted Means were computed. This approach provided an overarching view of prevailing attitudes within the sample, facilitating a deeper understanding of how infrastructure quality influences passenger experience. In examining differences among key variables, the study employed parametric tests based on the data distribution and sample size considerations. Given that the sample size ( $n = 385$ ) meets the conditions of the Central Limit Theorem (CLT), parametric tests were deemed appropriate for group comparisons. By applying a structured statistical approach, this study ensured the validity and reliability of its findings. The combination of weighted means, and t-tests enabled a robust assessment of the relationship between airport infrastructure and passenger satisfaction. The findings from these analyses provide a data-driven foundation for strategic recommendations aimed at enhancing service quality, optimizing airport infrastructure, and improving overall passenger experience at NAIA.

**Ethical Considerations** - The study adhered to the Data Privacy Act of 2012 in the Philippines. This law regulates the collection, use, and disclosure of personal data, ensuring respondents' rights to privacy and data protection. A detailed consent form was provided to all respondents, ensuring they understand their rights and the study's purpose before participating. Personal identifiers will be excluded from the final report to maintain confidentiality. The study presents findings objectively and impartially, adhering to the highest ethical standards and ensuring the research's transparency and credibility.

### 3. Results and discussion

**Table 2**

*Summary Table on Airport Infrastructure*

Airport Infrastructure	WM	Interpretation	Rank
Terminal Facilities	2.83	Agree	4
Accessibility	2.88	Agree	3
Safety and Security	2.96	Agree	1.5
Signage and Wayfinding	2.96	Agree	1.5
Amenities and Services	2.69	Agree	5
Grand Weighted Mean	2.86	Agree	

*Legend: 3.51 - 4.00: Strongly Agree, 2.51 - 3.50: Agree, 1.51 - 2.50 : Disagree, 1.00-1.50: Strongly Disagree*

Table 2 presents a summary evaluation of airport infrastructure at NAIA across five core dimensions: terminal facilities, accessibility, safety and security, signage and wayfinding, and amenities and services. The grand weighted mean score of 2.86, interpreted as “Agree,” indicates that passengers perceive the airport’s infrastructure as generally functional and serviceable. However, the scores suggest that while foundational elements are in place, performance remains moderate, and the airport has yet to reach the operational and experiential quality expected of top-tier international aviation hubs.

The highest-rated dimensions were safety and security and signage and wayfinding, both receiving a weighted mean of 2.96. This reflects passengers’ recognition of visible protective measures and navigational support throughout the terminals. These findings affirm the critical role that environmental clarity and secure processes play in the airport experience—particularly as NAIA serves a growing mix of international, regional, and domestic travelers. Terminal 3, the most modern facility, appears to have set a higher operational benchmark that partially elevates the scores across the broader system. Passenger trust in safety and security is reinforced by

consistent screening protocols, the presence of trained personnel, and visible surveillance infrastructure. These measures are especially impactful in high-traffic zones of Terminals 1 and 3, where international passenger volume is heaviest.

Parallel to safety, the effectiveness of signage and way-finding emerged as a significant strength. Clear gate information, visible emergency exit signage, and strategically placed maps enable passengers to navigate efficiently, especially during transfers or tight boarding schedules. Terminal 3 features more digital signboards and interactive displays, while Terminals 1 and 2 rely on static signage that, when appropriately placed, still supports passenger movement. Ryu et al.,(2019) found that effective way-finding design reduces bottlenecks, missed connections, and dependency on staff. Walia et al. (2021) further emphasized that multilingual and digital signage systems contribute to traveler autonomy, particularly for non-local and first-time users.

In contrast, the lowest-rated infrastructure component was amenities and services, which received a weighted mean of 2.69. This suggests that while passengers acknowledge the presence of basic services, they view comfort-oriented features—such as dining diversity, Wi-Fi connectivity, and wellness lounges—as insufficient. These concerns are most evident in Terminals 1 and 2, where outdated layouts and physical constraints continue to limit service modernization. Terminal 3 performs better but does not fully compensate for these network-wide deficiencies. The finding aligns with the broader shift in passenger expectations, where modern travelers no longer distinguish sharply between functional infrastructure and experiential services. Colak et al. (2023) noted that the presence of personalized, tech-enhanced, and wellness-oriented amenities significantly shapes passenger loyalty. Without adequate spaces to dine, work, or relax, passengers perceive the terminal environment as utilitarian rather than accommodating—a perception that constrains the airport’s service reputation.

Terminal facilities, ranked fourth with a mean score of 2.83, further reinforce this perception. While passengers responded positively to restroom cleanliness and lighting quality, they expressed consistent dissatisfaction with seating comfort, leisure zones, and the spatial flexibility of older terminals. Terminal 3, by contrast, benefits from a more intuitive layout and brighter ambiance, illustrating how infrastructure age and design legacy influence passenger evaluations. As highlighted by Ryu et al.,(2019), layout coherence and environmental comfort are foundational to reducing terminal fatigue and enhancing time spent at the airport.

Together, the results from Table 2 suggest a structural imbalance: while NAIA performs well in security and navigability—both critical for operational functionality—it falls short in delivering comfort, digital accessibility, and personalized service. These findings are consistent with those from earlier tables and point to a system that prioritizes basic throughput but under-delivers in areas that create value-added experiences. To elevate service performance, airport authorities must view safety and signage not as standalone achievements but as foundations to build upon. Meaningful improvements in amenities, connectivity, and terminal comfort will require targeted investment in both infrastructure and service innovation. This includes expanding food and retail options, modernizing digital networks, and adapting spaces for multi-use comfort, such as co-working lounges or quiet zones. Ultimately, the pathway toward global competitiveness lies in re-balancing the infrastructure equation—maintaining strengths in safety and way-finding, while aggressively closing the satisfaction gap in passenger-centered services. NAIA’s ability to deliver a seamless, inclusive, and enriching experience will determine not just its rankings, but its long-term relevance in an increasingly experience-driven global aviation landscape.

Table 3 presents a summary evaluation of passenger satisfaction across five service dimensions, yielding a grand weighted mean score of 2.75, interpreted as “Agree.” This rating suggests that while passengers find the airport’s service delivery acceptable, it falls short of excellence. The moderate performance level reflects systemic inconsistencies in both tangible and intangible service elements, highlighting key areas in need of modernization, particularly in terms of passenger comfort and stress-reduction during service disruptions.

Among the evaluated dimensions, the highest-rated component was staff communication and service

efficiency, which earned a weighted mean score of 2.92. This result underscores the strong role of interpersonal service in enhancing the airport experience. Passengers consistently praised the clarity of verbal updates, cultural professionalism, and staff responsiveness—particularly in Terminal 3, where staffing levels and announcement systems are more robust. However, variations in performance across Terminals 1 and 2 suggest that this strength is not yet fully standardized across the airport complex.

**Table 3**

*Summary Table on Passenger Satisfaction*

Passenger Satisfaction	WM	Interpretation	Rank
Queue Management Efficiency	2.64	Agree	4
Passenger Comfort During Delays and Cancellations	2.54	Agree	5
Passenger Support System	2.89	Agree	2
Sustainability Initiatives	2.76	Agree	3
Staff Communication and Service Efficiency	2.92	Agree	1
Grand Weighted Mean	2.75	Agree	

*Legend: 3.51 - 4.00: Strongly Agree, 2.51 – 3.50: Agree, 1.51 – 2.50 : Disagree, 1.00–1.50: Strongly Disagree*

Academic research supports the significance of this service dimension. El Samra (2020) highlighted that multilingual announcements, AI-driven alerts, and professional communication from frontline personnel are critical to passenger satisfaction during both regular and disrupted travel. Bogicevic et al. (2013) further noted that clear interpersonal communication builds positive emotional experiences, particularly in high-traffic international terminals.

In contrast, the lowest-rated indicator was passenger comfort during delays and cancellations, which received a weighted mean of 2.54. This reveals a significant gap in the airport’s service resilience, particularly during high-stress events such as flight delays or long layovers. Passengers expressed dissatisfaction with the scarcity of designated rest areas, limited access to food services or lounges, and poor visibility of rebooking assistance desks. This issue was especially pronounced in Terminals 1 and 2, although even Terminal 3—despite its modern facilities—struggles to accommodate extended waiting times.

This finding mirrors concerns documented in previous research. Bogicevic et al. (2013) reported that passenger satisfaction drops significantly during delays when airports fail to offer comfort-related amenities, such as lounges, quiet zones, or wellness areas. Usman et al. (2023) emphasized that providing digital updates, timely rebooking support, and hospitality gestures—like food vouchers or access to premium lounges—can help recover service quality. El Samra (2020) advocated for the inclusion of ergonomic rest infrastructure and emotional comfort features as essential components of delay management strategy.

The disparity between high ratings for staff communication and low ratings for physical comfort illustrates a service model that is responsive but not fully resilient. While passengers feel seen and heard by airport personnel, their physical and emotional needs during delays are not being adequately met. This disconnection is particularly damaging to the airport’s reputation among long-haul travelers, families, and business passengers, who may face higher stakes when disruptions occur.

To address this challenge, NAIA must adopt a three-pronged strategy to elevate satisfaction and service continuity. First, investment is required in infrastructure that promotes rest and comfort, such as sleep pods, wellness lounges, and interactive entertainment areas. Second, the airport must deploy AI-driven queue management and flexible staffing to better manage peak-time congestion. Third, enhancing the visibility and interactivity of sustainability efforts can appeal to increasingly eco-conscious travelers, improving perception and reinforcing long-term engagement.

The results of Table 3 suggest that NAIA has built a solid foundation in customer-facing communication but lacks the physical and technological infrastructure needed to manage discomfort during disruptions. Achieving a higher level of satisfaction will require transforming isolated service strengths into a seamless,

end-to-end passenger experience that blends emotional support, physical comfort, and operational innovation.

Ultimately, bridging the satisfaction gap across service dimensions will be essential to positioning NAIA as a leading airport in Southeast Asia. With focused investment in comfort, digitalization, and inclusivity, the airport can move from providing acceptable service to delivering truly exceptional passenger experiences—those that build loyalty, resilience, and international acclaim.

**Table 3**

*Relationship between the Indicators of Airport Infrastructure and Passenger Satisfaction*

Terminal Facilities	r-value	p-value	Remarks
Queue Management Efficiency	0.689	0.000	Significant
Passenger Comfort During Delays and Cancellations	0.782	0.000	Significant
Passenger Support System	0.657	0.000	Significant
Sustainability Initiatives	0.731	0.000	Significant
Staff Communication and Service Efficiency	0.646	0.000	Significant
Accessibility			
Queue Management Efficiency	0.717	0.000	Significant
Passenger Comfort During Delays and Cancellations	0.764	0.000	Significant
Passenger Support System	0.611	0.000	Significant
Sustainability Initiatives	0.693	0.000	Significant
Staff Communication and Service Efficiency	0.677	0.000	Significant
Safety and Security			
Queue Management Efficiency	0.747	0.000	Significant
Passenger Comfort During Delays and Cancellations	0.689	0.000	Significant
Passenger Support System	0.605	0.000	Significant
Sustainability Initiatives	0.660	0.000	Significant
Staff Communication and Service Efficiency	0.646	0.000	Significant
Signage and Wayfinding			
Queue Management Efficiency	0.749	0.000	Significant
Passenger Comfort During Delays and Cancellations	0.713	0.000	Significant
Passenger Support System	0.660	0.000	Significant
Sustainability Initiatives	0.751	0.000	Significant
Staff Communication and Service Efficiency	0.709	0.000	Significant
Amenities and Services			
Queue Management Efficiency	0.779	0.000	Significant
Passenger Comfort During Delays and Cancellations	0.771	0.000	Significant
Passenger Support System	0.644	0.000	Significant
Sustainability Initiatives	0.723	0.000	Significant
Staff Communication and Service Efficiency	0.602	0.000	Significant

*If p – value > 0.05 Threshold Level: Accept Ho: Not Significant*

Table 3 presents the correlation analysis examining the strength of relationships between the dimensions of airport infrastructure and various aspects of passenger satisfaction. The results reveal that all tested variables exhibit statistically significant relationships, with all probability values recorded well below the conventional 0.05 threshold, confirming the presence of meaningful associations. The correlation coefficients fall within the moderate to high range, indicating strong positive links between the quality of infrastructure and satisfaction levels across dimensions such as queue management, comfort during delays, customer support, sustainability, and staff communication.

The strongest relationship observed was between the quality of terminal facilities and passenger comfort during delays and cancellations, yielding a correlation coefficient of 0.782. This suggests a very high level of association, indicating that when terminal environments are well-designed—featuring sufficient seating, rest zones, power charging points, and accessible information desks—passengers are better able to cope with disruptions and prolonged waiting times. Terminals that are physically comfortable and operationally intuitive can offset the negative emotional effects of flight irregularities.

Terminal facilities were also strongly related to perceptions of sustainability, with a correlation value of 0.731. This indicates that well-maintained infrastructure is not only associated with operational quality but also with the airport's environmental identity. Passengers are more likely to trust and engage with green

initiatives—such as recycling programs or water-saving fixtures—when these are visibly integrated into the physical environment. The connection between terminal facilities and the passenger support system was also robust, with a correlation coefficient of 0.657. This reflects the importance of spatial and visual infrastructure in enabling effective service interactions. When help desks are easily located, and when infrastructure supports smooth movement, passengers experience faster resolution of issues and perceive support systems as more responsive.

The accessibility dimension also demonstrated high levels of association across all passenger satisfaction indicators. The strongest of these was with comfort during delays and cancellations, where the relationship registered a correlation of 0.764. This signifies that inclusive design—ranging from accessible toilets and ramps to wide pathways and elevators—enhances a passenger’s ability to comfortably endure unplanned waiting periods. This interpretation aligns with Symonds (2017), who emphasized that mobility-enhancing features serve not just those with physical impairments but also travelers carrying heavy luggage, elderly individuals, and families with small children. Kim et al. (2021) further explained that accessible layouts contribute to a calmer passenger experience, reducing the cognitive load associated with navigating unfamiliar terminals. Accessibility was also positively linked to queue management efficiency, with a correlation coefficient of 0.717. This suggests that efficient movement through the terminal, enabled by thoughtful infrastructure design, contributes to better crowd control and shorter wait times—especially in congested areas like immigration, security, and check-in counters.

Safety and security infrastructure also played a critical role in shaping passenger satisfaction. The most notable relationship was with queue management efficiency, reflected in a high correlation of 0.747. This supports the view that efficient security processes—those that are visible, streamlined, and conducted respectfully—are key drivers of perceived queue performance. When security checkpoints function without excessive delays or ambiguity, passengers feel reassured rather than obstructed. Comfort during delays was also significantly associated with safety and security, with a correlation coefficient of 0.689. This reinforces the idea that a sense of personal safety enhances the emotional resilience of travelers, particularly during prolonged waiting periods or in high-traffic zones. Secure, well-monitored environments reduce anxiety and foster a sense of trust in airport operations. Way finding and signage produced some of the most consistently high correlations across all satisfaction indicators. The strongest of these was with sustainability initiatives, where the relationship recorded a coefficient of 0.751. This suggests that when sustainable practices are well-communicated—through signage that explains environmental efforts or directs passengers to eco-friendly amenities—passengers become more aware of, and engaged with, the airport’s green agenda.

A similarly strong correlation was observed between way-finding and queue management efficiency, where the coefficient reached 0.749. This implies that clear signage contributes directly to passenger flow and queuing effectiveness by minimizing confusion, dispersing crowds, and ensuring that travelers reach their destinations quickly and independently. These findings are in line with Colovic et al. (2022), who found that inadequate signage significantly impairs movement and generates bottlenecks, especially for international and first-time travelers. The amenities and services dimension demonstrated strong relationships with all satisfaction outcomes. Its most powerful link was with queue management efficiency, where the correlation value was 0.779. This suggests that the strategic placement of amenities such as self-check kiosks, drinking stations, and fast-track lanes not only enhances convenience but also supports operational efficiency.

Passenger comfort during delays was also highly related to the quality of amenities, as reflected by a correlation of 0.771. Whether through lounges, seating arrangements, entertainment options, or dining facilities, these elements enable passengers to make productive or restful use of their time when flights are delayed or rescheduled. A correlation of 0.723 was observed between amenities and sustainability satisfaction, reflecting the influence of eco-conscious commercial services—such as green-certified food vendors, biodegradable packaging, and low-energy lighting in retail spaces—on environmental perception. These relationships suggest that passengers evaluate an airport’s service values not only by what is offered but by how it is delivered.

In sum, the data affirm that each airport infrastructure component exerts a significant and positive influence on multiple dimensions of passenger satisfaction. Terminal facilities and accessibility most strongly support comfort and movement, while safety and signage reinforce trust and orientation. Amenities, meanwhile, serve as multifunctional supports that enhance rest, engagement, and sustainability awareness.

These results underscore the need for NAIA and other international airports to adopt a holistic approach to infrastructure development—one that aligns architectural, operational, and environmental strategies to traveler-centered outcomes. Prioritizing digital integration, universal accessibility, green infrastructure, and spatial intelligence will not only enhance satisfaction but also establish NAIA as a forward-thinking, globally competitive hub.

**Table 4**

*Relationship between the Totality of Airport Infrastructure and Overall Passenger Satisfaction*

CORRELATION		r-value	p-value	Remarks
Airport Infrastructure	Passenger Satisfaction	0.855	0.000	<i>Significant</i>

*If p – value > 0.05 Threshold Level: Accept Ho: Not Significant*

Table 4 presents the correlation result between the composite index of airport infrastructure and the overall measure of passenger satisfaction. The analysis revealed a statistically significant relationship, as indicated by a correlation strength of 0.855. This very high positive association demonstrates that passenger satisfaction increases as the quality of airport infrastructure improves. The accompanying probability value, well below the accepted significance threshold of 0.05, confirms that this correlation is not due to chance but reflects a robust and reliable connection. This result strongly validates the foundational premise of this study—that airport infrastructure serves as a critical determinant of service quality perception. The magnitude of the relationship suggests that airport users form holistic judgments of their travel experience based largely on the physical and operational systems in place. These systems encompass terminal layout, signage, cleanliness, accessibility, digital touchpoints, queue management, safety procedures, amenities, and sustainability initiatives. When these elements perform effectively in concert, they significantly enhance traveler comfort, reduce stress, and improve perceptions of service reliability.

The strength of the relationship (with a coefficient above 0.85) places it within the category of a very strong positive correlation. This means that improvements in infrastructure are highly predictive of increases in overall satisfaction, with very little variation unaccounted for. In real terms, a well-lit terminal with adequate seating, organized security lanes, clean facilities, and multilingual wayfinding will create a far more favorable impression than a terminal lacking these features, even if other service elements (such as airline punctuality) remain constant. The current result supports the conclusion that infrastructure is not just a background enabler of service—it is a visible, functional, and emotionally salient factor in the travel process. Each infrastructure touchpoint, from signage to rest areas to eco-friendly initiatives, contributes incrementally to a passenger’s overall evaluation. A single innovation (e.g., biometric gates) can enhance satisfaction, but its effectiveness is maximized only when supported by equally responsive systems (e.g., staff communication or accessible seating). Thus, a systems-based approach to infrastructure development is imperative.

This study’s findings also highlight that infrastructure improvements should not be implemented in isolation. Instead, development should be integrated across terminals, ensuring that no aspect of the passenger journey is under-supported. For example, efficient baggage handling systems must be complemented by spacious baggage claim zones, just as digital signage must be paired with strong Wi-Fi infrastructure to ensure usability. In other words, infrastructure synergy amplifies the return on investment. From a sustainability and inclusivity perspective, infrastructure improvements can also generate long-term loyalty. The presence of solar energy panels, recycling zones, low-flow water systems, and visible green campaigns contribute positively to brand image and satisfaction. Likewise, infrastructure that supports passengers with disabilities—such as tactile floor



paths, accessible counters, and priority seating—reinforces a commitment to equity and user-centric design.

The observed relationship also confirms that comfort is inseparable from satisfaction. As highlighted by Symonds (2017), airports that offer high levels of environmental comfort—through lighting, air circulation, noise control, and ergonomic seating—are more likely to retain passenger loyalty and generate favorable word-of-mouth. These subtle environmental cues, which fall under the broader umbrella of infrastructure, shape emotional perception as much as functional service. Moreover, the relevance of infrastructure extends into digital transformation. The correlation suggests that passenger satisfaction is increasingly tied to technological integration, such as automated check-ins, digital wayfinding, and real-time service notifications. As more travelers rely on mobile tools, infrastructure must support both physical and virtual navigation. Failure to do so can erode satisfaction, even in otherwise modernized terminals. Economically, a high satisfaction rating tied to infrastructure quality also implies financial benefits. These commercial gains can, in turn, support further infrastructure reinvestment, establishing a virtuous cycle of satisfaction and profitability.

In light of this finding, NAIA and similar airport authorities must treat infrastructure not as a fixed capital cost but as a dynamic component of passenger service strategy. Regular infrastructure audits, user-centered design updates, and integration of smart technologies must be institutionalized practices. Furthermore, any infrastructure enhancement should be evaluated not only in terms of compliance and capacity but also in terms of its impact on emotional comfort and service fluidity. In conclusion, the very strong and statistically confirmed relationship between airport infrastructure and overall passenger satisfaction affirms infrastructure as the core driver of the airport experience. Each investment in physical space, environmental control, digital tools, and sustainable operations contributes directly to the traveler’s impression of the airport. Therefore, infrastructure must be viewed as a strategic asset—not just a requirement for operation, but the foundation of service excellence, competitive differentiation, and passenger loyalty.

**Table 5**

*Proposed Action Plan on Airport Infrastructure and Passenger Satisfaction*

Key Result Area	Objectives	Key Performance Indicators	Strategies	Timeline	Expected Outcome
1. Enhance Passenger Comfort	To increase passenger comfort during delays and service disruptions	Number of rest zones established; passenger satisfaction rating during delays	Development of designated rest zones with ergonomic seating, nap pods, family zones, and on-call assistance desks across all terminals.	Q2 2025	Reduced passenger complaints and improved comfort ratings during irregular operations.
2. Improve Airport-Wide Digital Connectivity	To enhance digital engagement and access to real-time services	Wi-Fi speed and coverage metrics; user connectivity feedback	Upgrading of existing Wi-Fi to high-speed, terminal-wide access and deployment of ICT help desks at key areas.	Q3 2025	Improved digital access and real-time service availability for all passengers.
3. Strengthen Multilingual Communication and Cultural Support	To improve inclusivity and information access for international passengers	Availability of multilingual help desks; user satisfaction by language group	Installation of AI-powered translation kiosks and multilingual help counters at check-in, immigration, and information desks.	Q3 2025	Enhanced service inclusivity and increased satisfaction among foreign travelers.
4. Improve Queue Management and Passenger Flow	To reduce congestion and processing time during peak periods	Average queue time; system response speed	Deployment of AI-based queue monitoring systems and real-time wait-time signage across all terminals.	Q4 2025	Reduced waiting times and enhanced perceptions of efficiency and order.
5. Promote Sustainability Awareness	To encourage eco-conscious behaviors among passengers and staff	Participation rate in eco-programs; volume of recycled waste	Implementation of interactive eco-signage and QR-based incentive recycling campaigns	Q4 2025	Increased engagement in green practices and compliance with sustainability standards.
6. Standardize Passenger Support During Disruptions	To unify service protocols for better support during irregular operations	Availability of disruption response kits; traveler support feedback	Implementation of standardized disruption protocols (e.g., food vouchers, lounge access, rebooking assistance)	Q3 2025	Improved recovery consistency and stronger airport-airline coordination.

7. Support National Aviation Policy Development	To integrate passenger-centric recommendations into policy	Inclusion of study findings in national policy drafts	Collaboration with CAAP and DOT for incorporation of findings into planning frameworks	Q1 2026	Policy development grounded in evidence-based passenger experience data.
8. Expand Academic Collaboration and Research	To sustain evidence-based service innovation through research	Number of research partnerships; applied study outcomes	Establishment of formal research partnerships with HEIs focused on passenger satisfaction	Q3 2025	Continuous service evaluation and innovation grounded in scholarly research.
9. Strengthen Cybersecurity and AI Safety Systems	To modernize digital surveillance and threat response	Number of AI tools deployed; security incident response rate	Implementation of facial recognition, encrypted systems, and AI-powered threat monitoring	Q4 2025	Improved airport security aligned with global aviation safety protocols.
10. Increase Stakeholder Participation in Service Planning	To align airport improvements with stakeholder feedback	Frequency of stakeholder consultations; stakeholder satisfaction index	Conduct of quarterly consultation forums with frontline staff, airlines, CAAP, and frequent travelers	Q2 2025	More inclusive, need-based infrastructure planning and implementation.

#### 4. Conclusions and recommendations:

Safety and security infrastructure, alongside signage and wayfinding systems, emerged as the most positively perceived aspects of airport infrastructure. However, terminal facilities, accessibility features, and the diversity and responsiveness of amenities and services showed areas of moderate to low satisfaction. Accessibility infrastructure, particularly for persons with disabilities, remains underdeveloped, while amenities such as rest areas, retail variety, and sensory-inclusive features are inconsistently available across terminals. These findings underscore the importance of a holistic and inclusive approach to infrastructure development to meet global standards and traveler expectations. Passenger satisfaction is influenced by several interrelated service dimensions. While staff communication and service efficiency continue to play a pivotal role in shaping emotional satisfaction and perceived service reliability, notable concerns persist in queue management efficiency, particularly during peak travel hours. Passenger comfort during delays and cancellations remains inconsistent, with limited access to rest areas and poor information dissemination. Support systems, such as help desks and digital assistance, are sporadically functional, and awareness of NAIA’s sustainability initiatives is generally low. These multidimensional gaps highlight the need for coordinated service improvement strategies that are both technologically adaptive and human-centered. A significant positive relationship between airport infrastructure quality and overall passenger satisfaction was established, reinforcing the imperative of investing in tangible service environments. Key infrastructure features—such as terminal comfort during delays and the strategic placement of wayfinding systems—act as mediators of emotional stability, service perception, and environmental engagement, confirming infrastructure’s central role in enhancing passenger satisfaction. Based on the findings, a strategic action plan was developed to address the identified service gaps and infrastructure deficits. The plan prioritizes four core pillars: (1) enhancement of digital infrastructure and real-time passenger communication tools; (2) expansion and diversification of amenities to cater to varied demographic segments; (3) implementation of inclusive design principles to improve accessibility for all travelers; and (4) visibility and integration of sustainability initiatives across touchpoints. These recommendations aim to elevate NAIA’s operational efficiency, passenger satisfaction, and alignment with global airport benchmarks, thereby positioning it as a traveler-centric and future-ready hub in the Asia-Pacific region.

The Manila International Airport Authority (MIAA) and airport facilities management teams may enhance traditional wayfinding systems by integrating dynamic digital signage, QR-based directional maps, and multilingual interactive kiosks to improve navigational ease, reduce passenger stress—particularly for first-time and foreign travelers—and align NAIA’s signage infrastructure with international accessibility and universal design standards, thereby elevating user experience and compliance with global benchmarks. The Airport Commercial Operations Division and terminal food and beverage concessionaires may redesign dining facilities across all terminals to better reflect passenger preferences regarding variety, spatial layout, and inclusivity by incorporating diverse culinary options, improved food court zoning, and menus that accommodate specific

dietary needs (e.g., vegetarian, halal, gluten-free), ultimately enhancing passenger satisfaction while increasing commercial revenues through broader and more inclusive culinary offerings. The Airport Planning and Development Office and the family services committee may establish dedicated family zones throughout the terminals, including stroller-accessible pathways, child-friendly play areas, and fully equipped nursing rooms to contribute to a safer, more convenient, and family-friendly airport environment in line with global best practices, thereby fostering inclusivity and improving the travel experience for passengers traveling with young children. The Airport Security Operations Center and Aviation Security Group may refine airport safety protocols by prioritizing transparency, responsiveness, and passenger-centric procedures through the integration of non-intrusive screening technologies and the implementation of real-time communication tools during security checks to enhance both passenger trust and comfort without compromising safety standards, leading to a more secure yet passenger-friendly security experience. The Airport Communications Office and Customer Service Division may strengthen multilingual and digitally assisted communication systems to enhance service inclusivity for international travelers by expanding language support across public announcements, mobile applications, and AI-based chat assistance platforms, thereby reducing communication barriers and improving the overall passenger experience in a diverse, global airport setting. The Bureau of Immigration, Bureau of Customs, and Airport Operations Management may streamline immigration and customs processing through the implementation of biometric e-gates, expanded queuing zones, and digital pre-clearance systems to mitigate congestion during peak periods and improve the efficiency and throughput of inbound and outbound passenger flows, thus aligning NAIA's border control operations with international benchmarks for seamless and efficient travel. The Manila International Airport Authority (MIAA) and future airport management stakeholders may replicate this study under the new airport administration to evaluate potential improvements in infrastructure quality and passenger satisfaction, providing comparative insights and validating the effectiveness of implemented strategies over time, thereby fostering a culture of evidence-based decision-making and continuous improvement. Future academic researchers and industry innovation committees may explore complementary dimensions of airport operations, such as digital feedback integration and responsive service recovery mechanisms, to develop smarter, more adaptive airport systems capable of sustaining high levels of traveler satisfaction even amid operational disruptions, thereby contributing to more resilient and traveler-centric aviation ecosystems.

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## Developing kamias with chili cubes as a tangy-spicy seasoning innovation

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### *Abstract*

This study focused on developing an innovative food product, Kamias with Chili Cubes, which combines the sourness of kamias (*Averrhoa bilimbi*) and the heat of chili peppers to create a unique seasoning cube. The research aimed to identify the processes involved in product development, assess sensory properties (appearance, taste, texture, aroma), analyze physicochemical properties specifically titratable acidity, and design educational materials to promote the product. Using an experimental research design, three trials were conducted where kamias and chili were prepared, sautéed with aromatics, blended into a paste, thickened with cornstarch, and molded into cubes. Sensory evaluations involved 30 panelists from the academic community and local residents, using a 9-point hedonic scale to measure acceptability. Results showed significant improvement across the three trials, with average sensory scores rising from “like slightly” to “like very much” for all parameters. The final cubes achieved a harmonious balance of tangy and spicy flavors, favorable texture, and pleasant aroma. The physicochemical test indicated a titratable acidity of 4.03%, confirming the expected sourness and supporting product preservation. Information, Education, and Communication (IEC) materials were also developed to disseminate knowledge about the product’s nutritional benefits and culinary versatility. This research highlights the potential of using locally sourced indigenous ingredients in value-added food products, promoting sustainable agricultural practices and supporting smallholder farmers. The Kamias with Chili Cubes serve as a healthier alternative to traditional seasoning cubes, aligning with goals for food security, responsible consumption, and improved health. The study provides a foundation for further product refinement and market introduction, demonstrating the integration of traditional flavors with modern convenience.

**Keywords:** kamias, chili cubes, food innovation, physicochemical test, product development

## Developing kamias with chili cubes as a tangy-spicy seasoning innovation

### 1. Introduction

In the evolving landscape of food innovation, there is a growing emphasis on developing products that not only deliver unique sensory experiences but also promote health and sustainability by leveraging indigenous ingredients. Kamias (*Averrhoa bilimbi*), a tropical fruit native to Southeast Asia and widely used in Filipino cuisine, is celebrated for its sharp sourness and high vitamin C content, along with antioxidant and antimicrobial properties (Kumar, Singh, & Sharma, 2020; Reyes et al., 2021). These characteristics make kamias a promising raw material for value-added food products. Coupled with chili peppers, which provide pungency, flavor complexity, and health benefits such as anti-inflammatory effects and metabolism enhancement (Almeida et al., 2020; Chen et al., 2019), this combination presents an excellent opportunity to innovate within the seasoning market.

The present study focuses on the development of Kamias with Chili Cubes, an innovative seasoning cube designed to blend the tangy sourness of kamias with the spicy heat of chili peppers. From a technical standpoint, this product's creation involves precise formulation and processing steps—including sautéing, blending, and thickening with cornstarch—to achieve a balance in flavor, texture, and shelf stability. Physicochemical analysis, particularly measuring titratable acidity, ensures product quality, safety, and preservation potential, while sensory evaluation using a structured hedonic scale provides insight into consumer acceptance of appearance, taste, texture, and aroma (Liu et al., 2021; Perham, 1995).

From a marketing perspective, Kamias with Chili Cubes addresses rising consumer demand for convenient, flavorful, and health-conscious seasoning options that honor local culinary traditions. By emphasizing its natural ingredients and nutritional advantages, the product appeals to health-oriented consumers seeking authentic Filipino flavors in an easy-to-use format (Kapsak et al., 2017; Moss et al., 2020). The accompanying Information, Education, and Communication (IEC) materials further enhance market outreach by educating target audiences—including consumers, culinary professionals, and farmers—about the product's uses and benefits (Chavez, Cruz, & Mendoza, 2021).

Ultimately, this research bridges traditional food heritage with modern food technology, promoting sustainable agriculture by supporting local farmers and reducing reliance on imported seasonings. Kamias with Chili Cubes not only introduces a novel product to the seasoning market but also contributes to food security, responsible consumption, and rural economic development (United Nations, 2015; Liu & Zheng, 2023). Through a combination of rigorous technical development, consumer-driven product testing, and strategic marketing efforts, this study exemplifies the potential of indigenous ingredients to drive innovation and meet contemporary food system challenges.

*Objectives of the Study* - The primary objective of this study is to develop Kamias with Chili Cubes as an innovative seasoning product that combines the unique sourness of kamias and the heat of chili peppers. Specifically, the study aims to identify and document the detailed processes involved in the development of these seasoning cubes to ensure consistent quality and flavor. It also seeks to assess the sensory attributes of the product—including appearance, taste, texture, and aroma—through systematic evaluation by selected panelists, thereby determining the product's overall acceptability. Lastly, the study aims to analyze the physicochemical properties of the seasoning cubes, focusing particularly on titratable acidity, which plays a significant role in flavor and preservation.

### 2. Methods

*Research Design* - This study employed an experimental research design to develop and evaluate Kamias

with Chili Cubes, an innovative food seasoning product. The research involved multiple iterative trials to optimize the formulation and production process, focusing on sensory attributes and physicochemical properties. Sensory evaluations were conducted using a descriptive approach to assess consumer acceptability based on appearance, taste, texture, and aroma. Physicochemical analyses, specifically titratable acidity tests, were performed to determine the product's quality and shelf stability. The integration of both experimental formulation and sensory testing allowed for comprehensive product development grounded in both technical and consumer perspectives.

*Participants of the Study* - A purposive sampling technique was used to select 30 participants affiliated with Central Bicol State University of Agriculture (CBSUA)–Calabanga and the nearby community. The sample comprised an equal number of students (n=10), teaching staff (n=10), and local community members from Barangay Sta. Cruz Poblacion, Calabanga (n=10). This diverse group was chosen to represent various consumer perspectives and to ensure balanced feedback on the sensory properties of the product.

*Data Gathering Instrument* - The primary instrument for data collection was a sensory evaluation form based on a 9-point Hedonic Rating Scale adapted from Perham (1995). This form measured participants' acceptance of the Kamias with Chili Cubes across four sensory parameters: appearance, taste, texture, and aroma. Ratings ranged from 1 ("dislike extremely") to 9 ("like extremely"). Additionally, laboratory instruments and standardized titration methods (AOAC 942.15) were used to measure physicochemical properties, specifically titratable acidity, ensuring the product's quality and safety.

*Data Gathering Procedure* - The data gathering commenced with product development through iterative experimental trials involving ingredient preparation, cooking, blending, molding, and storage. After finalizing the formulation, sensory evaluation sessions were conducted in designated locations within CBSUA premises, including the CHDC building and the campus gazebo. Participants were first briefed on the evaluation process and the sensory attributes to be assessed. Each participant was provided with the product samples and the sensory evaluation form, which they completed individually. Concurrently, physicochemical samples were collected and submitted to the CBSUA Food Testing Laboratory for titratable acidity analysis. All data collection adhered to standard protocols to maintain consistency and reliability.

*Ethical Considerations* - The study was conducted following ethical guidelines to protect participants' rights and welfare. Prior to data collection, informed consent was obtained from all participants after explaining the study's purpose, procedures, potential risks, and benefits. Confidentiality was ensured by anonymizing responses and securely storing all data. Participation was voluntary, with the option to withdraw at any time without penalty. Additionally, the product samples were prepared under hygienic conditions, and safety standards were strictly followed to prevent any health risks to participants.

*Data Analysis* - Sensory evaluation data were analyzed using weighted mean calculations to determine the level of acceptability for each sensory parameter. The 9-point Hedonic scale ratings were converted into numerical scores, and mean values were computed for appearance, taste, texture, and aroma. Physicochemical results, specifically titratable acidity percentages, were analyzed descriptively to assess compliance with quality standards. Comparative analysis across the three formulation trials was performed to identify improvements and determine the optimal product characteristics. The combined sensory and physicochemical data informed conclusions about product acceptability and quality.

### **3. Results and Discussion**

*Development of the Product.* The development of Kamias with Chili Cubes was conducted through a series of systematic experimental trials aimed at creating a seasoning product that balances the distinct sourness of kamias (*Averrhoa bilimbi*) with the pungent heat of chili peppers. The final formulation of Kamias with Chili Cubes, selected as the most preferred based on sensory evaluation results, utilized precise ingredient proportions to achieve a harmonious balance of sourness, spiciness, and texture. The key ingredients included 1.25 kilograms

(5 cups) of fresh kamias, which provided the characteristic tangy and vitamin-rich base flavor. To deliver an optimal heat level favored by the panelists, 125 grams (1/2 cup) of chili pepper was incorporated, offering a pronounced yet balanced spiciness that complemented the sourness without overpowering it. Supporting ingredients in the final product included 250 grams (1 cup) of sweet potato, serving as a natural binder and contributing to a smooth, velvety texture. Aromatics such as 30 grams (2 tablespoons) of white onion and 15 grams (1 tablespoon) of garlic powder were added to enrich the flavor profile and provide savory depth. For seasoning, 62 grams (1/4 cup) of salt and 7.5 grams (1/2 tablespoon) of ground black pepper were carefully measured to enhance taste without masking the natural flavors. Cornstarch, at 250 grams (1 cup), was incorporated to achieve the desired firmness and consistency, ensuring the cubes maintained their shape during handling and storage. Lastly, 15 grams (1 tablespoon) of cooking oil was used to sauté the ingredients and improve mouthfeel. The preparation process involved washing and slicing the kamias and chili, sautéing the aromatics in heated oil, and cooking the mixture with seasonings to develop complex flavors. The cooked ingredients were blended into a smooth paste, then simmered to concentrate the flavors and reduce moisture. The dissolved cornstarch was added to thicken the paste sufficiently to mold into cubes. After pouring into molds lined with wax paper, the mixture was allowed to cool, cut into uniform cubes, and refrigerated until firm.

**Table 1.**  
*Sensory Evaluation of Kamias and Chili Cubes*

Sensory Parameters	Trial 1	Trial 2	Trial 3
Appearance	6.4	7.8	7.7
Taste	6.6	7.5	7.8
Texture	7.1	7.6	7.5
Aroma	6.5	7.7	7.9
Mean	6.7	7.7	7.7

Legendary: 1.00-1.89= Dislike Extremely, 1.90-2.78= Dislike Very Much, 2.79-3.67= Dislike Moderately, 3.68-4.56= Dislike Slightly, 4.57-5.45= Neither like nor dislike, 5.46-6.34=Like Slightly, 6.35-7.23= Like Moderately, 7.24-8.12=Like Very Much. 8.13-9.01=Like Extremely

Sensory evaluation is a critical component in assessing the acceptability of Kamias with Chili Cubes, focusing on four key parameters: appearance, taste, texture, and aroma. Using a 9-point Hedonic Rating Scale, 30 participants from diverse backgrounds evaluated the product to provide comprehensive feedback on its sensory qualities. Table 1 presents the mean scores for each sensory parameter across three formulation trials.

*Appearance* -Table 1 shows the progressive improvement in appearance scores of Kamias with Chili Cubes during the three trials. The product’s appearance received a mean score of 6.4 ("like slightly") in Trial 1, which increased to 7.8 ("like very much") in Trial 2 and remained high at 7.7 in Trial 3. The upward trend in appearance ratings reflects the positive impact of formulation adjustments on visual attributes such as color vibrancy, cube shape uniformity, and surface texture. These enhancements likely contributed to a more attractive and consumer-friendly product. Appearance being the first sensory cue influences consumer willingness to try and buy a product. The improvement and consistent high scores indicate that the Kamias with Chili Cubes effectively met consumer expectations for visual appeal, which is essential for market success.

This is consistent with findings by Moss, Perez, and Russell (2020), who assert that visual appearance strongly affects consumers’ initial food perceptions and acceptance. Liu, Zhang, and Zheng (2021) also emphasize that improvements in visual presentation enhance consumer satisfaction. Furthermore, Kapsak, Landry, and Kapsak (2017) highlight that consistent, appealing appearance in seasoning products builds consumer trust and encourages repeat purchase behavior.

*Taste* - The mean taste score of Kamias with Chili Cubes increased progressively from 6.6 in Trial 1 ("like slightly") to 7.5 in Trial 2 ("like moderately") and reached 7.8 in Trial 3 ("like very much"). This upward trend reflects improvements in flavor formulation, particularly the adjustment of chili pepper levels that enhanced



spiciness while maintaining the natural sourness of kamias. The balancing of these flavors contributed to a more appealing taste profile that was favorably received by the panelists. Taste remains the most influential factor affecting consumer preference and repeat consumption. The consistent increase in taste acceptance indicates that the product's flavor became more refined and aligned with consumer expectations for a seasoning that delivers both heat and tanginess in a balanced manner.

This finding is supported by Jaeger et al. (2018), who emphasized that well-balanced flavor profiles increase consumer liking and product success. Furthermore, Stone and Sidel (2017) noted that flavor complexity and balance significantly affect food acceptance. According to Drewnowski and Gomez-Carneros (2000), the interplay of taste components like sourness and spiciness plays a critical role in overall flavor perception and consumer preference.

*Texture* - The mean texture scores for Kamias with Chili Cubes were 7.1 ("like moderately") in Trial 1, increased slightly to 7.6 in Trial 2, and remained consistent at 7.5 in Trial 3. The texture ratings suggest that the product achieved a generally favorable consistency that was smooth yet firm enough to hold its shape as seasoning cubes. The slight improvement from Trial 1 to Trial 2 reflects refinement in the thickening process, likely due to adjustments in the cornstarch concentration and cooking times. Texture is crucial for consumer acceptance of seasoning cubes since it affects ease of handling, dissolution in food, and overall mouthfeel. The consistent moderate to high scores implies that consumers found the cubes to have a desirable balance of firmness and smoothness, allowing them to easily integrate the product into cooking without altering the dish's texture adversely.

This is in line with findings by Stone and Sidel (2017), who stressed that texture significantly impacts perceived food quality and consumer preference. Szczesniak (2002) highlighted that texture attributes such as firmness and cohesiveness are critical in novel food products for ensuring user satisfaction. Additionally, Bourne (2002) noted that a well-balanced texture facilitates better product handling and consumption experience, enhancing repeat usage.

*Aroma* - The aroma scores for Kamias with Chili Cubes improved steadily from 6.5 ("like slightly") in Trial 1 to 7.7 ("like moderately") in Trial 2 and reaching 7.9 ("like very much") in Trial 3. The increasing scores indicate that the product's aroma became more appealing with each trial, likely due to optimized proportions of kamias and chili as well as improved cooking techniques that enhanced volatile aromatic compounds. The balanced sour and spicy scent contributed to the sensory appeal and anticipation of flavor. Aroma is a key sensory attribute that influences flavor perception and overall food enjoyment. The positive trend in aroma acceptance suggests that the seasoning cubes successfully delivered an enticing fragrance that enhanced consumer appeal and likely increased willingness to use the product in cooking.

This finding aligns with Drake and Civille (2003), who emphasized that aroma plays a critical role in the acceptance and liking of food products by influencing flavor expectations. Meilgaard, Civille, and Carr (2006) noted that aroma significantly affects consumer perceptions and can enhance or detract from overall sensory experiences. Furthermore, Bayarri, De La Fuente, and Costell (2001) demonstrated that well-balanced aroma profiles in seasoning products increase consumer satisfaction and product success.

Based on the sensory evaluation results presented in Table 1, **Trial 3** emerged as the most preferred formulation of Kamias with Chili Cubes. It achieved the highest average scores across all sensory parameters: 7.7 for appearance, 7.8 for taste, 7.5 for texture, and 7.9 for aroma, all of which fall under the "like very much" category on the 9-point Hedonic Scale. The enhanced spiciness from the increased chili content, combined with the natural tanginess of kamias and a well-balanced texture, contributed to its overall sensory appeal. These results indicate that Trial 3 was the most acceptable version, confirming its suitability as the final product for potential market use and consumer application.

**Table 2.***Result of Physicochemical Analysis*

Item No.	Sample and Lab Code	Sample Description	Results
			Titratable Acidity by Citric Acid (%)
215841	693-24-0	Kamias with Chili Cubes	4.03
		Method used	AOAC 942 15. Titrimetric method

*Physicochemical Analysis* - A sample of the final product from Trial 3 was submitted to the CBSUA Food Testing Laboratory for physicochemical testing. The **titratable acidity** of the Kamias with Chili Cubes was measured using the AOAC 942.15 titrimetric method. The analysis revealed a titratable acidity value of 4.03% expressed as citric acid. The measured titratable acidity of 4.03% confirms the presence of significant organic acid content, primarily derived from kamias, which is naturally rich in citric acid. This acidity level is within an ideal range for sour-based food products and contributes to both flavor intensity and product preservation, inhibiting microbial growth and spoilage. The acidity result validates the sensory findings, particularly the product's tangy flavor, and supports the product's shelf stability. A titratable acidity of over 4% indicates that the seasoning cube has both a strong sour profile and natural preservative properties, reducing the need for artificial additives. This aligns with the product's goal of being a healthier and more natural alternative to commercial seasoning cubes.

According to Liu et al. (2020), titratable acidity plays a crucial role in determining the preservation potential and sensory sharpness of fruit-based products. Similarly, Rivera et al. (2018) noted that acidity levels above 3.5% in concentrated food mixtures enhance microbial safety and flavor retention. De la Cruz and Marquez (2016) also emphasized that food products derived from tropical acidic fruits like bilimbi (kamias) exhibit natural preservative effects and consumer-preferred tartness due to their high citric acid content.

#### 4. Conclusions and Recommendation

The study successfully developed Kamias with Chili Cubes as an innovative seasoning product that effectively combines the distinct sourness of kamias with the spiciness of chili peppers. Through systematic experimentation, the detailed processes involved in product development were identified and optimized, resulting in a product with consistent quality and balanced flavor. Sensory evaluation by diverse panelists demonstrated increasing acceptability across the three trials, with Trial 3 emerging as the most acceptable formulation, receiving "like very much" ratings in appearance, taste, texture, and aroma. The physicochemical analysis further confirmed the product's quality, with a titratable acidity of 4.03% ensuring a desirable sour profile and natural preservative effect. Overall, the research demonstrated the viability of using indigenous ingredients to create a unique, healthy, and convenient seasoning cube that meets consumer preferences and promotes local agricultural resources.

Based on the findings, it is recommended that further product development focus on scaling production while maintaining sensory and physicochemical quality. The Kamias with Chili Cubes should be introduced to the market with strategic marketing emphasizing its natural ingredients, health benefits, and cultural authenticity to attract health-conscious consumers. Additional studies could explore shelf-life testing under various storage conditions to validate long-term stability and preservation. It is also advisable to expand consumer testing to broader demographic groups to gather more comprehensive feedback and tailor the product to different taste preferences. Educational campaigns and promotional materials should be enhanced to increase awareness among culinary professionals and consumers about the versatility and nutritional advantages of the seasoning cubes. Finally, collaboration with local farmers and food enterprises is encouraged to support sustainable sourcing and economic development in rural communities.

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# Marketing strategies, product innovation, and customer experience: Basis for a development plan for agritourism sites in CALABARZON

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## *Abstract*

This study aimed to propose a development plan for agritourism sites in CALABARZON. The researcher assessed the marketing strategies, product innovation, and customer experience at agritourism sites in CALABARZON. It tested for significant differences in responses when grouped by profile variables and examined the significant relationship between marketing strategies, product innovation, and customer experience. The researcher used a descriptive-correlational and comparative research design. The respondents to the study were 385 tourists who visited agritourism sites. The instrument was adapted from three different studies. Further, the statistical tools used for the study included the independent comparison of groups, or t-test, and the analysis of variance, together with post hoc analysis to test for differences in the variables when compared according to profile. Lastly, the Pearson correlation coefficient was used to establish possible relationships among the variables. The study concluded that most respondents were female, aged 18–26 years old (Generation Z), and single. The respondents who visited the agritourism sites came from CALABARZON for leisure and relaxation, visiting 1-2 times a year. They were highly satisfied, valuing experiences that reflect agricultural practices and the local community, offering opportunities to experience authentic rural culture through food, lifestyle, and fairs. Finally, the research paper developed a plan and provided relevant recommendations.

**Keywords:** promotion, services, service and facilities

## **Marketing strategies, product innovation, and customer experience: Basis for a development plan for agritourism sites in CALABARZON**

### **1. Introduction**

In today's environment, travelers are more concerned with obtaining peace and quiet from their vacation spot than with simply traveling. Travelers engage in travel experiences that allow them to interact with locals and gain a true knowledge of the culture and traditional ways of life. The global agritourism market size is expected to reach USD 15.78 billion by 2030, registering a CAGR of 11.4% during the forecast period where farmers can offer their visitors the opportunity to visit farms or agricultural lands for a short period of time and to enjoy many different activities. Agritourism is one way to respond to the needs of these all-inclusive travelers. Agritourism, or farm tourism is a type of rural tourism and is highly recognized as a means of farm income.

One of the problems in agritourism, specifically in the Philippines, is lack of product development. The development of unique and attractive products and experiences is essential for the success of agritourism (Yamagishi et al., 2020). There is a need to focus on improving the physical characteristics of farm tourism sites, as well as creating new and innovative products to attract tourists; marketing and customer relations, effective marketing and customer relations strategies are necessary to attract and retain tourists in the agritourism sector. Building strong customer relationships and promoting the benefits and experiences of agritourism can help overcome this challenge. In summary, the problems and issues related to agritourism in the Philippines include the lack of product development, and challenges in marketing and customer relations. Addressing these issues is crucial for the successful development of the agritourism sector in the country.

This research explored the marketing strategies, product innovation, and customer experience in the agritourism sites of Region IVA which comprises the five provinces namely Cavite, Laguna, Batangas, Rizal and Quezon (CALABARZON). According to Yamagishi et al.,(2020), the potential of farm tourism in the Philippines highlighted the challenges, strategies, and insights for its development. Farm tourism in the CALABARZON region of the Philippines had seen remarkable growth from 2019 to 2024, aligning with the country's overall tourism surge, which included over five million international visitors in 2023 and PHP 482.54 billion in receipts. The region, encompassing Cavite, Laguna, Batangas, Rizal, and Quezon, offers diverse products and services like farm-to-table dining, educational tours, and wellness activities. Key products include coffee, cacao, and coconuts, while innovations such as technology integration, agritourism circuits, and sustainability practices have been introduced. The Department of Tourism has also promoted initiatives like the "Philippine Experience Programs" to enhance the region's appeal. This development contributes significantly to economic growth and job creation in the area.

The research employed a methodology inspired by Perlas et al. (2019), which introduced the Enhanced Marketing Strategy for Selected Agritourism Farm Sites in San Pablo, Laguna, to evaluate the effectiveness of marketing strategies in agritourism. Furthermore, in assessing product innovation within agritourism sites, insights from Roman et al. (2020) were utilized, drawing from their work on Innovations in Agritourism: Evidence from a Region in Poland. Finally, the study investigated the customer experience of tourists visiting agritourism sites, leveraging findings from Thakur et al. (2022) on the Experience and Satisfaction of Tourists over Agritourism in Himachal Pradesh.

Marketing strategies refers to the plans and tactics that organizations develop and implement to promote their products or services and achieve their business objectives. These strategies involved various activities such as market research, product development, pricing, distribution, and promotion. The goal of marketing strategies is to effectively reach and engage the target market, increase brand awareness and visibility, and ultimately drive sales and customer loyalty. According to Enhanced Marketing Strategy of Selected Agritourism Farm Sites in

San Pablo, Laguna, the strength of the agritourism farms/sites lies in the quality of their products and services, which satisfy the visitors. The marketing mix 4P's (Place, Price, Product, and Promotion) provides a strong framework for assessing the effectiveness of marketing strategies (Perlas et al., 2019).

In addition, product innovation in agritourism sites refers to the development and introduction of new and improved products or services within the agritourism industry. It involves the implementation of creative and novel ideas to enhance the overall visitor experience, attract more tourists, and generate sustainable growth for agritourism businesses. These innovations can include various aspects such as accommodation facilities, recreational activities, food and beverage services, cultural experiences, and educational programs. The aim is to offer unique and distinctive offerings that differentiate the agritourism site from competitors and meet the evolving needs and preferences of tourists (Polukhina et. al.,2018). The introduction of innovative solutions can enhance the quality of tourist services, improve the technical comfort of accommodations, and provide a variety of food options. Tourists today are not only looking for accommodation in rural areas but also seek new experiences and opportunities for adventure (Wojcieszak, 2019).

Customer experience in an agritourism site refers to the overall satisfaction and enjoyment that tourists have while participating in agritourism activities. It encompasses various aspects such as the quality of services and facilities provided, the opportunity to learn about and experience local culture and traditions, and the interactions with locals. The goal of agritourism is to provide tourists with authentic and immersive experiences that connect them with the agricultural and rural lifestyle of the region. Tourists seek out agritourism sites to have a unique and different holiday experience, to taste and experience local food and drinks, and to enjoy the services and facilities offered at the site. Satisfaction of tourists is crucial for the growth of agritourism and tourism in general. Dissatisfaction occurs when tourists' actual experiences fail to meet their preconceived expectations (Shukla, 2017). To enhance customer experience, it is important for businesses to prioritize visitor satisfaction and meet the needs of customers (Peacock, 2019). Studies have shown that providing exceptional customer experiences can lead to customer satisfaction and loyalty. By prioritizing visitor needs and delivering high-quality services, agritourism sites can create positive and memorable experiences for their customers. Marketing strategies, product innovation, and customer experience are interlinked in achieving business success. By adopting effective marketing strategies, focusing on product innovation, and prioritizing customer experience, agritourism sites can develop a competitive edge in the industry and attract and retain customers.

In light of these facts, the researcher believed agritourism offers farmers an alternative income stream by diversifying their businesses and providing visitors with a unique experience of food and farming production. By marketing their offerings to tourists, farmers can generate revenue and support the various tourist attractions in the CALABARZON that showcase the region's diverse agricultural products. Agritourism benefits both farmers and rural communities by providing an alternative income source, promoting local agriculture, creating jobs, and contributing to the economic development of the country. Additionally, this will provide the academic community with further information that can be discussed with the students in relation to the nature of their future in the tourism and hospitality industry. Based on the study, a development plan of agritourism sites was proposed. Since some of the studies discussed the problems of agritourism that need to focus on marketing strategies, product innovation, and customer experience, the researcher is motivated to explore this topic. The Proposed Development Plan was designed to help farmers, agritourism site owners, tourism of local government units, and locals of Region IV-A achieve sustainability of Agri-Farm Tourism. The development plan may enhance the marketing strategies of agritourism farms/sites in CALABARZON. Through the assessment of the marketing mix 4P's (Place, Price, Product, and Promotion), the goal is to improve the competitiveness of these farms/sites in the industry and achieve future market growth. It addresses the need for improved products, services, marketing activities, and customer experience, which have been identified as crucial factors for achieving higher assessment ratings (Salarda, 2021).

**Objectives of the Study** - This study assessed the marketing strategies, product innovation, and customer experience in agritourism sites in CALABARZON. It specifically aimed to: assess the marketing strategies of

agritourism sites in CALABARZON in terms of place, price, product, promotion; describe the product innovation of agritourism sites in CALABARZON in terms accommodation, gastronomic, services; measure the customer experience of respondents over agritourism sites in CALABARZON in terms of destination characteristics, experience values, service and facilities, staff members, surrounding environment, and price level; test the significant relationship of marketing strategies and product innovation to customer experience; propose a development plan for Agritourism in CALABARZON.

## 2. Methods

**Research Design** - In order to facilitate the study, the descriptive-correlation and comparative method was used as the research design. Because the research aimed to assess the marketing strategies and product innovation among the agritourism tourists in CALABARZON and its correlation with the customer experience, the descriptive-correlational approach was the most suitable research design. Descriptive-correlational study was a research design that described the characteristics of a population or phenomenon and examined the relationship between two or more variables.

**Participants of the Study** - The respondents of the study were the tourists visiting DOT-accredited agritourism sites in CALABARZON. Using Raosoft's sample size calculator, the total sample size of the study was determined to be 385 tourists, which was proportionately distributed to the 12 DOT-accredited agritourism sites in CALABARZON offering accommodations and serving food and beverages. Stratified random sampling was used as the sampling technique. The researcher collected the data based on the availability of the target respondents as well as their willingness to provide the necessary information.

**Data Collection Instrument** - The researcher used an adapted questionnaire to obtain the needed data. The statements had been modified to suit the present setting. It was divided into four parts. Part one of the instrument identified the demographic profile of the respondents in terms of sex, age, civil status, educational attainment, place of origin, purpose of the visit, and frequency of visit per year. Part two of the instrument was adapted from Perlas et al., (2019) to assess the marketing strategies, which included the sub-scales of place, price, product, and promotion and was composed of 24-item statements, with six items per dimension. Part three of the instrument was adapted from Roman et al., (2020) to assess product innovation and was composed of 22-item statements: seven items for accommodation, six items for gastronomy, and nine items for service. Part four of the instrument was adapted from Thakur et al., (2022) and was composed of thirty-eight statements that related to the customer experience. The questionnaire used a five-point Likert scale with 5 denoting "Strongly Agree/Highly Satisfied," 4 as "Agree/Satisfied," 3 as "Slightly Agree/Slightly Satisfied," 2 as "Disagree/Not Satisfied," and 1 as "Strongly Disagree/Highly Not Satisfied."

To refine the instrument, the researcher conducted a face validation with the adviser and Program Dean of PhDIHTM. An expert panel review from the municipal tourism office, municipal agriculturist, and academia was also conducted. The expert validators included the tourism head which has a strong background in tourism management and agricultural development, with experience in promoting rural and farm-based tourism, have led successful agritourism initiatives, managed projects like farm tours and food festivals, and fostered community engagement, driving economic growth in rural areas, agriculturist head with expertise in sustainable farming and agritourism, has developed and promoted farm-based tourism initiatives. With a degree in Agriculture and training in rural development, they have led projects showcasing farm-to-table experiences, organized educational tours, and collaborated with tourism professionals to enhance visitor engagement. Their deep agricultural knowledge and understanding of tourism dynamics have enabled them to create innovative agritourism experiences that educate visitors, support farmers, and boost rural economies, and Faculty of Hospitality Management has a strong academic and professional background in the tourism and hospitality industry, with advanced degrees and extensive teaching experience in higher education. They have blended academic research, curriculum development, and industry practice, holding leadership roles in tourism and hospitality businesses. They have published research, developed innovative teaching methods, and engaged in



industry partnerships to provide practical learning experiences, ensuring students are well-prepared for careers in tourism and hospitality management. The purpose of the review was to check for content validity. Reliability analysis of the instrument used that the items included for each aspect or dimension acceptable to be used in data gathering. None of the items on the questionnaire needs to be deleted or changed.

A pilot test was conducted online using Google Forms among thirty (30) respondents, who were tourists that had visited the DOT-accredited agritourism sites in MIMAROPA (Mindoro, Marinduque, Romblon, Palawan), to determine the validity and reliability of the questionnaire. The reliability and validity analysis of the marketing strategy and product innovation for agritourism sites in CALABARZON revealed strong internal consistency across various dimensions, indicating robust instruments for data gathering. Key areas assessed included Place (.733), Price (.924), Product (.905), Promotion (.961), and Product Innovation (.958), encompassing aspects like unique natural attractions, tiered pricing options, diverse hands-on experiences, effective use of social media, and innovative accommodation options. Additionally, dimensions like Customer Experience (.977) and related subcategories such as Destination Characteristics, Experience Values, Services and Facilities, Staff Members, and Surrounding Environment were found to be reliable. This comprehensive analysis confirms the adequacy of the questionnaire items, ensuring they are suitable for data collection without any need for deletion or modification. After reliability testing with a statistician, the questionnaire underwent the approval of the ethics committee for review, ensuring that all aspects of the research undertaking conformed to standard institutional policies and adhered to acceptable and ethical research practices.

**Data Gathering Procedure** - After the research instrument had been approved, the researcher wrote a letter of consent to the agritourism site managers/owners, which was noted and signed by the research adviser. The letter was a request for permission to distribute the questionnaire by having the respondents complete the instrument. The researcher also wrote a letter to the Department of Tourism for endorsement to the agritourism sites in CALABARZON. In addition, a letter addressed to the respondents was directly attached to the questionnaire along with the data privacy agreement. Immediately after the requests had been approved, the researcher administered the distribution of the questionnaire to the agritourism sites. Following a friendly greeting, the researcher provided a brief explanation and instructions to the respondents. The respondents were given a few minutes to accomplish the questionnaire. Afterward, the researcher checked the questionnaires for the completeness of the data.

**Data Analysis** - Several statistical tools were utilized to meet the objectives of this study. Mean and rank were then utilized to determine the marketing strategies, product innovation, and customer experiences. Pearson correlation coefficient was used to establish possible relationships among the variables of this study.

**Ethical Consideration** - The researcher made sure that every respondent answered the questions voluntarily and freely in accordance with the Code of Ethics by having them sign a consent form, which ensured that the answers were given truthfully and objectively. In compliance with the Data Privacy Act of 2012, all responses were kept with utmost confidentiality and were only used for academic purposes, and the respondents were assured of anonymity. Tourists who did not cooperate with the conduct of the study were replaced by other respondents, considering ethical considerations

### **3. Results and discussion**

Table 1 presents the summary of the weighted mean, verbal interpretation, and rank of the marketing strategy of the agritourism sites in CALABARZON. The overall mean of 4.40 indicates that the respondents agreed in general. Among the four indicators of marketing strategies, highest in rank was the respondents generally strongly agreed on the statement pertaining to marketing strategy of place with a mean of 4.55, while marketing strategy of product agreed on the statement with a mean of 4.41.

**Table 1***Summary Table for Marketing Strategies*

	Mean	Interpretation	Rank
Place	4.55	Strongly Agree	1
Price	4.35	Agree	3
Product	4.41	Agree	2
Promotion	4.30	Agree	4
<b>Overall</b>	<b>4.40</b>	<b>Agree</b>	

*Legend: 1.00 – 1.49 Strongly Disagree, 1.50 – 2.49 Disagree, 2.50 – 3.49 Moderately Agree, 3.50 – 4.49 Agree, 4.50 – 5.00 Strongly Agree*

The strong agreement with the marketing strategy of place implies that respondents find the location and the way it is marketed to be particularly compelling. The "place" in marketing terms usually refers to how and where a product or service is delivered. In the context of agritourism, it could encompass the physical location, the ambiance, the accessibility, and the way these are presented in the marketing materials. The strong agreement here might indicate that the agritourism sites in CALABARZON are seen as desirable destinations due to their location, setting, or the way the sites' experiences are tied to a specific locale. Future marketing initiatives, agritourism sites in the region could benefit from continuing to highlight the unique aspects of their location. It also underlines the importance of place in the agritourism experience, which may include the natural beauty, the agricultural activities, and the cultural experiences that can only be had in those specific locations.

Meanwhile, the indicator of product followed with the mean of 4.41; price with the mean of 4.35, and promotion with the mean of 4.30 all with an interpretation of agree implies agreement but is notably less enthusiastic compared to other areas, possibly suggesting room for improvement in how the agritourism sites communicate with potential visitors, the persuasiveness of their messaging, or the channels they use to reach their audience. The agritourism sites might need to assess their promotional strategies and consider how they could more effectively engage their target market, possibly through enhanced messaging, more targeted channels, or innovative promotional techniques that resonate better with their intended demographic. Agritourism has been recognized as a significant avenue for diversifying farm income and enhancing sustainability. Promotion, a critical element of the marketing mix, plays a vital role in the success of agritourism ventures.

**Table 2***Summary Table for Product Innovation*

	Mean	Interpretation	Rank
Accommodation	4.36	Agree	1
Gastronomic	4.24	Agree	2
Services	4.19	Agree	3
<b>Overall</b>	<b>4.25</b>	<b>Agree</b>	

*Legend: 1.00 – 1.49 Strongly Disagree, 1.50 – 2.49 Disagree, 2.50 – 3.49 Moderately Agree, 3.50 – 4.49 Agree, 4.50 – 5.00 Strongly Agree*

Table 2 presents the summary of the weighted mean, verbal interpretation, and rank of the product innovation of the agritourism sites in CALABARZON. The overall mean of 4.25 indicates that the respondents agreed in general. Among the four indicators of product innovation, the respondents generally agreed on the statement pertaining to product innovation of accommodation, gastronomic, and services.

Product innovation shows that respondents agreed that innovation across these areas was present and valued at agritourism sites. Ranking illustrates that while all these aspects are important, visitors might prioritize a comfortable, unique, and integrative accommodation experience slightly more than gastronomic or other service innovations. For agritourism site operators, this might indicate that investments into enhancing accommodation options could yield greater impact on visitor satisfaction and should perhaps be prioritized.

Agritourism sites have increasingly recognized the importance of product innovation in accommodations to attract tourists seeking unique and authentic experiences. The literature suggests that the diversification of agritourism offerings, including accommodation typologies, is essential for enhancing the appeal of agritourism destinations (Tsung-Chiung et. al.,2024). This indicates a potential for growth in product innovation within

agritourism accommodations. There is a positive influence of landscapes, agricultural activities, and agri-food products on tourism products and services, passive agritourism activities such as tasting experiences and enjoyment of the landscape prevail (Tsung-Chiung et. al.,2024). This suggests that there is room for more active and innovative accommodation experiences that integrate agricultural activities more deeply.

Meanwhile, the indicator of gastronomic followed with the mean of 4.24 and services with the mean of 4.19, with both an interpretation of agree. In essence, while respondents agree that both gastronomic experiences and services are positively received and are important facets of the agritourism product offering, they may not be as compelling as the accommodations in driving satisfaction. This insight could suggest that agritourism site operators might focus more on enhancing the accommodation experience while still ensuring that the gastronomic and service elements are sufficiently attractive and well-promoted.

Agritourism has been recognized as a dynamic field where product innovation plays a crucial role in enhancing the attractiveness and competitiveness of rural areas. The literature reveals that agritourism sites have diversified their services by integrating production sectors and utilizing the multi-functionality of rural and land resources, leading to economic benefits and increased resilience against business challenges (Tsung-Chiung et. al.,2024). Moreover, the development of a competitive positioning index for agritourism farms suggests that innovation is key to gaining a market advantage (Roman et al., 2020).

**Table 3**  
*Summary Table for Customer Experience*

	Mean	Interpretation	Rank
Destination Characteristics	4.43	Satisfied	3.5
Experience Values	4.51	Highly Satisfied	1
Service and Facilities	4.34	Satisfied	6
Staff Members	4.43	Satisfied	3.5
Surrounding Environment	4.40	Satisfied	5
Price Level	4.44	Satisfied	2
Overall	4.42	<i>Satisfied</i>	

*Legend: 1.00–1.49 Dissatisfied, 1.50–2.49 Not Satisfied, 2.50–3.49 Moderately Satisfied, 3.50–4.49 Satisfied, 4.50–5.00 Highly Satisfied*

Table 3 presents the summary of the weighted mean, verbal interpretation, and rank of the customer experience of the agritourism sites in CALABARZON. The overall mean of 4.42 indicates that the respondents satisfied in general. Among the six indicators of customer experience, the respondents generally highly satisfied on the statement pertaining to customer experience with the highest rank of 4.51 on experience values and satisfied on price level with a mean of 4.44.

The most critical factor for customer satisfaction is the value they perceive from their experiences at the site. Price level is also crucial and is well-received by the customers, indicating that pricing strategies are effective. The service and facilities, while satisfactory, are identified as areas with potential for improvement to enhance customer satisfaction further. The staff members and destination characteristics receive similar satisfaction levels, indicating their significant contribution to the overall customer experience. The surrounding environment, while satisfactory, is not as impactful on the experience as the value and price levels. The agritourism destination managers could leverage this analysis to maintain high satisfaction in the 'Experience Values' and 'Price Level' while aiming to enhance 'Service and Facilities' for an even better customer experience. The concept of customer experience in agritourism sites is multifaceted, encompassing various experiential dimensions that contribute to visitor satisfaction and loyalty. Meanwhile, the indicator of surrounding environment followed with the mean of 4.40 and service and facilities with the mean of 4.34, with both an interpretation of satisfied. Visitors are satisfied with both the surrounding environment and services at the agritourism site, but not to the level of 'Highly Satisfied,' hinting at areas that could be enhanced. The surrounding environment is rated higher, suggesting it's more valued than the services and facilities. Targeted improvements in these areas could further boost satisfaction and enhance the overall visitor experience.

Table 4 shows the statistical evidence that there was a significant relationship between marketing strategies

and product innovation within the accommodation, gastronomic, and services sectors. Specifically, the Place strategy showed positive correlations with product innovation in all three sectors, with the strongest relationship in accommodation followed by gastronomic and services. Despite being the weakest, the service sector still presents a significant relationship, indicating that the physical location and distribution channels were relevant to the development of new products.

**Table 4**  
*Relationship of Marketing Strategies to Product Innovation*

	t/F	p-value	Interpretation
<b>Place</b>			
Accommodation	.333**	.000	Significant
Gastronomic	.239**	.000	Significant
Services	.158**	.002	Significant
<b>Price</b>			
Accommodation	.528**	.000	Significant
Gastronomic	.431**	.000	Significant
Services	.487**	.000	Significant
<b>Product</b>			
Accommodation	.532**	.000	Significant
Gastronomic	.393**	.000	Significant
Services	.368**	.000	Significant
<b>Promotion</b>			
Accommodation	.418**	.000	Significant
Gastronomic	.460**	.000	Significant
Services	.423**	.000	Significant

*Legend: Relationship is significant at 0.05 alpha level*

Marketing strategies have a significant positive relationship with product innovation across all three categories studied, but the strength of the relationship varies, with Accommodation showing the strongest relationship and Services the weakest. This could imply that for companies in the accommodation sector, innovative marketing strategies might be more closely tied to the development of new products or services than in the gastronomic or general services sectors. The relationship between marketing strategy and product innovation in agritourism sites is multifaceted, encompassing aspects such as accommodation, gastronomy, and services. Agritourism, as unification strategy, integrates production sectors and capitalizes on the multifunctionality of rural resources, leading to economic resilience and innovation in tourist services (Tsung-Chiung et al., 2024). Contradictions arise when considering the broader tourism and hospitality industry, where innovation is often underestimated.

The analysis revealed a significant positive correlation between pricing strategies and a dependent variable—potentially product innovation or a different business performance indicator—in Accommodation, Services, and Gastronomic sectors, in descending order of correlation strength. This finding implies that within these sectors, refined pricing strategies are linked to beneficial outcomes, with the strongest evidence in Accommodation. Although the results underscore pricing as a key element of strategic business management, caution is advised in inferring direct causality; other variables may be at play, and the practical significance of these pricing strategies necessitates a deeper dive into effect size, confidence intervals, and other pertinent business metrics to fully grasp their impact. The relationship between marketing strategy, particularly pricing, and product innovation in agritourism sites is multifaceted, encompassing accommodation, gastronomy, and services. In the context of agritourism, diversification and innovation in tourist services, including accommodation and gastronomy, have been shown to bring considerable economic returns and increase resilience against business challenges (Tsung-Chiung et al., 2024). Gastronomy extends beyond mere consumption to a continuum of experiences from production to post-consumption, which can be leveraged through innovative marketing strategies. In a comparative analysis across the Accommodation, Gastronomic, and Services sectors, a statistically robust correlation emerged, denoting a significant positive link between product-related factors and a specified outcome variable, with the Accommodation sector exhibiting the most pronounced association. This suggests that product-centric strategies yield marked benefits, most notably within

the realm of accommodation. While the relationship in the Gastronomic and Services sectors was somewhat less strong, it remained statistically significant, underscoring the universal importance of product strategy to business efficacy. The double asterisks signifying the statistical data convey a high degree of significance, thereby reinforcing the solidity of these findings. Managers across these domains are advised to prioritize product strategy in their operational considerations, although the results warrant cautious interpretation, as they do not establish causality, and additional investigation is necessary to navigate the complexities of these dynamics and the potential influence of other variables.

In summary, the relationship between marketing strategy and product innovation in agritourism is well-established in the literature. Marketing strategies are pivotal in developing innovative products and services that cater to evolving consumer preferences, particularly in accommodation and gastronomy.

The statistical data reveals that promotional efforts significantly enhance a key outcome variable across the Accommodation, Gastronomic, and Services sectors, with the influence of promotions being most prominent in the Gastronomic sector, followed by Services, and then Accommodation. This correlation is underscored by the presence of double asterisks next to each coefficient, indicating a high statistical significance, and suggesting that these patterns are not mere products of chance. Consequently, sector managers should consider these insights as a strong incentive to refine their promotional strategies, given the apparent linkage to positive effects. However, it's imperative to understand that these correlations do not necessarily imply causation; thus, further investigative research is warranted to exclude confounding variables and to grasp more conclusively the precise impact of promotional activities on the observed outcomes. Literature on agritourism underscores the intricate relationship between marketing strategies and product innovation, particularly in the realms of accommodation, gastronomy, and services. Integration of gastronomic experiences, such as local cuisine and wine, is a significant factor that attracts visitors to agritourism sites, necessitating innovative marketing approaches to highlight these attributes (Fanelli et. al.,2020).

**Table 5**  
*Relationship of Marketing Strategies on Customer Experience*

	t/F	p-value	Interpretation
<b>Place</b>			
Destination Characteristics	.215**	.000	Significant
Experience Values	.101*	.047	Significant
Service and Facilities	.216**	.000	Significant
Staff Members	.223**	.000	Significant
Surrounding Environment	.278**	.000	Significant
Price Level	.335**	.000	Significant
<b>Price</b>			
Destination Characteristics	.400**	.000	Significant
Experience Values	.222**	.000	Significant
Service and Facilities	.335**	.000	Significant
Staff Members	.405**	.000	Significant
Surrounding Environment	.490**	.000	Significant
Price Level	.478**	.000	Significant
<b>Product</b>			
Destination Characteristics	.522**	.000	Significant
Experience Values	.214**	.000	Significant
Service and Facilities	.309**	.000	Significant
Staff Members	.441**	.000	Significant
Surrounding Environment	.592**	.000	Significant
Price Level	.507**	.000	Significant
<b>Promotion</b>			
Destination Characteristics	.274**	.000	Significant
Experience Values	.109*	.032	Significant
Service and Facilities	.539**	.000	Significant
Staff Members	.395**	.000	Significant
Surrounding Environment	.370**	.000	Significant
Price Level	.346**	.000	Significant

Legend: Difference is significant at 0.05 alpha level

Table 5 shows each marketing strategy exhibits a significant influence on various dimensions of customer experience, with Product showing the highest impact in most areas, followed by Price, suggesting that these two strategies might be particularly powerful levers for businesses looking to enhance customer experiences. In examining the role of Place in customer experience, the data revealed that Destination Characteristics, Service and Facilities, Staff Members, and Surrounding Environment all possessed strong positive correlations, signifying their considerable influence on customer perceptions. Conversely, Experience Values, though still positively linked to customer experience, exhibited a comparatively weaker correlation, indicating its lesser yet still notable impact within the broader context of place in shaping customer experience. The data provided indicates a strong and statistically significant relationship between the Price marketing strategy and various factors that contribute to customer experience. Each factor destination characteristics, experience values, service and facilities, staff members, surrounding environment, and price level has a positive correlation coefficient, indicating that these relationships are highly unlikely to be due to chance.

The 'Product' marketing strategy showed a significant impact on all dimensions of customer experience examined, with the surrounding environment and destination characteristics being the most affected. This underscores the importance of aligning product offerings with the customer's holistic experience at a destination. Product marketing strategy had a significant impact on all aspects of customer experience examined. It highlights that the surrounding environment and destination characteristics were the most affected by a product marketing strategy. This emphasizes the importance of aligning product offerings with a customer's holistic experience at a destination. In other words, how a product is marketed can influence how customers perceive their entire experience at a destination, especially the surrounding environment and the destination itself. This highlights the importance of considering the customer experience when developing a product marketing strategy.

The breakdown of a promotion's impact on various aspects of a customer's experience. All the characteristics listed, including destination, experience, service, staff, environment, and even price level, are labeled "Significant," indicating a strong positive influence from the promotion. The promotion appears highly attractive, creating a strong positive perception of the destination. This likely stems from a significant discount or the inclusion of valuable extras like experiences or upgraded services. Notably, the promotion's benefits extend beyond just a lower price. High scores across experience, service, staff, and environment suggest it enhances the entire customer journey, not just the price point. The promotion is likely very effective in attracting customers and enhancing their experience.

Table 6 shows statistically significant positive relationships between product innovation and all aspects of customer experience except for "Gastronomic Destination Characteristics." This means that customers tend to perceive a positive impact on their experience in all these areas when encountering a product that is perceived to be innovative. The results indicate that product innovation across various aspects of the accommodation experience had a substantial and statistically significant positive relationship with customer experience, with price level changes being possibly the most impactful. It is important to note that while these results show strong correlations, they did not necessarily imply causation, and further analysis would be required to determine causative effects.

Product innovation in the Gastronomic sector showed a significant positive impact on customer experience, with every element examined demonstrating statistical significance. The influence is notably strong in the areas of Destination Characteristics and Service and Facilities, respectively. Even aspects with lower coefficients, like Experience Values, show a meaningful contribution to customer satisfaction. Innovations concerning Staff Members and the Surrounding Environment also enhance the customer experience, and pricing strategies play a crucial role. The uniformly strong statistical significance across these elements, indicated by double asterisks, underscores the importance of a comprehensive approach to innovation within gastronomy to drive customer satisfaction, keeping in mind that these correlations do not inherently indicate causality.

**Table 6***Relationship of Product Innovation on Customer Experience*

	t/F	p-value	Interpretation
<b>Accommodation</b>			
Destination Characteristics	.518**	.000	Significant
Experience Values	.244**	.000	Significant
Service and Facilities	.436**	.000	Significant
Staff Members	.382**	.000	Significant
Surrounding Environment	.555**	.000	Significant
Price Level	.636**	.000	Significant
<b>Gastronomic</b>			
Destination Characteristics	.444**	.000	Significant
Experience Values	.203**	.000	Significant
Service and Facilities	.597**	.000	Significant
Staff Members	.394**	.000	Significant
Surrounding Environment	.416**	.000	Significant
Price Level	.437**	.000	Significant
<b>Services</b>			
Destination Characteristics	.442**	.000	Significant
Experience Values	.214**	.000	Significant
Service and Facilities	.607**	.000	Significant
Staff Members	.450**	.000	Significant
Surrounding Environment	.436**	.000	Significant
Price Level	.443**	.000	Significant

*Legend: Difference is significant at 0.05 alpha level*

In the Services sector, product innovation is significantly and positively correlated with improved customer experience across various dimensions. The robust relationship is especially apparent in Service and Facilities, which shows the most significant potential for enhancing customer experience. Destination Characteristics, Staff Members, and Price Level also strongly contribute to satisfaction. Even Experience Values, with a lower yet significant coefficient, indicate the value of innovation in experiential aspects. However, the data should be interpreted as correlation rather than causation, with the understanding that other factors not captured in this analysis may also affect customer experience.

The development plan created based on the lowest result in 3 variables, which is in marketing strategies, promotion is in the lower rank, in product innovation, services is in the lower rank, and in customer experience, services and facilities is in the lower rank.

In CALABARZON region, known for its agricultural richness and cultural heritage, the development plan for agritourism sites is multi-dimensional. It strategically integrates marketing with product and customer experience innovations. The promotion strategy, commencing in the first quarter, is set to harness the storytelling prowess of TV and documentary collaborators to amplify the site's appeal, aiming to captivate a broad audience with diverse interests. High-quality visual content and professional design are leveraged to translate the intrinsic beauty and activities of the sites into compelling promotional materials, sparking curiosity and encouraging visits. Concurrently, the plan underscores product innovation by introducing new experiential packages and educational workshops by the third quarter, emphasizing organic farming and local gastronomy. This not only enriches the visitor experience but also positions the site as a model for sustainable practices, adding layers of value that go beyond mere tourism. Additionally, an ongoing commitment to enhance customer satisfaction is marked by facility upgrades for improved comfort and a systematic feedback mechanism to be operational by the second quarter. These improvements aim to elevate service standards and adapt to visitor needs, ultimately fostering a high-quality visitor experience that contributes to the region's reputation as a distinguished agritourism destination.

**Table 7***Development Plan for 2024-2025*

<b>Strategic Areas</b>	<b>Objectives</b>	<b>Actions</b>	<b>Expected Outcome</b>	<b>Timeline</b>
Marketing Strategy (Promotion)	Increase awareness and visitor numbers to the agritourism site.	<ul style="list-style-type: none"> <li>- Establish partnerships with TV producers and documentary filmmakers who have a track record of producing successful travel, lifestyle, or cultural content.</li> <li>- Gather high-quality images and engaging content that highlight the unique aspects of the agritourism site, such as its landscapes, activities, and agricultural products.</li> <li>- Collaborate with a professional graphic designer to create a visually appealing layout.</li> </ul>	<ul style="list-style-type: none"> <li>- Forming such partnerships is anticipated to broaden the agritourism site's reach and attract a diverse audience by leveraging the proven storytelling and audience engagement expertise of these content creators.</li> <li>- Access to high-quality production resources and channels to reach a wider and more diverse audience.</li> <li>- Professional and attractive brochures and pamphlets that effectively communicate the value and appeal of the agritourism site, enticing potential visitors.</li> </ul>	Campaign rollout in Quarter 1, with partner engagements starting in Quarter 2, signifies a rapid approach to getting the marketing strategy off the ground in the first half of the year.
Product Innovation (Services)	Diversify and enrich visitor experiences.	<ul style="list-style-type: none"> <li>- Design and offer new agritourism experience packages.</li> <li>- Conduct workshops on organic farming, local cooking, etc.</li> <li>- Adopt and showcase sustainable practices.</li> </ul>	<ul style="list-style-type: none"> <li>- Expanded service offerings leading to longer stays.</li> <li>- Enhanced visitor satisfaction and education.</li> <li>- Recognition as a sustainable tourism model.</li> </ul>	New packages launching by Quarter 3, with workshops starting in Quarter 2 and sustainability measures from Quarter 1, showing a staggered approach to fully rounding out the service offerings throughout the year.
Customer Experience (Service and Facilities)	Improve overall visitor satisfaction through high-quality service and facilities.	<ul style="list-style-type: none"> <li>- Upgrade existing facilities to enhance comfort and accessibility.</li> </ul>	<ul style="list-style-type: none"> <li>- Upgrade existing facilities to enhance comfort and accessibility.</li> </ul>	Facility upgrades completed by Quarter 4 and staff training sessions quarterly, ensuring that the physical improvements are matched by service quality. The feedback system is to be implemented by Quarter 2, allowing for mid-year adjustments based on visitor input.

To effectively measure the objective of bolstering awareness and visitor numbers at an agritourism site, a blend of analytics and direct feedback mechanisms should be employed. Trackable metrics, such as the number of visitors before and after implementing new strategies, website and social media analytics for insights into online engagement, and conversion rates of inquiries to actual visits, offer quantitative data. Qualitative insights can be gleaned from visitor surveys, assessing how they discovered the site, and the efficacy of different marketing channels. Monitoring revenue trends and analyzing the distribution and impact of promotional materials will provide a comprehensive understanding of both awareness and actual visitor increases. Such a multi-angle approach ensures a robust evaluation of the development plan's effectiveness in achieving its marketing objectives. To effectively measure the objective of diversifying and enriching visitor experiences, a nuanced approach that encompasses both direct visitor feedback and observational data is required. Surveys and interviews can be conducted to capture subjective experiences of visitors, focusing on their satisfaction levels and the perceived variety and depth of the offerings. Metrics such as uptake rates of new experience packages, the duration of stays, and the rate of repeat visitation offer quantitative data reflective of enriched experiences. Additionally, tracking participation numbers in workshops and special events can indicate the successful expansion of offerings. Monitoring reviews and ratings on travel sites and social media platforms provides external validation of enhancements to the visitor experience. Collectively, these indicators will help gauge whether the experiences provided are resonating with and adding value to the visitors' time spent at the site.

To effectively measure the objective of enhancing overall visitor satisfaction through high-quality service and facilities, it's critical to collect and analyze both qualitative and quantitative data. Implementing a detailed visitor satisfaction survey is a direct method to gather feedback on various aspects of service and facility quality.



Reviewing online ratings and comments on travel platforms and social media can offer additional insights into public perception. Facility utilization rates, including the frequency and duration of use, can serve as quantitative indicators of facility appeal. Moreover, a well-maintained feedback loop, where visitors can report issues in real-time, coupled with monitoring the resolution rates of these issues, can help in assessing the responsiveness and effectiveness of the service team. These combined metrics enable a comprehensive assessment of visitor satisfaction levels and the success of improvements in service and facilities.

#### **4. Conclusion and recommendation**

The tourists visiting the agritourism sites in CALABARZON demonstrated a marketing strategy in agritourism site in place. The agritourism site adopted a strategic pricing approach that caters to various customer segments, ensuring a fair price that reflects the quality of its services. By offering discounts to students, seniors, and other groups, the site enhances its appeal and inclusivity, potentially attracting a wider audience. Moreover, its tiered pricing system, tailored to different budgets and group sizes, further maximized its market reach and revenue potential, making it a standout strategy in the realm of marketing tactics for agritourism. The tourist in CALABARZON demonstrated the product innovation in accommodation. The agritourism site excelled in accommodation innovation by adopting a holistic approach offering a range of options that cater to diverse preferences while prioritizing sustainability and environmental harmony. This holistic approach not only provided unique and memorable experiences for guests but also demonstrated a commitment to responsible tourism and environmental conservation. From the traditional charm of a farmhouse to the seamless blend of aesthetics and comfort in charming cottages, the site went further by pushing boundaries with tree houses constructed from sustainable materials and equipped with eco-friendly features like solar pans and composting toilets. This holistic approach not only provided unique and memorable experiences for guests but also demonstrated a commitment to responsible tourism and environmental conservation. The tourists visiting the agritourism sites in CALABARZON experienced customer experience values. The agritourism site emphasized authentic experiences that deeply connect visitors with agricultural practices and the local community, offering a genuine taste of rural life. Visitors were encouraged to engage with the essence of rural culture, from experiencing local food and lifestyle to participating in fairs, creating a rich and immersive customer experience rooted in the site's agricultural heritage and community spirit. The study highlighted the significant relationships among marketing strategies, product innovation, and customer experience in agritourism. By managing the 4Ps (price, place, product, promotion), marketers can enhance the perceived value, enjoyment, and satisfaction of a product or service. Strategic marketing played a key role in elevating perceived value and satisfaction, while product innovation, with its novel features and benefits, also positively impacts customer experience which underscored the importance of both marketing strategies and product innovation in shaping customer experience, suggesting that agritourism sites should prioritize both to create memorable and positive experiences for tourists. The development plan for an agritourism site in CALABARZON aimed to improve rural tourism by focusing on place, accommodation innovation, and customer experience values. The marketing strategy will tap into the authenticity of the countryside, while the accommodation will offer immersive experiences and cultural engagement.

To attract a diverse range of visitors, agritourism owners may adopt a culturally sensitive approach and utilize traditional media channels to promote their offerings such as personalized assistance programs ; digital platform for customized educational content, and enhancements such as ramps, clear signage, and comfortable seating to make the experience more inclusive and inviting for families, elderly visitors, and people with disabilities. Agritourism site owners in CALABARZON may enhance their marketing strategies by focusing on digital presence and storytelling, improving online visibility through SEO, engaging social media content, and targeted advertising, utilizing customer testimonials and interactive virtual tours, collaborating with travel influencers, integrating user-generated content, and forming partnerships with local travel agencies to differentiate the sites and attract both new and returning visitors. It is recommended to farmers, agritourism owners and the local communities to develop a suite of experiential services that not only invite participation in

the agricultural process but also incorporate local traditions and practices, such as farm-to-table cooking classes, cultural workshops, and bespoke Agri-educational programs thus, creating immersive experiences that encapsulate the essence of the region. Owners, farmers, and the local community can enhance agritourism by training staff, improving booking systems, and maintaining accessible facilities. Investing in rustic amenities like cozy rest areas and clear signage enhances the visitor experience. Encouraging feedback and integrating local hospitality fosters a welcoming atmosphere, driving positive reviews and repeat visits. The local tourism office should upgrade services and facilities by assessing visitor feedback, training staff, and improving cleanliness, comfort, and cultural integration. Partnering with industry experts can enhance service quality, boosting satisfaction, patronage, and the area's agritourism reputation. Future researchers in CALABARZON may study digital marketing's impact on visitor attraction through campaign analysis and explore agritourism's integration of culture and sustainability. Assessing customer feedback and comparing findings with national and global benchmarks can provide strategic insights for improving visitor experiences and regional growth.

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## Exploring moringa stems and twigs as an alternative raw material for herbal tea production

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### *Abstract*

This study focused on the development and evaluation of an herbal tea made from *Moringa Oleifera* (Malunggay) stems and twigs—parts of the plant often discarded during food preparation. The objective was to explore their potential as a sustainable, nutritious, and functional beverage alternative. Three drying methods were tested to determine their effects on the sensory qualities of the tea: sun drying (Treatment 1), pan drying (Treatment 2), and oven drying (Treatment 3). The tea samples were evaluated by 30 purposively selected respondents from the university and local communities based on appearance, texture, aroma, and taste. Among the treatments, oven drying (Treatment 3) received the highest acceptability scores, particularly in taste and texture, followed closely by sun drying (Treatment 1). Pan drying (Treatment 2) had the lowest ratings due to its strong, slightly burnt flavor and aroma. The most preferred treatment (Treatment 3) was further subjected to physicochemical analysis, revealing a pH of 7.15 (neutral) and moisture content of 8.01%, which meet acceptable food safety standards. The study demonstrates that *Moringa* stems and twigs are viable raw materials for tea production, providing an innovative way to reduce agricultural waste while promoting health and sustainability. The findings contribute to food innovation, sustainability practices, and potential entrepreneurial opportunities in the local community.

**Keywords:** *Moringa Oleifera*, herbal tea, sensory evaluation, drying methods, physicochemical analysis

## Exploring moringa stems and twigs as an alternative raw material for herbal tea production

### 1. Introduction

In the face of rising global health concerns and environmental challenges, there is a growing demand for functional, natural, and sustainable food products. Consumers are becoming increasingly aware of the connection between diet, health, and environmental sustainability, leading to a shift toward plant-based and organic alternatives (Lobo et al., 2010). Herbal teas, in particular, have gained traction for their health benefits, cultural relevance, and minimal environmental impact. Unlike conventional teas derived from *Camellia sinensis*, herbal teas are produced from a wide variety of leaves, roots, flowers, and barks and are often caffeine-free, making them a suitable alternative for health-conscious individuals (Ravikumar, 2014).

One plant that stands out in the field of functional foods is *Moringa Oleifera*, locally known as Malunggay in the Philippines. Moringa is considered a "miracle tree" due to its resilience, ease of cultivation, and high nutritional value. Various studies have confirmed that its leaves, pods, seeds, and even bark are rich in antioxidants, vitamins (A, C, and E), calcium, iron, and essential amino acids (Anwar et al., 2007; Fahey, 2005). Despite its versatility, the stems and twigs are often discarded as agricultural waste, even though they also contain bioactive compounds that may be beneficial to human health (Shanmugapriya et al., 2019).

The improper disposal of these parts reflects a missed opportunity for food innovation and waste reduction. In line with the principles of a circular economy, which encourages the reuse of resources to reduce waste, exploring these by-products for product development presents a dual opportunity: improving nutrition and promoting sustainability (Singh et al., 2021). Utilizing moringa stems and twigs in herbal tea production offers a viable solution to minimize waste while creating a valuable health product. Moreover, this aligns with Sustainable Development Goal 12: Responsible Consumption and Production, and Goal 2: Zero Hunger, both of which advocate for sustainable food practices and improved access to nutritious food (United Nations, 2015). Furthermore, the development of Moringa tea from stems and twigs addresses health-related concerns such as iron deficiency, chronic inflammation, and immune support. Research shows that *Moringa Oleifera* extracts have strong antioxidant, antimicrobial, and anti-inflammatory properties, which can contribute to disease prevention and wellness promotion (Verma et al., 2009). With the global herbal tea market projected to grow substantially, driven by increased interest in organic and functional beverages, the exploration of locally sourced, affordable, and underutilized ingredients becomes even more relevant (Grand View Research, 2021).

This study investigates the development of a nutritious herbal tea product using *Moringa Oleifera* stems and twigs. It specifically evaluates three different drying methods—sun drying, pan drying, and oven drying—to identify the most acceptable product in terms of appearance, texture, aroma, and taste through sensory evaluation. It also subjects the preferred sample to physicochemical analysis to assess its pH level and moisture content, ensuring its safety and quality as a consumable beverage. Additionally, the researchers developed Information, Education, and Communication (IEC) materials to support knowledge dissemination and product promotion. The findings of this study are expected to contribute to sustainable food innovation, empower communities through potential micro-entrepreneurship, and support health promotion using indigenous and accessible plant resources.

**Objectives of the Study** - This study aims to explore the potential of *Moringa Oleifera* (Malunggay) stems and twigs as a sustainable and health-promoting raw material for herbal tea production. Specifically, the research seeks to identify the different stages involved in the development of Moringa stems and twigs tea, including the preparation, processing, and packaging methods. It also aims to evaluate the sensory acceptability of the tea in terms of appearance, texture, aroma, and taste using various drying techniques such as sun drying, pan drying, and oven drying. Lastly, the study intends to determine the physicochemical properties of the most preferred tea

variant by analyzing its pH level and moisture content to ensure safety and quality for consumption.

## 2. Methods

**Research Design** - The research design for the Moringa Oleifera Stems and Twigs Tea study follows a descriptive research design with an experimental approach. This combination allows for a detailed exploration of both the sensory attributes and physicochemical properties of Moringa tea produced from the stems and twigs of the Moringa Oleifera plant. The study focuses on evaluating the acceptability of the tea by using three different drying methods: sun drying, pan drying, and oven drying. These methods are tested to determine which one produces the best tea in terms of appearance, texture, aroma, and taste. The tea is produced by drying the stems and twigs of Moringa, followed by grinding them into powder and packaging them into standardized tea bags. A purposive sampling technique is employed to select 30 evaluators, including students, staff, and community members, ensuring a diverse range of feedback. These evaluators use a 5-point Likert scale to rate the sensory attributes of the tea, providing valuable data on consumer acceptability. In addition to the sensory evaluation, physicochemical tests are conducted to assess the pH and moisture content of the tea, which are critical factors in determining the tea's quality, safety, and shelf stability. The data collected from both the sensory evaluation and the physicochemical analysis are then analyzed to identify the most acceptable drying method and to ensure that the final product meets the necessary quality standards. This research design integrates technical and consumer perspectives, making it a comprehensive approach for developing a high-quality, sustainable tea product.

**Participants of the Study** - The participants of the study were selected using a purposive sampling technique, which was carefully designed to ensure a diverse and representative group of evaluators. A total of 30 participants were chosen, and they were divided into three groups to provide a broad range of perspectives. The first group consisted of 10 students from Central Bicol State University of Agriculture-Calabanga, representing a youthful and academic demographic. The second group included 10 teaching and non-teaching staff from the university, offering a professional viewpoint. Finally, the third group comprised 10 community members from Canaman and Bombon, reflecting a more general, local perspective. This sampling method allowed the study to gather a variety of opinions on the sensory attributes of the Moringa tea, including appearance, texture, aroma, and taste. By including individuals from different backgrounds and sectors, the research was able to ensure that the feedback was comprehensive and reflective of the broader community's acceptance of the product. This diversity in the participant pool is crucial for assessing the tea's potential in different market segments and understanding how it may be received by various consumer groups.

**Data Gathering Instrument** - The data gathering instrument used in the study was a sensory evaluation form designed to assess the acceptability of the Moringa tea based on its sensory attributes. The form utilized a 5-point Likert scale, which allowed participants to rate the tea on four key sensory parameters: appearance, taste, texture, and aroma. This scale ranged from 1 (Not Acceptable) to 5 (Highly Acceptable), providing a clear and quantifiable way to measure participants' opinions on the product's characteristics. The Likert scale is commonly used in sensory evaluations because it simplifies the process of capturing subjective impressions and allows for easy statistical analysis.

In addition to the sensory evaluation form, physicochemical analysis was conducted using laboratory instruments to measure the pH and moisture content of the tea. These tests were essential for determining the safety, quality, and shelf stability of the final product. The data gathering instruments were structured to ensure consistency in the evaluation process and to provide reliable data on both the sensory and physicochemical aspects of the Moringa tea. The combination of sensory feedback and scientific analysis allowed the researchers to comprehensively assess the product and its potential for market acceptance.

**Data Gathering Procedure** - The data gathering procedure for this study involved a systematic approach to ensure reliable and consistent evaluation of the Moringa tea. The process began with preparing the tea samples through three drying methods: sun drying, pan drying, and oven drying. After drying, the Moringa stems and

twigs were ground into powder and packaged into standardized tea bags. For the sensory evaluation, 30 evaluators, selected from students, teaching and non-teaching staff, and community members, assessed the tea samples based on four sensory attributes: appearance, texture, aroma, and taste, using a 5-point Likert scale. Simultaneously, physicochemical analysis was performed to measure the pH and moisture content of the samples. The sensory data were collected using evaluation forms, while the laboratory tests were conducted following standard procedures. This comprehensive data collection ensured the accurate assessment of both the sensory and physicochemical properties of the Moringa tea, providing valuable insights into its quality and acceptability.

**Ethical Considerations** - The study adhered to strict ethical considerations to ensure the protection and well-being of all participants involved. Before any data collection, informed consent was obtained from all participants. They were thoroughly briefed on the purpose of the study, the procedures involved, potential risks, and benefits, and their right to withdraw from the study at any point without facing any negative consequences. All participants were assured of their confidentiality, with their personal information and responses anonymized and securely stored to protect their privacy. Participation in the study was entirely voluntary, and participants were free to withdraw at any time without penalty. Additionally, the tea samples were prepared under hygienic conditions, following all safety protocols to minimize any health risks to the participants. By following these ethical guidelines, the study ensured that the participants' rights were respected, and the research process remained transparent, fair, and safe.

**Data Analysis** - The data analysis for this study involved both sensory evaluation and physicochemical analysis. The sensory evaluation data were analyzed using the Weighted Mean (WM) formula, where the ratings from the 5-point Likert scale for each sensory attribute—appearance, taste, texture, and aroma—were multiplied by their corresponding frequency and then summed up. This total was divided by the total number of participants to calculate the mean score for each attribute. The results were categorized into different levels of acceptability, ranging from "Not Acceptable" to "Highly Acceptable," providing a clear understanding of the overall consumer preference for each tea variant. For the physicochemical analysis, the pH level and moisture content of the tea samples were measured and analyzed descriptively. These values were compared to standard quality requirements to ensure that the product met safety and preservation criteria. By combining both sensory and physicochemical data, the analysis provided a comprehensive assessment of the tea's overall quality and acceptability, helping to identify the best drying method and the most suitable tea formulation.

### 3. Results and Discussion

**Development of the Product.** The development of Malunggay (*Moringa Oleifera*) Stems and Twigs Tea followed a systematic process involving three major experimental trials to determine the most effective method of drying the raw materials. The researchers began by collecting fresh moringa from selected communities, specifically separating the stems and twigs from the leaves. These parts, often discarded, were chosen as the main ingredient for the tea product. The initial stage included thorough washing and draining, followed by cutting the stems and twigs into smaller pieces to ensure even drying. Three drying techniques were then applied across the trials: sun drying, pan drying, and oven drying.

In Trial 1, sun drying was used, wherein the moringa stems and twigs were dried under direct sunlight for four days until completely crisp and moisture-free. This method produced a light-yellow tea with mild aroma and taste, scoring highest in appearance and texture among the trials. Trial 2 employed pan drying over low to medium heat for 42 minutes. While it produced a golden yellow appearance, the tea developed a strong, slightly burnt flavor and aroma. Trial 3, the most successful, utilized oven drying at a consistent temperature of 50°C for approximately 4 hours and 21 minutes. This method ensured even drying without burning the product, resulting in a smooth texture, slightly herby aroma, and herby taste. After drying, the samples from each trial were minced and measured at 2.30 grams per tea bag. The entire process demonstrated how different drying methods impact the quality and sensory properties of the final moringa tea product.

**Table 1***Sensory Evaluation of Malunggay (Moringa Oleifera) Stems and Twigs Tea*

Sensory Parameters	T1	T2	T3
Appearance	4.7	3.0	4.5
Texture	4.7	3.8	4.6
Aroma	4.0	3.8	4.1
Taste	4.1	3.9	4.4
Mean	4.4	3.6	4.4

Legendary: 5.00-4.21 Highly Acceptable, 4.20-3.41 Acceptable, 3.40-2.61 Moderately Acceptable, 2.60-1.81 Slightly Acceptable, 1.80-1.00 Not Acceptable

This table displays the results of the sensory evaluation of Malunggay (*Moringa Oleifera*) Stems and Twigs Tea, which were prepared using three different drying methods: sun drying (T1), pan drying (T2), and oven drying (T3). The evaluators rated the tea samples based on four sensory parameters: appearance, texture, aroma, and taste. The ratings were based on a 5-point Likert scale, where higher scores indicate better acceptability.

**Appearance** -The sensory evaluation results presented in Table 1 provide valuable insights into the appearance of Malunggay (*Moringa Oleifera*) Stems and Twigs Tea, evaluated through three different drying methods: sun drying (T1), pan drying (T2), and oven drying (T3). The appearance of the tea was rated on a 5-point Likert scale, where higher scores indicated greater acceptability. The mean scores for appearance were 4.4 for T1, 3.6 for T2, and 4.4 for T3. These scores suggest that both sun-dried and oven-dried teas were considered highly acceptable, while the pan-dried tea was rated moderately acceptable due to its less favorable visual appearance.

Upon analysis, the results reveal a clear distinction in the appearance of the tea samples based on the drying method. Sun-dried tea (T1) and oven-dried tea (T3) received higher acceptability ratings of 4.4, which places them within the "Highly Acceptable" category. This suggests that these drying methods preserved the natural appearance of the Moringa stems and twigs, resulting in a more visually appealing product. In contrast, pan-dried tea (T2) received a much lower score of 3.0, indicating that the tea's appearance was negatively affected by the pan drying process. The pan drying method, which involved heating the tea over direct heat, likely caused uneven drying, resulting in a dull or slightly burnt appearance, thus lowering its visual appeal.

These results emphasize the importance of the drying method in preserving the visual qualities of the tea. Sun drying appears to provide a slower, more natural drying process that helps retain the color and texture of the Moringa stems and twigs. Oven drying, which involves a controlled environment, also appears to be an effective method, providing a smooth texture and consistent appearance without the risks of burning associated with pan drying. In contrast, pan drying may have caused overheating or uneven heat distribution, leading to a less appealing visual outcome.

These findings align with existing literature on the role of appearance in consumer food acceptance. Moss, Perez, and Russell (2020) highlight the critical role of visual appeal in food products, stating that consumers are often drawn to foods with vibrant, uniform colors, which influence their willingness to try and buy products. Similarly, Liu, Zhang, and Zheng (2021) emphasize that an attractive appearance can enhance consumer satisfaction and influence market success. Furthermore, Kapsak, Landry, and Kapsak (2017) discuss how consistent and appealing food appearance can build consumer trust and encourage repeat purchases. These studies reinforce the importance of visual attributes in consumer food choices, supporting the higher ratings for both sun-dried and oven-dried tea samples in this study.

**Texture** - The texture of the Malunggay (*Moringa Oleifera*) Stems and Twigs Tea was assessed across three different drying methods: sun drying (T1), pan drying (T2), and oven drying (T3). The texture scores for the samples were 4.7 for T1, 3.8 for T2, and 4.6 for T3, with mean scores of 4.4 for T1, 3.6 for T2, and 4.4 for T3. These scores indicate that the texture of the tea was most acceptable for both the sun-dried and oven-dried samples, while the pan-dried tea had a lower score, suggesting a less favorable texture.

The higher texture scores for sun drying (T1) and oven drying (T3) may suggest that these drying methods preserved a smoother and more consistent texture in the tea leaves, which are key attributes for consumer satisfaction. On the other hand, the pan drying (T2) method, which received a lower texture score, may have resulted in a rougher, less desirable texture due to the uneven drying process. The texture of a product, particularly in tea, is critical as it affects mouthfeel and the overall drinking experience. A smooth, well-preserved texture is more likely to be preferred by consumers, as it contributes to the overall sensory appeal.

In support of these findings, Stone and Sidel (2017) emphasize that texture plays a pivotal role in consumer preference for food products, as it impacts the overall eating or drinking experience. Their research indicates that smooth, consistent textures are often linked with higher consumer satisfaction. Similarly, Szczesniak (2002) identifies texture as a key factor in the acceptance of novel food products, especially when consumers are unfamiliar with the product's texture. In this case, the consistent, smooth texture provided by sun and oven drying methods likely contributed to their higher scores. Additionally, Bourne (2002) further supports this by highlighting that the handling characteristics of a product, including its texture, can significantly affect consumer enjoyment. A more pleasing texture encourages repeat consumption, which is crucial for products like herbal teas, where consumer loyalty can be built over time.

**Aroma** - The aroma of the Malunggay (*Moringa Oleifera*) Stems and Twigs Tea was evaluated based on three different drying methods: sun drying (T1), pan drying (T2), and oven drying (T3). The aroma scores for the tea samples were 4.0 for T1, 3.8 for T2, and 4.1 for T3, with mean scores of 4.4 for T1, 3.9 for T2, and 4.4 for T3. These scores suggest that sun-dried and oven-dried teas were more favorably rated for their aroma compared to the pan-dried tea. The sun drying (T1) and oven drying (T3) methods likely helped preserve a more pleasant, natural aroma, contributing to higher aroma scores. The pan drying (T2) method, which scored lower, might have resulted in a less favorable aroma due to the uneven drying process, which could have led to a burnt or overly strong aroma that detracted from the tea's natural scent.

Aroma is a significant factor in the overall sensory experience of tea, as it contributes to the anticipation of flavor and enhances the drinking experience. Drake and Civille (2003) emphasize the crucial role aroma plays in food acceptance, as it influences consumer expectations and enjoyment. They note that a balanced and appealing aroma can enhance the perception of taste, creating a more enjoyable sensory experience. Similarly, Meilgaard, Civille, and Carr (2006) argue that aroma is a critical determinant of food preference, as it plays a large part in shaping overall flavor perception. The higher aroma scores for sun-dried and oven-dried teas suggest that these methods better preserved the aromatic compounds in the *Moringa* stems and twigs. In addition, Bayarri, De La Fuente, and Costell (2001) highlight that a well-balanced aroma profile is important for increasing consumer satisfaction with food products. This is consistent with the higher ratings for the aroma of the sun-dried and oven-dried teas, which likely had more desirable and balanced aromatic qualities.

**Taste** - The taste of the Malunggay (*Moringa Oleifera*) Stems and Twigs Tea was evaluated based on three different drying methods: sun drying (T1), pan drying (T2), and oven drying (T3). The taste scores for the tea samples were 4.1 for T1, 3.9 for T2, and 4.4 for T3, with mean scores of 4.4 for T1, 3.6 for T2, and 4.4 for T3. These scores suggest that the taste of the tea was most acceptable in both the sun-dried and oven-dried samples, while the pan-dried tea received a lower score, indicating less favorable taste. The sun drying (T1) and oven drying (T3) methods were likely more effective in preserving the natural taste of the *Moringa* stems and twigs, resulting in a more pleasant and balanced flavor. The higher taste scores for these methods reflect the better taste preservation. On the other hand, the pan drying (T2) method received a lower score, possibly due to the development of a burnt or overly intense flavor from uneven drying, which negatively affected the overall taste.

Taste is one of the most influential factors in food acceptance, and it significantly impacts consumer preference. Jaeger et al. (2018) emphasize that a well-balanced flavor profile is crucial for increasing consumer liking and ensuring a product's success in the market. When the flavor is balanced, with a proper combination of



sweetness, bitterness, and other taste components, consumers are more likely to accept and enjoy the product. In this study, the more favorable taste scores for sun-dried and oven-dried teas align with findings that preserving the natural flavor of the raw materials enhances the overall acceptability of the product.

Additionally, Drewnowski and Gomez-Carneros (2000) highlight the importance of balancing taste components, such as bitterness and sweetness, to create a harmonious flavor profile that appeals to consumers. The higher ratings for the taste of sun-dried and oven-dried teas may reflect a better balance of the tea's natural flavors, while the pan-dried tea, with its possibly burnt or overly bitter taste, scored lower.

**Table 2**

*Result of Physicochemical Analysis*

Item No.	Sample and Lab Code	Sample Description	Results	
			pH	Moisture Content (%)
232371	685-24-01	Moringa Stem and Twigs Tea	7.15	8.01
Method used			AOAC 981.12, pH Meter	AOAC 925.10, Gravimetric Method

**Physicochemical Analysis** - The physicochemical analysis results presented in Table 2 were submitted to the CBSUA Food Testing Laboratory for evaluation. These tests were conducted on the most preferred sample from Trial 3, which utilized oven drying at a controlled temperature of 50°C for approximately 4 hours and 21 minutes. This trial was chosen due to its superior sensory attributes, particularly in terms of taste and texture, as evidenced by the higher acceptability scores in the sensory evaluation. The physicochemical analysis measured two critical parameters—pH and moisture content—of the final tea product to assess its safety, quality, and shelf stability.

Table 2 presents the results of the physicochemical analysis of the Malunggay (*Moringa Oleifera*) Stems and Twigs Tea, specifically focusing on two key parameters: pH and moisture content. The pH of the final tea product was measured at 7.15, which is classified as neutral, while the moisture content was determined to be 8.01%. These values were obtained from the preferred sample produced using the oven drying method (Trial 3), which was selected due to its superior sensory qualities in terms of taste, texture, aroma, and appearance.

The neutral pH of 7.15 suggests that the tea is well within the acceptable range for consumption. A pH level near neutral is considered ideal for beverages because it minimizes the risk of acidity-related discomfort for consumers. Additionally, a neutral pH supports the stability of the tea's flavor, which is critical for consumer acceptance. The moisture content of 8.01% indicates that the tea has been sufficiently dried, which is important for both preservation and microbial safety. This relatively low moisture level reduces the risk of spoilage and enhances the shelf life of the product, ensuring that it remains safe and stable for consumption over time.

These results are in line with findings from Liu et al. (2020), who highlighted that a neutral pH in food and beverages is important for both safety and consumer comfort, particularly for products like tea. Additionally, Rivera et al. (2018) stressed the significance of moisture control in food preservation, noting that products with moisture content below 10% are less likely to develop microbial contamination, ensuring longer shelf life and quality retention. The physicochemical results for the Moringa tea confirm that it meets the necessary standards for a stable and safe product, supporting its potential for commercial production and consumption.

#### 4. Conclusions and Recommendation

This study successfully explored the potential of *Moringa Oleifera* (Malunggay) stems and twigs as a sustainable and health-promoting raw material for herbal tea production. The primary objectives of the study were to evaluate the sensory acceptability of the tea, considering appearance, texture, aroma, and taste, and to assess the impact of different drying methods—sun drying, pan drying, and oven drying—on these sensory qualities. The study also aimed to determine the physicochemical properties of the most preferred tea sample to

ensure its safety and quality for consumption.

The findings revealed that both sun drying and oven drying methods produced highly acceptable tea, with the oven-dried tea (Trial 3) being the most favored due to its superior sensory attributes in terms of taste, texture, and overall appearance. In contrast, the pan-dried tea received the lowest ratings, particularly for aroma and taste, due to a slightly burnt flavor. The physicochemical analysis confirmed the safety and stability of the tea, with a neutral pH of 7.15 and a moisture content of 8.01%. These values indicate that the tea produced from Moringa stems and twigs is not only safe for consumption but also meets food safety standards, ensuring long-term preservation. Overall, the study demonstrates that Moringa stems and twigs are viable, sustainable raw materials for tea production, contributing to waste reduction while providing a nutritious and functional beverage alternative.

The study's positive results suggest several avenues for future work and commercialization. First, scaling up the production of Moringa tea, particularly using the oven drying method, is recommended. This method produced the highest sensory acceptability scores, making it the best candidate for larger-scale manufacturing. Expanding production could help reduce agricultural waste, providing a sustainable alternative while creating a product with health benefits.

Further sensory testing with a larger and more diverse sample group should be conducted to validate the findings and ensure consistent results across different demographics. Additionally, shelf-life testing under various storage conditions is necessary to determine the product's long-term stability, ensuring it maintains its flavor and quality over time. To facilitate market adoption, it is recommended that the Moringa tea be introduced to health-conscious consumers with a marketing strategy that highlights its antioxidant, anti-inflammatory, and immune-boosting properties. This would position the tea as a functional beverage with added health benefits. Future research could also explore using other parts of the Moringa plant, such as leaves or seeds, to further expand the product range and enhance the health-promoting qualities of the tea.

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# Technopreneurship, innovation facilitation, and corporate networking of feedmill manufacturing companies: Basis for the development of process innovation framework

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## Abstract

This paper developed a framework to improve operational efficiency in feedmill industries in Batangas Province, focusing on three key pillars: technopreneurship, innovation facilitation, and corporate networking. The study involved 400 feedmill employees with expertise in these areas and used quantitative analysis with the Shapiro-Wilk Test and Spearman's rho through SPSS version 28. The study's findings highlighted the following key insights: Technopreneurship is driven by entrepreneurship skills, technological proficiency, and market orientation, enabling effective adaptation and innovation; Innovation facilitation, backed by strategic R&D, strong infrastructure, and solid processes, advances technopreneurship; Corporate networking enhances both technopreneurship and innovation through its focus on network structure, information sharing, and knowledge transfer. Feedmill industries generally agreed on the company's effective and multi-faceted technopreneurial skills, their active facilitation of innovation, and their recognition of key indicators of corporate networking. This framework provides valuable insights for feedmills and a foundation for future research on how these factors can drive industrial growth in the region. By integrating these pillars, feedmill industries can achieve greater resilience, competitiveness, and sustainable development.

**Keywords:** corporate networking, feedmill industry, innovation facilitation, process innovation, technopreneurship

## **Technopreneurship, innovation facilitation, and corporate networking of feedmill manufacturing companies: Basis for the development of process innovation framework**

### **1. Introduction**

Manufacturing industry remains a critical sector in both developed and emerging economies, including the feedmill industry. However, the industry is constantly evolving due to technological advancements, regulatory changes, and external disruptions. The Philippine feed mill industry plays a vital role in supporting the livestock sector, driven by rising investments in animal farming and growing demand for meat and dairy products. While regulations help ensure feed quality, operators continue to face challenges in improving efficiency, managing costs, and optimizing resources to stay competitive.

Koteshwar (2021) provides detailed empirical insights into the dynamic capabilities required for the smooth transformation of firms from traditional process innovation to digitally enabled process innovation. While dynamic capabilities have been limitedly explored in the context of process industries, particularly regarding process innovation and digitalization, the study highlights their importance. The ability to adapt and innovate within production processes has become essential for sustaining industry growth and addressing emerging challenges in an increasingly digital and competitive environment.

In Batangas, a province known for its strong agricultural base, the feedmill industry serves as a key contributor to the local economy. The region hosts 89 operational animal feed mill enterprises, the majority of which are concentrated in Lipa City, San Jose, Rosario, and Padre Garcia. Of these, 81 operate as commercial businesses, while eight (8) function under the cooperative model. The high prevalence of feed mills in Batangas can be attributed to the concentration of commercial swine and poultry farms, as well as the presence of numerous backyard farms in the region. This concentration of livestock farming creates a consistent demand for animal feed, making Batangas a key area for feed mill operations. However, despite the industry's strong presence, the adoption of process innovations remains a significant challenge for many enterprises. Technopreneurship within the feedmills sector in Batangas remains in its early stages of maturity. While some business owners have begun to integrate entrepreneurial thinking and technological tools into their operations, many still rely on traditional management styles and legacy systems. There is a noticeable gap in the consistent application of entrepreneurial skills, technological proficiency, and market-driven strategies, which limits the sector's potential to scale and innovate effectively.

According to the study of Kreiterling (2023), digitalization fosters entrepreneurship expansion into new markets and digital technologies have been shown to enhance firm productivity, particularly in manufacturing and intensive industries. However, many feedmill enterprises in Batangas still rely on traditional production methods, which can limit their ability to adapt to market fluctuations and external disruptions, such as the COVID-19 pandemic and the African Swine Flu outbreak. The lack of widespread process innovation hinders the industry's ability to optimize costs, improve productivity, and ensure long-term sustainability.

In terms of innovation facilitation, only a few feed mills in Batangas invest in R&D or innovation infrastructure, with most still relying on traditional, largely manual methods despite limited adoption of basic machinery. Many enterprises face financial and logistical barriers that limit modernization and adoption of innovative techniques. Despite efforts to improve processes and product quality, a systematic approach to innovation remains largely absent. Today's companies are working in a fast-changing and unpredictable environment, where digital technologies are speeding up the rate of change (Ghezzi et. al.,2020). These technologies also help create value and open new business opportunities (Spender et. al.,2017). In the digital sector, innovation often doesn't need huge investments or heavy spending on equipment (Leliveld et. al.,2018), which makes it easier for even small businesses to innovate and grow. As a result, their growth is often limited,

and they may struggle to keep up with more technologically advanced competitors in other regions.

Innovation can help entrepreneurial businesses create value, promote sustainable growth, and achieve long-term success (Rubio-Andrés et al.,2022). Entrepreneurs often face challenges in spotting opportunities and taking advantage of them due to limited knowledge, resources, and networks. To encourage entrepreneurship to drive digital innovation in companies, these challenges need to be overcome (Khanin et. al.,2022). Process innovation in the feedmill industry involves adopting new or improved methods to enhance production efficiency, streamline operations, and integrate advanced technologies. The study of Borbon et. al.,(2022) concluded that innovation is necessary for the company's competitive advantage. No company can survive without advancement; it also plays a central role in entrepreneurship. This includes refining workflows, minimizing waste, and improving product quality to remain competitive in the market.

This research proposes to analyze the three pillars—technopreneurship, innovation facilitation, and corporate networking—as foundational components of a process innovation framework tailored specifically for feedmill manufacturers. The resulting framework will provide actionable guidance for implementing new technologies, restructuring production systems, and building collaborative networks that strengthen business performance. It will offer a roadmap for feedmill companies to become more agile, sustainable, and competitive—capable of responding to both market demands and future disruptions.

**Objectives of the Study** - This study aimed to assess the technopreneurship, innovation capacity and corporate networking of Feedmill Industries in Batangas Province as a basis for formulating their process innovation framework. Specifically, this study aimed to describe technopreneurship in terms of entrepreneurial skills, technological proficiency, and market orientation; to determine innovation facilitation in terms of research and development investment, innovation infrastructure, and process formulation; to evaluate corporate networking in terms of network structure, information sharing and knowledge transfer; to test the significant relationships among technopreneurship, innovation facilitation and corporate networking; and, to develop a process innovation framework to enhance their operations.

## 2. Methods

**Research Design** - A descriptive research design was employed in this study to ensure an accurate and thorough interpretation of the findings. The primary goal of a descriptive study is to offer a detailed account of a group, scenario, or phenomenon without manipulating any variables. Its main objective is to portray characteristics, behaviors, or patterns as they occur naturally in the real world. This approach typically uses methods such as surveys, observations, and existing data to gather information, allowing researchers to present a comprehensive view of the subject matter. Descriptive research is conducted to describe the characteristics of the variables under study. It can also be used to identify attributes such as trends, frequency, categories, and more. Typically, the data collection methods for descriptive research include observation, surveys, and case studies. Using a descriptive research approach, the study aimed to provide empirical evidence and quantitative insights into the relationship between technopreneurship, innovation facilitation, and corporate networking within the Feedmill Industries of Batangas Province. This approach allowed for a detailed examination of these factors as they naturally occur in the industry, providing valuable data for understanding their interactions and impact.

**Participants of the Study** - The study's respondents focused on employees of feedmills industries specifically from administrative and operational functions using stratified random sampling to ensure representation from various sizes and locations of feedmill industries. The respondents did not include those ISO certified feedmill companies as respondents in the study because they operate very differently from small and medium-sized businesses. Their size, resources, and way of doing things could have affected the results of the study. To gather the needed data, the researcher focused only on five (5) selected municipalities in the province of Batangas and was able to get 400 responses by giving out questionnaires directly to small and medium-sized businesses. The researcher did this through personal visits, and sending out online survey forms. This way, the

researcher was able to reach the number of respondents needed and make sure the answers were relevant to the goals of the study. The majority of survey respondents were engineers, technical personnel, and supervisors, all of whom possess extensive knowledge of technopreneurship, innovation facilitation, and corporate networking within their organizations. These individuals play key roles in driving and overseeing the implementation of innovative practices and strategies, which are vital for ensuring organizational success in a rapidly evolving business environment. Their valuable insights and comments, based on their deep understanding of the relationship between innovation and corporate performance, contributed significantly to the thorough examination of the research topic.

**Instruments of the Study** - A self-made questionnaire was used by the researcher for data gathering. The researcher took a validated questionnaire and modified it into three parts to better suit the study's objectives. This allowed for a more targeted approach in collecting data on specific areas of interest, including technopreneurship, innovation facilitation, and corporate networking. The research questionnaire was organized into three comprehensive parts, each designed to measure a key variable relevant to the study. Each part includes 21 questions, evenly grouped into three key areas with seven questions each. Part I focuses on technopreneurship by exploring entrepreneurial skills, technological proficiency, and market orientation. Part II looks into how well an organization encourages innovation, covering aspects such as R&D investment, process formulation, and innovation infrastructure. Lastly, Part III examines corporate networking, highlighting information sharing, knowledge transfer, and network structure.

The questions in the survey were based on a Likert Scale using a four-point rating system, where 4 represented the highest rating and 1 represented the lowest. The response scale of 4, with a range of 3.50–4.00, was interpreted as "Strongly Agree" and qualitatively defined as indicating a very high level of technopreneurial capability, a highly developed level of innovation facilitation, or a strongly established level of corporate networking. Response scale of 3 with the range of 2.50 - 3.49 has a verbal interpretation of agree and a qualitative definition of high level of technopreneurial capability/moderately developed level of innovation facilitation/moderately established level of corporate networking. Response scale of 2 with the range of 1.50-2.49 has a verbal interpretation of disagree and a qualitative definition of low level of technopreneurial capability/emerging level of innovation facilitation/minimally established level of corporate networking. Response scale of 1 with the range of 1.00-1.49 has a verbal interpretation of strongly disagree and a qualitative definition of very low level of technopreneurial capability/underdeveloped level of innovation facilitation/ not established level of corporate networking.

After the topic and questionnaire validation, the researcher conducted a dry-run survey to assess the reliability of the questions. Reliability testing is a critical step in research and evaluation, as it examines the dependability and consistency of a measurement tool or instrument. Reliable test ensures that the data collection tool provides accurate and consistent results under similar conditions. This process confirms that the instruments or questionnaires used to assess technopreneurship, innovation facilitation, and corporate networking practices are effective in gathering the intended data without bias or inconsistency. Once the questionnaire passed the reliability test with a Cronbach's Alpha of 0.897, it was deemed ready for the study.

**Table 1**

*Reliability Test Result*

Indicator	Cronbach Alpha	Remarks
Technopreneurship		
A. Entrepreneurship Skills	0.832	Good
B. Technological Proficiency	0.755	Acceptable
C. Market Orientation	0.944	Excellent
Innovation Facilitation		
A. Research and Development (R&D) Investment	0.930	Excellent
B. Innovation Infrastructure	0.920	Excellent
C. Process Formulation	0.935	Excellent



Corporate Networking		
A. Network Structure	0.914	Excellent
B. Information Sharing	0.925	Excellent
C. Knowledge Transfer	0.918	Excellent

George and Malley (2003) provide the following rules of thumb “>0.90 – Excellent, >0.80 – Good, >0.7 – Acceptable, >0.60 – Questionable, >0.50 – Poor, and <0.50 – Unacceptable”

Table 1 presents the results of the Cronbach Alpha analysis, which evaluates the internal consistency of various study indicators. Cronbach Alpha is a statistical measure used to assess the reliability or consistency of a set of items or measures. The indicators in this scenario include Entrepreneurship Skills, Technological Proficiency, Market Orientation, Research and Development (R&D) Investment, Innovation Infrastructure, Process Formulation, Network Structure, Information Sharing and Knowledge Transfer. The Cronbach Alpha coefficients for these indicators were found to range from 0.755 to 0.944, indicating a high level of internal consistency. Specifically, the coefficients were 0.832, 0.755, 0.944, 0.930, 0.920, 0.935, 0.914, 0.925, and 0.918. These values suggest that the indicators exhibit a good to excellent level of reliability, making the instrument suitable for measuring the intended constructs.

**Data Gathering Procedures** - The target feedmill manufacturing industries were selected based on their proximity to labor-intensive operations and their strong potential to offer meaningful insights into technopreneurship, innovation facilitation, and corporate networking. To ensure the validity of the questionnaire, the researcher first consulted three experts from the feedmill manufacturing industry and one research specialist. These experts reviewed the content to confirm that the questions accurately measured the intended concepts and constructs. After their evaluation, a certificate of validation was issued for the survey tool. The next step was to test the reliability of the questionnaire to assess how consistently it would produce results over time and across different respondents. For this purpose, the questionnaire was distributed to 30 participants from the feedmill manufacturing sector, providing a solid basis for evaluating the reliability of the instrument. After completing the reliability test, the researcher sent formal letters to authorized personnel in feedmill manufacturing companies to request permission to conduct the survey using both pen-and-paper and Google Forms. Once approved, questionnaires were distributed to employees to collect data on technopreneurship, innovation facilitation, and corporate networking. Data collection utilized both online and printed formats to suit respondents' preferences. For the paper-based survey, participants were given 10 to 15 minutes to respond, and their answers were collected right after. The researcher then compiled and encoded the responses for analysis.

**Data Analysis** - To analyze the data, several statistical tools were used. The weighted mean and ranking were applied to evaluate and compare technopreneurship responses of the participants in terms of entrepreneurial skills, technological proficiency, and market orientation; also to determine innovation facilitation in terms of research and development investment, innovation infrastructure, and process formulation, lastly to evaluate corporate networking in terms of network structure, information sharing and knowledge transfer. The Shapiro-Wilk test showed that the p-values for the main variable were below 0.05, indicating that the data were not normally distributed. Because of this, Spearman's rho was used to examine the significant relationships between variables. A Likert Scale was used for assessment, with the following ranges: 3.50–4.00 = Strongly Agree, 2.50–3.49 = Agree, 1.50–2.49 = Disagree, and 1.00–1.49 = Strongly Disagree. All data were analyzed using PASW version 26, applying significance levels of 0.05 and 0.01 to interpret the results.

**Ethical Considerations** - The study followed proper ethical standards to ensure the information collected was used only for research purposes. The researcher obtained permission from the feedmill companies through formal letters and communication, ensuring respondents were informed and willing to participate. To maintain privacy, no names were collected during the survey. Participation was voluntary, with all respondents giving their consent. The researcher also ensured the safety and well-being of all participants throughout the study.

### 3. Results and discussion

**Table 2**

*Summary Table on Technopreneurship*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Entrepreneurship Skills	2.94	Agree	2
Technological Proficiency	2.60	Agree	3
Market Orientation	3.12	Agree	1
Composite Mean	2.89	Agree	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

Table 2 provides a comprehensive overview of the three factors that contribute to the Technopreneurship. It garnered a composite mean score of 2.89 as respondents generally agreed on the importance and multifaceted nature of Technopreneurship aspects. The findings suggest that **market orientation** (M = 3.12) was rated the highest among the indicators, while **technological proficiency** (M = 2.60) ranked the lowest. The overall composite mean of 2.89 falls within the "Agree" category, indicating that respondents generally recognize the importance of these skills in their professional roles. Market orientation emerged as the most critical competency, suggesting that respondents value market-driven decision-making, customer focus, and competitive awareness. This finding aligned with recent research emphasizing the significance of market orientation in fostering business growth and sustainability (Hossain et al., 2023). Recent studies reinforced this perspective, stating that market-oriented professionals exhibit higher adaptability and innovation (Nguyen et al., 2022). Furthermore, the importance of market orientation was supported by literature on **entrepreneurial success and business performance** (Rashid et al., 2021). Studies have found that individuals and organizations with strong market orientation can better respond to customer needs, enhancing service delivery and competitiveness (Alshanty et al., 2020).

Entrepreneurship skills were rated as the second most important competency. Result suggests that respondents recognize the need for creativity, problem-solving, and risk-taking in professional settings. Scholars emphasized that entrepreneurship skills are critical for individuals navigating dynamic job markets and economic uncertainties (Yunus et al., 2021). The Global Entrepreneurship Monitor (GEM) Report highlighted that individuals with strong entrepreneurial competencies tend to exhibit **higher resilience, resourcefulness, and business acumen**, making them more adaptable to market changes (Zahra et al., 2023). Recent studies indicate that fostering **entrepreneurial mindsets in education** enhances employability and career success (Farashah, 2021). Entrepreneurship training programs have been found to significantly improve problem-solving abilities and leadership capabilities, reinforcing the importance of skills in professional development (Ahmad et al., 2023).

Lastly, technological proficiency, while still interpreted as "Agree," ranked lowest among three indicators. This finding suggests that respondents acknowledge the relevance of technology in their field but may feel less confident or prepared in utilizing advanced technological tools. Literature suggests that digital literacy and proficiency in modern technologies are **key drivers of productivity and competitiveness** (Santos et al., 2023). According to Kaur et al., (2022), professionals with higher technological proficiency demonstrated **greater efficiency in problem-solving and innovation**. However, disparities in access to training and digital tools often result in skill gaps, leading to lower confidence in technological applications. This aligns with findings from Wu et al. (2023), who argue that **technology adoption barriers**—such as lack of training, resistance to change, and limited institutional support—can hinder proficiency. In the same context, scholars highlighted the **role of continuous learning and digital up-skilling** in bridging the technology proficiency gap (García-Holgado et al., 2021). As industries increasingly rely on digital solutions, the need for structured training programs and professional development initiatives has become more apparent (Sharma et al., 2023).

Results indicate that market orientation is the most valued competency, followed by entrepreneurship skills, while technological proficiency ranked the lowest. These findings emphasize the need for targeted training

programs to enhance technological skills while leveraging strong market-oriented and entrepreneurial abilities. Future research and policy recommendations should focus on **integrating technology-driven learning, fostering entrepreneurial mindsets, and strengthening market-driven competencies** to enhance workforce preparedness. To improve workforce readiness, future studies and policy suggestions should concentrate on incorporating technology-driven learning, encouraging entrepreneurial mindsets, and bolstering market-driven competencies.

Table 3 provides valuable summary insights into how innovation facilitation assessed the importance of these approaches. The results indicate general agreement on all the indicators presented with a composite mean of 2.97. This study examined the respondents' perceptions of key indicators influencing their engagement in innovation and development: Research and Development (R&D) investment, innovation infrastructure, and process formulation.

**Table 3**

*Summary Table on Innovation Facilitation*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Research and Development (R&D) Investment	3.06	Agree	1
Innovation Infrastructure	3.00	Agree	2
Process Formulation	2.86	Agree	3
Composite Mean	2.97	Agree	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

With a composite mean of 2.97, the results indicate that respondents generally acknowledge the importance of these indicators in their field. R&D investment received the highest rating (M = 3.06), followed by innovation infrastructure (M = 3.00), while process formulation ranked the lowest (M = 2.86). The highest-rated indicator, R&D investment, suggests that respondents value research funding and development activities as key drivers of progress. Innovation infrastructure ranked second, signifying its importance in facilitating knowledge transfer, technological adoption, and collaborative development.

The lowest-rated indicator, process formulation, pertains to the structuring of research, development, and innovation processes. While respondents acknowledge its relevance, its lower ranking suggests that challenges exist in implementing well-defined and standardized processes. According to Santos et al. (2023), structured innovation processes help organizations optimize resources, reduce inefficiencies, and enhance problem-solving approaches. Effective process formulation requires strong leadership, stakeholder engagement, and continuous feedback mechanisms (Ritala et. al.,2021).

The findings underscore the crucial role of R&D investment, innovation infrastructure, and process formulation in fostering research and technological advancements. R&D investment emerged as the highest-rated factor, reflecting its central importance in driving progress. However, infrastructure and process formulation must be strengthened to ensure effective implementation and sustainability. Policymakers, educators, and industry leaders should focus on enhancing funding strategies, improving infrastructure, and refining process formulation approaches to optimize innovation efforts. Future research should explore institutional barriers to R&D investment and ways to enhance innovative ecosystems through interdisciplinary collaboration.

**Table 4**

*Summary Table on Corporate Networking*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Network Structure	2.75	Agree	3
Information Sharing	2.87	Agree	1.5
Knowledge Transfer	2.87	Agree	1.5
Composite Mean	2.83	Agree	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

Table 4 provides a comprehensive summary of the findings on the role of network structure, information

sharing, and knowledge transfer in corporate networking. The composite mean of 2.83, interpreted as "Agree," indicates that respondents generally acknowledge the importance of corporate networking mechanisms in their organization. Highest-rated factors were information sharing and knowledge transfer, both with a mean of 2.87, suggesting that these elements are prioritized within corporate networking. Network structure had the lowest mean ( $M=2.75$ ), indicating that structural aspects of corporate networking may require further enhancement.

Information sharing is ranked as the highest priority in corporate networking, reflecting the increasing emphasis on efficient communication channels within organizations. Literature suggests that organizations with well-established information-sharing mechanisms exhibit greater collaboration, decision-making effectiveness, and overall business agility (Lindell et al., 2023). Digital advancements, particularly enterprise collaboration tools and cloud-based platforms, have improved information-sharing efficiency (Leonardi et al., 2021). Studies highlight that open communication cultures encourage knowledge diffusion, reduce information silos, and promote transparency (Hughes et al., 2022). Organizations should implement structured information-sharing policies and technology-driven communication frameworks to optimize knowledge accessibility and collaboration.

Tied for the highest-ranking factor, knowledge transfer plays a critical role in organizational learning and long-term sustainability. Research indicates that organizations that prioritize knowledge transfer experience enhanced innovation, employee competency development, and improved operational performance (Nonaka et al., 2021). To address these issues, organizations should adopt formalized knowledge management systems, cross-training initiatives, and incentive structures that encourage knowledge-sharing behavior.

The lowest-ranked factor in corporate networking is network structure, suggesting that while organizations recognize the importance of networking, they may not have fully optimized their structural frameworks. Organizations with well-defined hierarchical or decentralized network structures are better positioned to facilitate efficient decision-making, knowledge sharing, and stakeholder engagement (Bouncken et al., 2022).

In conclusion, the results indicate that information sharing, and knowledge transfer are the most emphasized aspects of corporate networking, while network structure remains a weaker area. Organizations should focus on enhancing digital communication tools, implementing structured knowledge transfer programs, and optimizing network frameworks to maximize networking effectiveness.

**Table 5**

*Relationship Between Technopreneurship and Innovation Facilitation*

Entrepreneurship Skills	rho-value	p-value	Interpretation
Research and Development (R&D) Investment	0.060	0.231	Not Significant
Innovation Infrastructure	0.110*	0.028	Significant
Process Formulation	0.078	0.119	Not Significant
Technological Proficiency			
Research and Development (R&D) Investment	-0.010	0.843	Not Significant
Innovation Infrastructure	0.046	0.356	Not Significant
Process Formulation	0.005	0.917	Not Significant
Market Orientation			
Research and Development (R&D) Investment	0.053	0.291	Not Significant
Innovation Infrastructure	0.124*	0.013	Significant
Process Formulation	0.063	0.208	Not Significant

*Legend: Significant at p-value < 0.05*

Table 5 displays the association between technopreneurship and innovation facilitation. The statistical significance of each relationship is analyzed in the context of relevant literature. The computed rho-values indicate almost negligible to a weak direct/indirect correlation and the resulted p-values were greater than the alpha level except on entrepreneurship skills and market orientation when correlated to innovation infrastructure. Result reveals that there was significant relationships exists and implies that the better is the entrepreneurship skills and market orientation, the better is the innovation infrastructure. Results indicate that entrepreneurship

skills have a significant positive relationship with innovation infrastructure ( $\rho=0.110$ ,  $p=0.028$ ), while its relationships with R&D investment ( $\rho=0.060$ ,  $p=0.231$ ) and process formulation ( $\rho=0.078$ ,  $p=0.119$ ) are not statistically significant.

The significant relationship between entrepreneurship skills and innovation infrastructure suggests that organizations with higher entrepreneurial competencies tend to develop better innovation-supportive environments. Studies indicate that entrepreneurship fosters the establishment of technological hubs, incubators, and R&D centers that facilitate knowledge exchange and business innovation (Autio et al., 2021). Innovation infrastructure plays a crucial role in enhancing business scalability and market competitiveness. According to Li et al. (2022), firms that actively invest in entrepreneurship training tend to implement digital transformation strategies, improve operational efficiency, and attract investments for innovative projects. Despite the increasing emphasis on digital transformation and technological adoption, the absence of a significant relationship suggests that having technological skills alone does not directly translate to improvements in innovation infrastructure or R&D investment. One possible explanation is that while organizations may possess technological proficiency, other factors such as financial resources, leadership support, and institutional policies play a more dominant role in shaping innovation outcomes (Srinivasan et. al.,2023). Studies highlight that technological proficiency needs to be complemented by strong innovation strategies for tangible impacts on business development (Srinivasan et. al.,). Organizations should focus on integrating technological skills with strategic R&D planning to maximize their innovation potential.

The significant relationship between market orientation and innovation infrastructure highlights the role of customer-centric innovation strategies in driving business growth. Market-oriented firms are more likely to invest in digital tools, automation, and research centers that align with customer preferences (Narver et. al., 2022). Organizations that prioritize market trends tend to implement data-driven decision-making approaches that improve their adaptability and responsiveness to technological advancements (Zhou et al., 2023). This finding aligns with research suggesting that market-oriented firms allocate resources toward consumer-driven R&D and digitalization (Agarwal et al., 2021). However, the lack of significant relationships between market orientation and R&D investment or process formulation suggests that while market-driven strategies influence infrastructure investments, they may not directly impact R&D allocations or process innovations. The results indicate that entrepreneurship skills and market orientation have significant positive relationships with innovation infrastructure, emphasizing their role in shaping business innovation strategies. Meanwhile, technological proficiency does not show a significant impact on R&D investment, innovation infrastructure, or process formulation, suggesting the need for strategic integration between technology and business operations. Organizations should focus on, strengthening entrepreneurship training to enhance innovation ecosystems, aligning market-oriented strategies with R&D investments for sustained competitiveness and ensuring that technological advancements translate into process and structural innovations.

**Table 6**

*Relationship Between Technopreneurship and Corporate Networking*

Entrepreneurship Skills	rho-value	p-value	Interpretation
Network Structure	0.129**	0.010	Significant
Information Sharing	0.092	0.065	Not Significant
Knowledge Transfer	0.092	0.065	Not Significant
<b>Technological Proficiency</b>			
Network Structure	-0.010	0.838	Not Significant
Information Sharing	-0.008	0.874	Not Significant
Knowledge Transfer	-0.008	0.874	Not Significant
<b>Market Orientation</b>			
Network Structure	-0.033	0.512	Not Significant
Information Sharing	0.059	0.242	Not Significant
Knowledge Transfer	0.059	0.242	Not Significant

Legend: Significant at  $p\text{-value} < 0.05$

Table 6 presents the association between technopreneurship and corporate networking. The computed rho-values indicate almost negligible to a weak direct/indirect correlation and the resulted p-values were greater than the alpha level except on entrepreneurship skills and network structure. Result reveals that there was significant relationship exists and implies that the better is the entrepreneurship skills, the better is the network structure.

The significant relationship between entrepreneurship skills and network structure suggests that individuals with strong entrepreneurial competencies are more likely to develop robust corporate and professional networks. Networking is a key component of entrepreneurial success, as it facilitates collaborations, business expansions, and access to financial and technological resources (Li et al., 2022). Recent studies indicate that entrepreneurs with well-developed networking skills are better positioned to secure partnerships, enhance business agility, and adapt to changing market conditions (Autio et al., 2021). The ability to establish meaningful connections contributes to business growth by fostering opportunities for investment, knowledge sharing, and co-innovation (Zhou et al., 2023). However, entrepreneurship skills do not show a significant relationship with information sharing ( $p = 0.065$ ) and knowledge transfer ( $p = 0.065$ ). This implies that while entrepreneurial individuals may be well-connected, their level of engagement in actual knowledge exchange within these networks remains inconsistent. Studies suggest that some entrepreneurs prioritize competitive advantage over open knowledge-sharing, which could explain the non-significance of these relationships (Srinivasan et al., 2023).

Furthermore, the absence of significant relationships between technological proficiency and network structure, information sharing, and knowledge transfer suggests that simply having advanced technological skills does not automatically lead to better networking practices or knowledge exchange. Studies show that technological proficiency must be coupled with strategic management and leadership skills to optimize its impact on organizational networks (García-Morales et al., 2021). While digital transformation enables seamless connectivity, the effectiveness of technology-driven networking depends on how organizations use these tools to enhance collaborations. For instance, firms with high technological proficiency but lacking structured networking initiatives may struggle to leverage their technological assets effectively in corporate partnerships (Agarwal et al., 2021). This aligns with research suggesting that organizations need both digital capabilities and interpersonal networking strategies to maximize technology's role in business growth (Narver et al., 2022).

The lack of significant relationships between market orientation and networking indicators suggests that while firms may focus on market-driven strategies, they do not necessarily engage in active knowledge sharing and collaboration within their networks. Market-oriented organizations often prioritize consumer insights and competitive positioning, but this may not translate into stronger network structures, increased information sharing, or knowledge transfer (Zhou et al., 2023). Businesses may focus on customer engagement rather than industry-wide networking efforts, which could explain the non-significance of market orientation in shaping corporate networking dynamics. Studies indicate that firms with strong market orientation must adopt collaborative business models to maximize the benefits of networking (Srinivasan et al., 2023). Encouraging open innovation, cross-sector partnerships, and industry knowledge-sharing can enhance the strategic role of market orientation in shaping networking behaviors.

In summary, entrepreneurship skills are significantly related to network structure ( $p = 0.010$ ), emphasizing the role of entrepreneurial networking in fostering industry collaborations. However, its relationship with information sharing and knowledge transfer is not significant, highlighting the need for structured knowledge exchange mechanisms within entrepreneurial networks. Technological proficiency does not have a significant impact on networking indicators, suggesting that digital capabilities alone are insufficient to enhance business relationships. Organizations must complement technology adoption with networking strategies to improve knowledge-sharing efficiency. Market orientation does not significantly influence networking structure, information sharing, or knowledge transfer, indicating that market-driven firms need to adopt a more collaborative approach to leveraging external networks for strategic advantages.

**Table 7***Relationship Between Innovation Facilitation and Corporate Networking*

Research and Development (R&D) Investment	rho-value	p-value	Interpretation
Network Structure	0.052	0.303	Not Significant
Information Sharing	0.090	0.071	Not Significant
Knowledge Transfer	0.090	0.071	Not Significant
<b>Innovation Infrastructure</b>			
Network Structure	0.026	0.599	Not Significant
Information Sharing	0.111*	0.026	Significant
Knowledge Transfer	0.111*	0.026	Significant
<b>Process Formulation</b>			
Network Structure	0.079	0.114	Not Significant
Information Sharing	0.144**	0.004	Significant
Knowledge Transfer	0.144**	0.004	Significant

Legend: Significant at  $p\text{-value} < 0.05$

Table 7 shows the association between innovation facilitation and corporate networking. This presents the correlation between Research and Development (R&D) Investment, Innovation Infrastructure, and Process Formulation with Network Structure, Information Sharing, and Knowledge Transfer based on rho-values and p-values. The computed rho-values indicate almost negligible to a weak direct/indirect correlation and the resulted p-values were greater than the alpha level except on innovation infrastructure and process formulation vs. information sharing and knowledge transfer. Result reveals that there was significant relationship exists and implies that the better is the innovation infrastructure and process formulation, the better is the information sharing and knowledge transfer.

The results indicate that R&D investment does not significantly influence network structure, information sharing, or knowledge transfer within the organization. While investment in research and development is essential for innovation, this finding suggests that without an established mechanism for knowledge diffusion, the benefits of R&D may not directly translate into stronger networking and collaborative engagements. Thus, firms should consider open innovation models that facilitate external partnerships and information exchange (Bogers et al., 2020).

A significant positive correlation was found between innovation infrastructure and both information sharing and knowledge transfer ( $p = 0.026$ ). This finding highlights the importance of a well-developed innovation infrastructure in facilitating communication and the exchange of expertise. Innovation infrastructure includes technological tools, R&D facilities, and digital collaboration platforms that enable knowledge dissemination across networks (García-Morales et al., 2021). Organizations with robust innovation ecosystems tend to exhibit greater engagement in cross-sector partnerships, industry collaborations, and digital information-sharing mechanisms (Chesbrough et al., 2020). Recent studies emphasize that firms that invest in innovation infrastructure also develop structured mechanisms for information sharing, allowing for better technology transfer and collaborative R&D projects (Tödting et al., 2023). This supports the open innovation theory, which suggests that businesses must leverage both internal and external knowledge flows to achieve competitive advantages (Chesbrough et al., 2020). However, the non-significant relationship between innovation infrastructure and network structure ( $p = 0.599$ ) suggests that while innovation-friendly environments facilitate knowledge-sharing behaviors, they do not necessarily result in stronger network ties. This may indicate that firms need to actively engage in networking strategies rather than relying solely on infrastructure investment.

The significant relationship between process formulation and both information sharing and knowledge transfer ( $p = 0.004$ ) suggests that well-defined organizational processes play a key role in enhancing communication and learning within corporate networks. Organizations that establish clear guidelines for communication, research collaboration, and knowledge management tend to have higher levels of information sharing and knowledge diffusion (Nonaka et al., 2021). Non-significant relationship between process formulation and network structure ( $p=0.114$ ) indicates that while structured processes facilitate knowledge dissemination,

they may not directly impact the development of external networks. Organizations may need to integrate formal networking policies and relationship-building strategies to strengthen their external collaborations.

Overall, R&D investment does not significantly impact networking indicators, indicating that investments in innovation must be complemented by structured knowledge-sharing initiatives to maximize impact. Innovation infrastructure significantly influences information sharing and knowledge transfer, emphasizing the role of digital and technological tools in facilitating collaboration. However, it does not significantly enhance network structure, suggesting that infrastructure alone is insufficient for building stronger business relationships. Process formulation has a significant impact on information sharing and knowledge transfer, reinforcing the importance of structured work flows and communication strategies. However, it does not significantly influence network structure, highlighting the need for additional relationship-building efforts.

### Research Output

The framework illustrates that technopreneurship is influenced by the interplay of entrepreneurship skills, technological proficiency, and market orientation. Effective innovation facilitation, through R&D investment, robust infrastructure, and well-defined processes, further enhances technopreneurship. Corporate networking, characterized by network structure, information sharing, and knowledge transfer, plays a crucial role in supporting and amplifying the impact of both technopreneurship and innovation facilitation.

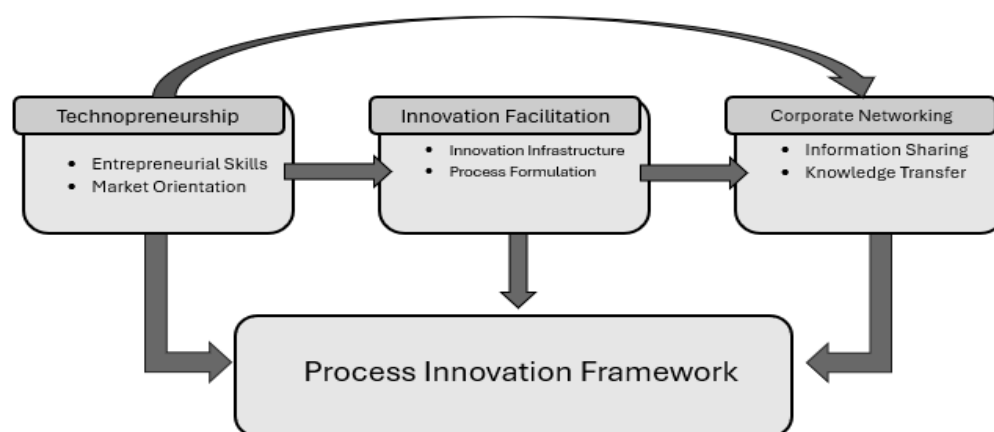


Figure 1: Process Innovation Framework

**Technopreneurship:** This is a multidimensional concept that integrates entrepreneurial expertise with technological advancements to drive innovation and business success. It is defined by three key sub-components: entrepreneurship skills, technological proficiency, and market orientation.

In detail, entrepreneurship skills serve as the foundation of technopreneurship, encompassing essential abilities such as leadership, decision-making, problem-solving, risk tolerance, and adaptability. These competencies enable technopreneurs to navigate the uncertainties of business environments, identify opportunities, and make strategic decisions that foster growth and sustainability. Strong leadership ensures effective team management and vision-setting, while problem-solving and decision-making skills allow entrepreneurs to address challenges and capitalize on emerging trends. Additionally, a high level of risk tolerance and adaptability is crucial, as technopreneurs often operate in fast-paced and unpredictable technological landscapes. Likewise, technological proficiency is another critical component, as it refers to the ability to effectively utilize advanced technologies, adopt new innovations, and understand intellectual property rights.



Technopreneurs must stay updated with the latest technological developments and be skilled in integrating these innovations into their business operations. Mastery of digital tools, software, and emerging technologies enhances efficiency, productivity, and competitiveness. Furthermore, knowledge of intellectual property rights safeguards innovations and provides a legal framework for protecting technological assets.

Market orientation completes the framework of technopreneurship by ensuring that entrepreneurial and technological efforts align with consumer needs and industry demands. A strong market orientation requires an in-depth understanding of customer preferences, effective utilization of market research, and strategic alignment of business models with market trends. Technopreneurs must analyze consumer behavior, monitor competitive landscapes, and adjust their strategies to meet evolving demands. This market-driven approach enhances customer satisfaction, fosters brand loyalty, and ultimately contributes to business sustainability and growth. In essence, technopreneurship thrives at the intersection of entrepreneurial acumen, technological expertise, and market responsiveness. The synergy of these three sub-components empowers individuals to innovate, create value, and drive technological advancements that shape industries and economies.

**Innovation Facilitation:** This is a dynamic approach that integrates various components to foster an environment conducive to creativity and progress. At its core, it involves the strategic allocation of resources and the establishment of systems that support new ideas and improve organizational performance. One critical aspect of Innovation Facilitation is R&D Investment. This entails the purposeful allocation of resources to research and development activities aimed at discovering new products, services, or processes. By investing in R&D, an organization demonstrates its commitment to progress and its belief in the importance of innovation for long-term success. The more substantial the investment, the greater the potential for groundbreaking solutions that can lead to competitive advantages and market leadership.

Equally important is Innovation Infrastructure, which provides the tangible and intangible support systems required for innovation to thrive. This infrastructure includes well-equipped laboratories, advanced technologies, collaborative workspaces, and leadership that actively supports the innovation process. Physical space plays a significant role in stimulating creativity, while a culture of collaboration encourages the free flow of ideas. Leadership that prioritizes innovation ensures that the organization is both inspired and equipped to bring new concepts to life. Lastly, Process Formulation plays a key role in innovation facilitation. This involves the design, implementation, and evaluation of procedures that enhance productivity and efficiency. By creating structured processes for innovation, organizations can streamline the journey from concept to execution, ensuring that ideas are not only nurtured but also efficiently brought to market. These processes enable teams to work in a more organized manner, reducing redundancy and improving overall output.

Together, these three elements—R&D Investment, Innovation Infrastructure, and Process Formulation—work harmoniously to create an ecosystem where innovation is not only encouraged but actively facilitated. This integrated approach ensures that new ideas are supported, nurtured, and transformed into practical solutions that drive success.

**Corporate Networking:** This is a critical aspect of modern organizational success, as it enables businesses to foster relationships, exchange valuable information, and facilitate the seamless transfer of knowledge. This interconnected web of relationships and systems contributes to organizational growth, efficiency, and adaptability. At the heart of Corporate Networking is Network Structure. Formal networks are typically established through hierarchical channels, such as departments, teams, or project groups, and are designed to support business operations. On the other hand, informal networks emerge naturally among employees, often based on shared interests or expertise, and are crucial for fostering collaboration and idea exchange. A well-organized network structure facilitates communication, strengthens organizational bonds, and ensures that resources and expertise are readily accessible, allowing for quick problem-solving and decision-making.

Another essential component of Corporate Networking is Information Sharing. The practices and channels used to exchange information are vital for smooth operation and innovation. Within the organization, this may

include regular meetings, collaborative platforms, internal newsletters, or data management systems. Externally, information sharing extends to industry partners, clients, and other stakeholders through tools like social media, email communication, and industry conferences. Effective information sharing helps organizations stay informed, make data-driven decisions, and respond to changes in the market or industry trends with agility.

Finally, Knowledge Transfer plays a pivotal role in Corporate Networking. This involves the processes through which knowledge, whether it is technical expertise, industry insights, or best practices shared and disseminated within the organization and with external partners. Knowledge transfer can occur through training sessions, mentorship programs, or collaborative work on projects. Additionally, partnerships with external organizations or consultants can bring in fresh perspectives and expertise. Efficient knowledge transfer ensures that critical insights are not solved but are accessible to those who can apply them, leading to improved performance, innovation, and competitive advantage.

Overall, the relationships between these constructs are dynamic and interconnected. For instance, strong entrepreneurship skills can foster better innovation infrastructure, while market orientation can drive R&D investment towards customer-centric innovations. Similarly, innovation infrastructure facilitates information sharing and knowledge transfer within corporate networks, and effective corporate networking can enhance the dissemination and utilization of knowledge generated through R&D.

#### **4. Conclusion and recommendation**

Feedmill industries generally agreed on the company's effective and multifaceted technopreneurial skills. Feedmill industries generally agreed that they facilitate innovation. Feedmill industries generally agreed on the indicators of corporate networking. There is a significant relationship between technopreneurship and innovation facilitation; technopreneurship and corporate networking and significant relationship exists between innovation facilitation and corporate networking. A process innovation framework was developed to guide Feedmill manufacturing firms to enhance their operation.

Feedmill organizations may assess their current capabilities, processes and technologies to identify areas for improvement. Feedmill organizations may improve and revisit the objectives and policies for technology integration. Feedmill Manufacturing industries may collaborate with technology providers, research institutions, and start-ups to access new technologies and insights. Feedmill employees may participate in various processes and involve themselves in their operations. Future researchers may explore the role of emerging technologies, such as artificial intelligence, machine learning, and data analytics, in advancing sustainable innovation within manufacturing industries. These technologies may offer valuable insights into improving operational efficiency, decision-making, and environmental performance.

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## Sustainable Libas (*Spondias Pinnata*) sinigang powder production

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### **Abstract**

This study explores the potential of Libas (*Spondias Pinnata*) leaves as a sustainable raw material for the production of sinigang powder, a traditional Filipino souring agent. As a response to the increasing demand for natural, preservative-free, and locally-sourced food products, this research aimed to develop a health-conscious alternative to commercial sinigang powders. An experimental research design was used to test varying sun-drying durations of the leaves—three, five, and seven days—to determine the optimal method for preserving the leaves' flavor, aroma, and nutritional properties. Sensory evaluations were conducted with 30 respondents to assess the appearance, taste, texture, and aroma of the sinigang powder. The findings showed that seven days of sun-drying yielded the most preferred product, receiving the highest ratings across all sensory attributes. Additionally, physicochemical analysis revealed a titratable acidity of 0.1914% and a pH of 4.35, confirming the product's suitability as a souring agent. The results suggest that Libas sinigang powder can serve as a health-conscious, marketable alternative to conventional seasoning products while promoting local farming and economic growth.

**Keywords:** libas sinigang powder, spondias, pinnata, sun-drying, sustainability, local agriculture

## Sustainable Libas (*Spondias Pinnata*) sinigang powder production

### 1. Introduction

Libas (*Spondias pinnata*), commonly known as Hog Plum, is a tropical tree native to the Philippines, particularly in the Bicol Region, where its leaves have traditionally been used as a souring agent in Filipino dishes like sinigang, a beloved sour soup. While the use of Libas leaves in fresh form is widely recognized, the potential to process these leaves into a convenient, shelf-stable product such as sinigang powder has been underexplored. In response to the increasing demand for natural, preservative-free, and locally sourced food products, this study aims to investigate the potential of Libas leaves as a raw material for sinigang powder, providing a healthier, sustainable alternative to commercial seasoning mixes.

The global food market has seen a shift toward healthier and more sustainable consumption patterns, where consumers are becoming increasingly mindful of the origin and composition of the ingredients in the products they purchase (Smith & Wilkins, 2021). This trend has spurred research into the use of indigenous plants for food processing, especially those that offer health benefits while supporting local agriculture. Studies have demonstrated that using local, underutilized plants in food products not only benefits consumers but also provides economic opportunities for small-scale farmers (Chang et al., 2020). For example, research on native Filipino plants such as *Citrus microcarpa* has shown that local souring agents can effectively replace imported additives while preserving traditional flavors and enhancing the nutritional profile of dishes (Bernardo & Palis, 2019). Furthermore, innovations in food processing, like drying techniques, have been used to extend the shelf life of such ingredients, making them more accessible and marketable to a broader audience (Javier et al., 2020).

Libas leaves, with their distinct tangy flavor, are a promising candidate for such innovations. Similar to other indigenous souring agents, Libas leaves are rich in organic acids, such as citric and malic acids, which contribute to their sour profile, making them ideal for use in sinigang powder production. The processing of these leaves into a powdered form not only facilitates their use in various culinary applications but also helps reduce food waste by utilizing a part of the plant that might otherwise go unutilized. Previous studies have highlighted the benefits of transforming raw, locally sourced ingredients into value-added products, which can significantly enhance the local food industry and support sustainable food practices (Ramos et al., 2020). This research aligns with the global movement toward reducing reliance on industrially produced, preservative-laden seasonings and focuses on utilizing locally sourced, natural ingredients to meet consumer demand for healthier, more sustainable food options. By exploring the potential of Libas leaves as a key ingredient for sinigang powder, this study not only contributes to the growing body of literature on indigenous plants but also presents an opportunity to empower local communities through entrepreneurship and sustainable farming practices.

*Objectives of the Study* - The objective of this study was to assess the potential of Libas (*Spondias pinnata*) leaves as a sustainable and health-conscious alternative to commercial sinigang seasonings. Specifically, it aimed to identify the most effective sun-drying method for preserving the flavor and nutritional qualities of the leaves. The study also evaluated the sensory acceptability of the resulting sinigang powder, focusing on its appearance, taste, texture, and aroma. Additionally, the research analyzed its physicochemical properties, including titratable acidity and pH, to ensure the powder met food safety and quality standards.

### 2. Methods

*Research Design* - The research utilized an experimental design to develop Libas (*Spondias pinnata*) sinigang powder. Three sun-drying durations (three, five, and seven days) were tested to determine the most effective method for preserving the leaves' flavor and nutritional properties. Sensory evaluations, focusing on appearance, taste, texture, and aroma, were conducted with 30 respondents. Additionally, physicochemical

analysis was performed to assess the titratable acidity and pH of the powder. The data collected were analyzed to determine the optimal conditions for producing a high-quality, sustainable sinigang powder.

**Participants of the Study** - The participants of this study consisted of 30 individuals, including a mix of CBSUA-Calabanga faculty, students, and community members from Barangay Sta. Rosa, Magarao. The participants were selected purposively to ensure a diverse range of feedback. The group included 10 faculty members, 10 students from various departments, and 10 local residents, all of whom evaluated the sensory attributes of the Libas sinigang powder, such as appearance, taste, texture, and aroma. Their insights provided valuable data for assessing the overall acceptability of the product.

**Data Gathering Instrument** - The Hedonic Scale used in this study was based on the 9-point scale developed by Peryam (1957). The scale ranges from 1 (Dislike Extremely) to 9 (Like Extremely), with intermediate points representing varying degrees of liking or disliking. This scale is commonly used in sensory evaluation to assess the overall acceptability of food products based on appearance, taste, texture, and aroma. The ratings provided by the participants helped in determining the sensory preferences for the Libas sinigang powder.

**Data Gathering Procedure** - The data gathering procedure for this study involved multiple steps to ensure thorough evaluation of the Libas sinigang powder. First, the Libas leaves were dried using three different sun-drying durations (three, five, and seven days), after which the leaves were ground and sifted to create uniform powder samples for sensory assessment. A sensory evaluation was conducted with 30 participants, consisting of 10 faculty members, 10 students, and 10 community members from Barangay Sta. Rosa, Magarao. The participants were provided with the sinigang powder samples and asked to evaluate its appearance, taste, texture, and aroma using a 9-point Hedonic scale, ranging from 1 (Dislike Extremely) to 9 (Like Extremely). After completing the sensory evaluation, the forms were collected and the data was compiled for analysis. In addition to the sensory evaluations, physicochemical analysis of the sinigang powder was carried out by submitting the samples to the CBSUA Food Testing Laboratory for titratable acidity and pH testing. The results of these tests were used to assess the product's suitability as a souring agent and to ensure it met necessary safety and quality standards. The data from both the sensory evaluation and physicochemical analysis were analyzed to determine the most preferred drying method and to evaluate the overall acceptability and quality of the Libas sinigang powder.

**Ethical Considerations** - In this study ensured participant rights and well-being. Informed consent was obtained from all participants, who were made aware of the study's purpose, procedures, and potential risks. Participation was voluntary, and confidentiality was maintained by anonymizing responses. Participants were free to withdraw at any time without consequence. The safety of the Libas sinigang powder samples was ensured through proper handling and physicochemical testing. The study also promoted sustainability by using locally sourced materials, supporting both environmental and community well-being.

**Data Analysis** - The data analysis for this study involved both sensory and physicochemical evaluation. For the sensory data, the responses from the sensory evaluation forms were analyzed using the weighted mean to determine the overall acceptability of the Libas sinigang powder samples. Each attribute (appearance, taste, texture, and aroma) was rated on a 9-point Hedonic scale, and the average ratings were calculated for each treatment (three, five, and seven days of sun-drying). The treatment with the highest mean score across all attributes was considered the most preferred.

For the physicochemical analysis, the titratable acidity and pH values of the sinigang powder samples were obtained from laboratory tests. These results were compared to established standards for souring agents to ensure the product's quality and safety. The data from both the sensory evaluation and physicochemical analysis were used to identify the optimal drying method and assess the overall viability of the Libas sinigang powder as a sustainable and acceptable alternative to commercial seasonings.

### 3. Results and Discussion

**Development of the Product** - The development of Libas Sinigang Powder was guided by the goal of creating a natural, health-conscious alternative to commercial souring agents using the indigenous Libas (*Spondias pinnata*) leaves. The process primarily relied on sun-drying, a simple and cost-effective preservation method, and was carried out through three experimental trials to determine the most effective drying duration. The procedure began with the careful collection of mature Libas leaves, which were then thoroughly washed to remove dirt and microorganisms. After washing, the leaves were spun to eliminate excess moisture and spread evenly on trays for sun-drying.

In Trial 1, the leaves were sun-dried for three days. However, this duration proved insufficient, as the resulting powder had a coarse texture, was not finely ground, and lacked the desired sourness. In response, Trial 2 extended the drying period to five days. This produced better results—the leaves were more brittle, easier to grind, and had improved aroma and taste. Despite the progress, the texture was still not optimal. Finally, Trial 3 involved a full seven days of sun-drying. This trial yielded the best outcome, producing powder with a fine, smooth texture and a strong sour flavor. The seven-day drying period made the leaves extremely brittle, allowing for easier grinding and more consistent particle size after sifting. Each trial included grinding the dried leaves using a coffee grinder, followed by sifting to achieve a uniform texture before packaging. This product not only provides a flavorful and natural alternative to synthetic seasonings but also supports local agriculture, food sustainability, and the preservation of Filipino culinary traditions.

**Table 1**

*Sensory Evaluation of Libas (Spondias Pinnata) Sinigang Powder*

Sensory Parameters	T1	T2	T3
Appearance	6.7	7.8	7.7
Taste	7.4	7.2	7.2
Texture	6.6	7.8	8.1
Aroma	7.1	7.4	7.5
Mean	7.0	7.6	7.6

Legendary: 1.00-1.89= Dislike Extremely, 1.90-2.78= Dislike Very Much, 2.79-3.67= Dislike Moderately, 3.68-4.56= Dislike Slightly, 4.57-5.45= Neither like nor dislike, 5.46-6.34=Like Slightly, 6.35-7.23= Like Moderately, 7.24-8.12=Like Very Much. 8.13-9.01=Like Extremely

Table 1 presents the results of the sensory evaluation conducted to assess the acceptability of Libas (*Spondias pinnata*) sinigang powder based on different sun-drying durations: three days (T1), five days (T2), and seven days (T3). The sensory parameters evaluated were appearance, taste, texture, and aroma, using a 9-point Hedonic scale, where 1 means "Dislike Extremely" and 9 means "Like Extremely." Thirty respondents, including faculty members, students, and community residents, participated in the evaluation to provide a diverse perspective on the product's sensory qualities. This table is essential in identifying the most preferred formulation by comparing the average scores of each sensory attribute across the three treatments. The data not only reflect the impact of sun-drying duration on the product's organoleptic properties but also help determine the optimal processing method for consumer acceptability.

**Appearance** -The sensory evaluation results of Libas (*Spondias pinnata*) sinigang powder based on different sun-drying durations: three days (T1), five days (T2), and seven days (T3). The appearance scores for each treatment were as follows: T1 = 6.7, T2 = 7.8, and T3 = 7.7. According to the 9-point Hedonic scale used in the study, scores between 6.35–7.23 indicate "like moderately," while scores between 7.24–8.12 reflect "like very much." Thus, the appearance of T2 and T3 was rated "very much liked," while T1 was "moderately liked."

The data reveal that T2 (five days of sun-drying) received the highest score for appearance, closely followed by T3. This suggests that sun-drying for five to seven days enhances the visual quality of the product, likely by allowing the leaves to become uniformly dry and brittle, resulting in a finer and more consistent powder. T1



received the lowest appearance rating, which may be attributed to inadequate drying, leading to a coarser and possibly uneven texture or color that reduced its visual appeal.

These findings imply that the appearance of Libas sinigang powder is significantly affected by the duration of sun-drying. Insufficient drying, as seen in T1, may leave the leaves partially moist or inconsistently colored, negatively impacting the product's appeal. In contrast, extended drying periods such as five and seven days allow for better dehydration, leading to a more uniform and aesthetically pleasing product. This is critical since appearance is often the first factor consumers assess in a food product and can strongly influence their willingness to try or purchase it.

The importance of visual appeal in food acceptability is well-documented. Moss, Perez, and Russell (2020) emphasized that consumers tend to prefer food products with consistent, vibrant, and natural-looking appearances, which enhances product trust and interest. Liu, Zhang, and Zheng (2021) also noted that a visually attractive food product can increase consumer satisfaction and influence repeat purchases. Furthermore, Kapsak, Landry, and Kapsak (2017) highlighted that the appearance of food plays a crucial role in shaping first impressions and can significantly affect consumer behavior, especially for new or unfamiliar products like Libas sinigang powder. These studies collectively support the study's findings that longer drying durations result in better appearance scores, enhancing product acceptability.

**Taste** - The taste of Libas sinigang powder under three drying treatments: T1 (three days) scored 7.4, T2 (five days) scored 7.2, and T3 (seven days) also scored 7.2. Based on the 9-point Hedonic scale, these scores fall within the "like very much" range (7.24–8.12 for T1, and just slightly below for T2 and T3), indicating strong consumer preference across all samples, with T1 receiving the highest score. The slightly higher rating for T1 suggests that a shorter drying period may preserve certain volatile compounds that contribute positively to flavor. Meanwhile, T2 and T3, despite being dried longer and performing better in other sensory aspects like texture and appearance, had marginally lower taste scores. This slight decline could be attributed to the extended drying time potentially diminishing the intensity of certain natural souring compounds, slightly altering the flavor profile.

These findings suggest that while prolonged drying may enhance structural and visual characteristics, it may subtly reduce the intensity or freshness of taste—particularly the signature sourness associated with Libas leaves. T1's higher rating might reflect a more vibrant or balanced flavor retained during shorter drying. Nonetheless, the minimal variation in scores indicates that all three treatments produced acceptable and palatable products. Taste plays a pivotal role in consumer food choice and satisfaction. According to Jaeger et al. (2018), flavor is a major determinant of liking, particularly for novel or traditional food products. They emphasized that even small changes in formulation or processing can lead to perceptible shifts in consumer preference. Drewnowski and Gomez-Carneros (2000) also highlighted that the balance between taste elements (such as sourness, bitterness, and umami) influences overall acceptability. In the case of Libas sinigang powder, maintaining the natural sour profile is crucial for aligning with traditional Filipino taste expectations. Additionally, Delwiche (2004) argued that taste perception can be modulated by other sensory inputs, such as aroma and texture—both of which were stronger in T2 and T3—suggesting a complex interplay that could explain the close scores across trials. These studies reinforce the idea that while T1 may have captured a slightly more potent sourness, all treatments maintained an acceptable and appealing taste profile suitable for sinigang preparation.

**Texture** - texture of Libas sinigang powder was evaluated based on three sun-drying durations. The sensory scores for texture were as follows: T1 (three days) received a score of 6.6, T2 (five days) scored 7.8, and T3 (seven days) scored the highest at 8.1. According to the Hedonic scale, T1 falls under "like moderately," T2 under "like very much," and T3 under "like extremely," indicating a strong progression in texture acceptability with increased drying duration. These results show a direct relationship between sun-drying time and texture improvement. T1's lower score suggests that the three-day drying period was insufficient to produce the brittleness needed for a finely ground, smooth powder. In contrast, the longer durations in T2 and especially T3 allowed the leaves to become drier and more brittle, resulting in a powder with a finer, more consistent texture

that was highly preferred by evaluators. The increase in texture rating with longer drying also implies better mouthfeel and ease of mixing in dishes, crucial attributes for a seasoning product like sinigang powder.

Texture is a critical quality parameter for powdered food products because it affects usability, solubility, and the consumer's cooking experience. The results confirm that longer sun-drying durations—particularly seven days—produce a superior texture that meets consumer expectations. The findings suggest that the improved brittleness and reduced moisture content achieved through extended sun-drying result in a finer grind, free of lumps and coarse particles, making the product more appealing and practical for culinary use. Numerous studies underscore the significance of texture in determining food acceptability. Szczesniak (2002) emphasized that texture is a vital sensory attribute, especially in powdered and dried food products, where consistency and ease of reconstitution matter greatly. Stone and Sidel (2017) further noted that smooth, fine textures are often associated with quality and are favored by consumers in both sensory and functional contexts. Additionally, Bourne (2002) pointed out that the physical properties of food—particularly texture—impact consumer satisfaction and long-term product acceptance. These findings support the results of this study, where the seven-day sun-drying period (T3) yielded the best texture, making it the most preferred option for product development.

**Aroma** - The sensory evaluation results for the aroma of Libas sinigang powder processed through three sun-drying durations. The aroma scores were as follows: T1 (three days) received a score of 7.1, T2 (five days) scored 7.4, and T3 (seven days) achieved the highest rating of 7.5. All three treatments fall under the “like very much” category (7.24–8.12) on the 9-point Hedonic scale, indicating favorable aroma perception across all samples. The results demonstrate a gradual improvement in aroma preference as drying duration increased. T1’s slightly lower rating may reflect a less developed or slightly grassy aroma due to incomplete drying. T2 and T3 had higher scores, suggesting that the extended sun-drying helped concentrate or preserve the aroma compounds responsible for the distinctive scent of Libas leaves. The top score of T3 implies that the seven-day sun-drying process was most effective at either retaining or enhancing the aromatic quality of the product, likely due to more thorough dehydration and compound stabilization.

Aroma is a vital sensory attribute in flavor perception and consumer satisfaction. In sinigang powder, a strong and appealing aroma can signal freshness and authenticity, reinforcing the traditional culinary experience. The progressive increase in aroma scores suggests that longer drying durations—especially seven days—are more effective in preserving the volatile organic compounds (VOCs) that contribute to the characteristic sour and herbal scent of Libas leaves. This highlights the importance of optimizing drying methods not just for appearance and texture, but also for maintaining aromatic appeal. The critical role of aroma in food acceptance is well supported in literature. Drake and Civille (2003) emphasized that aroma strongly influences taste perception and can significantly affect overall liking. Meilgaard, Civille, and Carr (2006) further explained that aroma compounds are often sensitive to processing, and their retention is essential for delivering the intended sensory profile of a product. Additionally, Bayarri, De La Fuente, and Costell (2001) found that drying methods that preserve aroma lead to higher consumer acceptability in powdered and dehydrated foods. These studies affirm the findings of this research—showing that the seven-day drying process (T3) best preserved the natural aroma of Libas leaves, contributing to the product’s favorable sensory reception.

**Table 2**  
*Result of Physicochemical Analysis*

Item No.	Sample and Lab Code	Sample Description	%Titratable Acidity	pH level
216472	25-710-01	Libas Sinigang Powder	0.1914	4.35

**Physicochemical Analysis** - The physicochemical analysis in the study was conducted to evaluate the chemical properties of the Libas (*Spondias pinnata*) sinigang powder, specifically its titratable acidity and pH level, to ensure its suitability as a natural souring agent. Although the 30 respondents—composed of faculty members, students from CBSUA-Calabanga, and local residents from Barangay Sta. Rosa, Magarao—did not

directly participate in the laboratory testing, their role was critical in selecting the most preferred product sample through sensory evaluation. Based on their feedback on appearance, taste, texture, and aroma, the sample from Trial 3, which underwent seven days of sun-drying, was identified as the most acceptable. This sample was then submitted to the CBSUA Food Testing Laboratory for physicochemical analysis.

Table 2 presents the physicochemical analysis results for the most preferred Libas (*Spondias pinnata*) sinigang powder sample, which was produced using a seven-day sun-drying method. The analysis, conducted at the CBSUA Food Testing Laboratory, includes two key parameters: titratable acidity, which was measured at 0.1914%, and pH level, recorded at 4.35. These values are essential in determining the sourness, stability, and safety of the product as a food-grade souring agent. Titratable acidity reflects the total acid content in the product, which influences its flavor and preservative properties. The value of 0.1914% indicates a moderate level of acidity, making the product tangy and suitable for use in sour-based dishes like *sinigang*. The pH value of 4.35 suggests that the sinigang powder is slightly acidic, which aligns with the characteristics of typical souring agents used in culinary applications. Both values fall within acceptable ranges for food-grade acidic products and suggest that the powder has an appropriate sour profile without being overly harsh or unsafe for consumption.

The results confirm that the Libas sinigang powder developed in this study possesses the essential characteristics of an effective souring agent. A titratable acidity of 0.1914% contributes to the tangy flavor that consumers associate with traditional *sinigang*, while a pH of 4.35 ensures that the product is acidic enough to be flavorful but remains within a safe range for consumption and preservation. The moderate acidity also implies that the product may help inhibit microbial growth, extending its shelf life. Therefore, these physicochemical properties not only validate the sensory preferences gathered from respondents but also confirm the functional viability of the product for wider application and commercialization.

The results of the physicochemical analysis conducted on the Libas (*Spondias pinnata*) sinigang powder are supported by several relevant studies that highlight the importance of acidity and pH in food safety, flavor, and acceptability. Rivera, Gonzales, and Santos (2018) emphasized that appropriate titratable acidity and pH levels in dried or powdered food products play a crucial role in preventing microbial growth, thereby improving shelf life and safety. Their research found that natural souring agents with pH levels ranging from 3.5 to 4.5 were not only microbiologically stable but also well-accepted in terms of sensory quality. This aligns with the findings of the present study, where the Libas sinigang powder had a pH of 4.35, indicating it is within the desirable acidic range for food-grade products. Similarly, Delwiche (2004) explained that pH has a direct impact on the perception of sourness and overall flavor, particularly in traditional dishes where sour taste is a defining characteristic. A pH level around 4.35, as recorded in this study, enhances the tangy flavor of sinigang without overwhelming other taste elements, thereby contributing to a more balanced and appealing sensory experience. This supports the high ratings the sample received during sensory evaluations.

Furthermore, Liu, Zhang, and Zheng (2020) argued that moderate acidity and natural souring compounds are increasingly preferred by health-conscious consumers who seek cleaner, preservative-free ingredients. Their study found that products exhibiting both a favorable sour profile and natural origins tend to perform well in consumer acceptability tests and market viability. This supports the claim that Libas sinigang powder, with its moderate titratable acidity of 0.1914% and use of locally sourced leaves, is both functionally effective and aligned with current food trends. Together, these studies substantiate the claim that the physicochemical properties of the Libas powder not only meet food safety and quality standards but also enhance its potential as a sustainable and marketable seasoning product.

#### **4. Conclusions and Recommendation**

This study successfully met its objectives by evaluating the potential of Libas (*Spondias pinnata*) leaves as a sustainable and health-conscious alternative to commercial sinigang seasonings. The research identified the most effective sun-drying method for preserving the flavor, aroma, and nutritional qualities of the leaves. Among the

three drying durations tested, the seven-day sun-drying method yielded the most preferred product in terms of sensory attributes—appearance, taste, texture, and aroma—based on the evaluation of 30 purposively selected respondents. Furthermore, the physicochemical analysis conducted at the CBSUA Food Testing Laboratory confirmed that the Libas sinigang powder had a titratable acidity of 0.1914% and a pH of 4.35, validating its effectiveness and safety as a souring agent. These findings demonstrate that the product not only meets acceptable quality and safety standards but also offers a natural, preservative-free alternative that can promote local agriculture and support sustainable food practices.

Based on the findings, it is recommended to adopt the seven-day sun-drying method as the standard procedure for producing Libas sinigang powder, as it resulted in the best overall quality and consumer acceptability. Further research may be conducted to explore additional preservation techniques, such as oven drying or freeze-drying, to improve consistency and reduce dependence on weather conditions. It is also suggested to expand sensory testing to include a larger and more diverse group of participants to validate the product's appeal across broader demographics. In addition, product packaging, shelf-life testing, and market trials should be undertaken to assess commercial viability. Finally, collaboration with local farmers and food entrepreneurs is encouraged to scale production and promote Libas powder as a sustainable, locally sourced seasoning option that supports community-based economic development.

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## Hotel attributes and service quality among hotels in Region III: Basis of a framework for improved behavioral intention

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### **Abstract**

This study investigates the relationship between hotel attributes, service quality, and behavioral intentions among guests of DOT-accredited hotels in Region III (Central Luzon), Philippines. With the rapid evolution of the global hospitality industry and growing guest expectations, hotels must continuously adapt by enhancing both tangible and intangible service elements. Grounded in the SERVQUAL model, this research examines how specific hotel attributes—Essentials, In-Room Amenities, Website, High-Speed Internet Access (HSIA), and Breakfast—alongside service quality dimensions—Reliability, Empathy, Responsiveness, Assurance, and Tangibility—affect guests' behavioral intentions, including revisit intention, intention to recommend, willingness to pay more, and loyalty. Utilizing a quantitative research design, the study collected data from guests through structured surveys. It also analyzed significant differences across demographic profiles (age, sex, civil status, and purpose of stay) and tested correlations among the key variables. Findings reveal that modern hotel attributes and consistent service quality significantly influence positive guest behaviors. In particular, Essentials and Responsiveness emerged as strong predictors of guest loyalty and revisit intention. The study concludes with a proposed framework for continuous improvement, aiming to enhance guest behavioral intention and provide strategic direction for hotel operators in Region III. This research contributes valuable insights for hospitality practitioners, policymakers, and academics by highlighting the critical interplay between hotel features and service performance in shaping guest decisions. The resulting framework serves as a practical tool for elevating service standards and strengthening the competitive positioning of hotels within Central Luzon's tourism sector.

**Keywords:** tourism, hotel attributes, SERVQUAL, Philippines

## **Hotel attributes and service quality among hotels in Region III: Basis of a framework for improved behavioral intention**

### **1. Introduction**

This section highlights the key global trends shaping hotel attributes and explores their profound impact on service quality and behavioral intentions. In the rapidly evolving global hospitality industry, service quality and behavioral intentions are continuously shaped by emerging trends and shifting preferences. Saragat (2024) stated that kicked off with exceptional growth in the hospitality sector, particularly in Q1, where we observed a notable surge in hotel guest satisfaction and responsiveness. This trend, especially pronounced in the 3 and 4-star hotel categories, not only mirrors but also exceeds the upward trajectory seen in the previous year's first quarter. The latest Guest Experience Benchmark Report reveals key trends shaping the sector in early 2024. As travelers become more discerning and diverse, hotels must adapt to meet these changing demands. Online booking platforms like Expedia and Agoda have registered significant increases in review volumes, especially in North America and Asia-Pacific, reflecting a shift in guest booking preferences. This shift underscores travelers' changing preferences and a competitive shake-up in the online booking space (Sarasagat, 2023). The attributes that define a hotel's appeal have evolved beyond traditional measures of luxury and comfort. From the integration of cutting-edge technology to the emphasis on sustainability and personalized experiences, modern hotel attributes now encompass a broader spectrum of factors that resonate with today's guests.

Understanding these global trends is vital for hotels to not only meet but also enhance behavioral intentions. By aligning their offerings with these trends, hotels can ensure sustained service quality and foster loyalty in an increasingly competitive market. One of the most positive trends observed in the early part of 2024 is the rise in positive mentions, which increased by 1.0 points to 75.8% globally. This is further emphasized by a significant reduction in negative comments about room quality, particularly in the Asia-Pacific and Middle Eastern markets, which saw increases of 2.0 and 1.4 points, respectively, in positive room mentions(Sarasagat, 2023).

This study aims to fill a significant research gap by focusing on the less-explored Region III, a critical area for the hospitality and tourism industry in the Philippines. While prior research has extensively covered various factors impacting service quality, there is a notable lack of studies examining the interplay between hotel attributes, service quality, and behavioral intentions in this specific region. Ocampo (2018) state that many hotels in Central Luzon face challenges with outdated facilities and amenities. This issue affects the overall guest experience as older infrastructure and amenities may not meet the modern standards and expectations of travelers. This research intends to bridge this gap by exploring how these factors collectively influence behavioral intention. Inconsistent service quality is a prevalent issue in hotels across Central Luzon, with varying levels of service performance affecting and perceptions of reliability (Yeo et. al.,2022). Many hotels in Central Luzon struggle with inadequate customer service training, leading to a noticeable decline in service quality and guest interactions (Al-Damen et. al.,2023)

In this study, Hotel Attributes are operationally defined by evaluating Essentials, In-Room Amenities, Website, High-Speed Internet Access (HSIA), and Breakfast. Essentials refer to the fundamental aspects of the hotel such as cleanliness and comfort, which are essential for meeting basic guest needs. In-Room Amenities include items provided within guest rooms that enhance comfort and convenience. The Website assesses the usability and functionality of the hotel's online presence, while HSIA evaluates the quality of internet connectivity provided to guests. Breakfast encompasses the quality and variety of morning meal options offered. Theoretically, these attributes align with the foundational principles of hospitality that emphasize meeting guests' basic needs and enhancing their overall experience through convenience and added value.

Service Quality is measured in terms of Reliability, Empathy, Responsiveness, Assurance, and Tangibility.



Reliability refers to the hotel's ability to deliver promised services consistently and accurately. Empathy involves understanding and addressing the unique needs of guests. Responsiveness is the promptness and efficiency with which staff address guest requests and issues. Assurance pertains to the professionalism and knowledge of staff, instilling confidence in guests. Tangibility includes the physical appearance of the hotel and its facilities, which impacts guests' perceptions of service quality. Theoretically, dimensions of service quality are integral to the SERVQUAL model, which suggests that high service quality is achieved through consistent, responsive, and empathetic interactions, alongside tangible elements that enhance the behavioral intentions.

This research explores how hotel attributes and service quality influence guests' behavioral intentions—such as revisit intention, intention to recommend, willingness to pay more, and loyalty—among hotels in Region III. Behavioral intention is a critical predictor of future guest engagement and long-term hotel success. The SERVQUAL model, which evaluates service quality across five key dimensions—tangibles, reliability, responsiveness, assurance, and empathy—provides a framework to measure how well hotels meet or exceed the factors that directly shape these behavioral intentions.

The study emphasizes the importance of hotel attributes and service quality in influencing guests' likelihood to revisit, recommend, pay more for services, and demonstrate loyalty. High-quality hotel attributes, including the physical environment, amenities, and interactions with staff, directly enhance service quality, which in turn influences guests' behavioral intentions. When hotels deliver effective service quality—characterized by reliability, responsiveness, empathy, and assurance—it leads to stronger revisit intentions, increased willingness to recommend, greater willingness to pay higher prices, and improved guest loyalty.

By understanding the interrelationships between these variables, this research aims to provide actionable insights for hotel managers to optimize service delivery and hotel attributes in a way that consistently meets or exceeds guests' behavioral intentions. The framework developed from this study will assist hotels in Region III by adapting existing theoretical models to their specific context, helping them improve operational effectiveness, enhance guest satisfaction, and ensure long-term loyalty and engagement. This approach ensures a robust evaluation of how hotel attributes and service quality influence behavioral intentions. The findings will contribute to a deeper understanding of these dynamics in a regional context and offer practical insights for enhancing hospitality services in Central Luzon.

The theoretical foundation of this study is rooted in established frameworks in hospitality research. The SERVQUAL model by Parasuraman et al.,(1988) provides foundational concepts for measuring service quality, adapted for this study. Behavioral intention on hotel attributes research" refers to a study that examines how different aspects of a hotel (like room quality, location, amenities, service) influence a guest's likelihood to choose that hotel, essentially measuring their "behavioral intention" to book a stay there based on their perception of these attributes (Ahmad et al. 2017). The hypothesized relationships were supported by the data. The results show an insignificant relationship between accessibility and hospitality services. Reliability had an insignificant relationship with hospitality services. Insights from Lee et al.,(2018) on measuring service quality in green hotels are also incorporated, focusing on Reliability, Empathy, Responsiveness, Assurance, and Tangibility. These frameworks ensure the study's reliability and validity by providing a comprehensive evaluation of hotel attributes, service quality, and behavioral intentions.

Research literature supports the relationship between the variable's hotel attributes, service quality, and behavioral intentions. Tran (2020) mentioned in his study that customers' positive behavioral intentions come from their satisfaction, while satisfaction is the result of good service quality. Specifically, satisfaction is a strong mediator of the effect of service quality on behavioral intentions. However, this research stream primarily discusses consumer behavioral intentions from the benefit aspect. The study's objective is to establish how an increase or decline in service quality affects customer feedback. This study builds on this understanding by investigating how various hotel attributes and service quality may influence behavioral intentions in Region III.

The relationship between hotel attributes and guest satisfaction has been well-documented. Okocha et al

(2021) stated that hotel attributes refer to the physical features and characteristics of a hotel like room quality, amenities, and facilities, while "service quality" encompasses the level of customer service provided by staff, including responsiveness, reliability, and empathy, which ultimately influence a guest's "behavioral intention" - their likelihood to return, recommend the hotel, or engage in positive actions based on their overall experience. This research draws on these sources to validate the framework for assessing hotel attributes, service quality, and behavioral intentions.

The purpose of this study is to examine the relationship between hotel attributes, service quality, and behavioral intentions among hotels in Region III. Behavioral intentions, including revisit intention, intention to recommend, willingness to pay more, and customer loyalty, are critical indicators of future guest engagement and long-term success in the hospitality industry. By identifying the key factors that significantly impact these intentions, the study aims to develop a comprehensive framework that hotels can use for continuous improvement specifically on how to improve guests' behavioral intentions. This framework will play a crucial role in optimizing operational processes, enhancing service delivery, and boosting behavioral intentions among guests. It will also provide actionable insights for hotel managers, policymakers, and tourism stakeholders, enabling them to implement strategies that strengthen the region's hospitality industry and elevate its reputation as a tourist destination. Contributing to the academic field, the study will deepen the understanding of service quality within the context of Region III, offering new perspectives and empirical data that enrich the existing literature. Furthermore, the findings will serve as a foundation for future research, guiding scholars in exploring additional dimensions of service quality and guest satisfaction. Despite potential limitations such as regional specificity and biases in self-reported data, the study aims to offer significant practical value and contribute meaningfully to both academic knowledge and industry practices.

The rationale for this study stems from the need to address a research gap concerning the relationship between hotel attributes, service quality, and behavioral intention in Region III (Central Luzon). As the hospitality industry becomes increasingly competitive, understanding the factors that influence guest behavioral intention this region is essential for hotel operators aiming to enhance their service offerings and operational efficiency. The primary beneficiaries of this study include hotel managers and operators in Region III, who will gain actionable insights into improving their service quality and meeting evolving guest's behavioral intentions. Additionally, tourism stakeholders and policymakers will benefit from the findings, as they can use the insights to support regional tourism development and craft strategies that will enhance the tourists behavioral intention . The study's findings will also provide valuable insights for academic researchers exploring service quality and behavioral intention in the hospitality industry.

The primary output of this study is a tailored framework for continuous improvement in hotel operations and service delivery, specifically designed for Region III. This framework will provide practical recommendations for enhancing service quality and influencing behavioral intentions based on the study's findings. Contributions to the body of knowledge include a deeper understanding of the unique factors affecting behavioral intention in Region III, thereby filling a gap in existing research. The study will advance the literature on hospitality management by offering empirical data and insights that can be applied to similar regional contexts. Additionally, the findings will inform future research, providing a foundation for exploring additional dimensions of service quality and operational efficiency in the hospitality industry.

This study focuses on DOT Accredited hotels within Region III (Central Luzon), specifically examining the relationship between hotel attributes, service quality, and behavioral intention. The scope is limited to this geographic region and to hotels rated as DOT Accredited hotels with varying star ratings , which may not fully represent the broader spectrum of hospitality experiences such as those in other geographical regions. Additionally, the study relies on self-reported data from guest surveys, which may introduce biases or inaccuracies. The findings may therefore not be generalizable to other regions or hotel categories. Despite these limitations, the study aims to provide valuable insights relevant to the context of Region III and contribute meaningfully to the field of hospitality research.

**Objectives of the Study** - The general objective of the study is to investigate the relationship of hotel attributes and service quality on guest behavioral intention. This serves as the basis for a framework for an improved behavioral intention. Specifically it, assessed the attributes of the hotel in terms of Essentials, In-Room Amenities, Website, HSIA (High-Speed Internet Access), and Breakfast; determined service quality in terms of Reliability, Empathy, Responsiveness Assurance, and Tangibility; assessed guests' behavioral intention in the areas of Revisit Intention, Intention to Recommend, Willingness to Pay More and Loyalty; tested significant relationship between guest hotel attributes, service quality and behavioral intention; determined the predictors of guest behavioral intention; and proposed a framework for an improved behavioral intention.

## 2. Method

**Research Design** - The research employed in this study was a quantitative descriptive correlational design, which involved the use of a survey questionnaire to evaluate the relationship among hotel attributes, service quality, and behavioral intentions in hotels. In this method, researchers collected data on the variables of interest and then analyzed the data to determine whether there was a relationship or correlation between these variables. The primary focus was on understanding the existing relationships or patterns among the variables, not on establishing causality. It was often used when researchers wanted to examine associations or connections between variables in a real-world context. In the context of this study, the quantitative descriptive correlational design was employed to investigate the relationships among three key variables: hotel attributes, service quality, and behavioral intentions. The study sought to describe and understand how these variables were related within the hotel industry. By using this method, the researcher gathered valuable insights into whether certain behavioral intentions were associated with higher levels of hotel attributes and service quality.

**Participants of the Study** - The study focused on hotel guests from the five provinces of Central Luzon: Aurora, Bataan, Bulacan, Nueva Ecija, and Pampanga. In each province, at least one DOT-accredited hotel, accredited by the Department of Tourism (DOT), was included to ensure a broad representation of hotel types and service levels. This geographic and institutional diversity provided a comprehensive view of guest experiences across the region. The participants were vacation, leisure, and business travelers who had stayed at these hotels. By including a mix of traveler types, the study aimed to capture a wide range of perspectives and intentions. Leisure tourists often sought different amenities and services compared to business travelers, so including both groups allowed for a more nuanced understanding of service quality and hotel attributes. In the selection process for this research, two key criteria were employed. First, a comprehensive list of DOT-accredited hotels was obtained directly from the Department of Tourism (DOT) website. Second, the researchers contacted the DOT via email to request the list of accredited hotels. These criteria ensured that all selected hotels met the established benchmarks for safety, service quality, and operational standards. By incorporating these methods, the research maintained high credibility and ensured that the sample accurately reflected reputable hospitality establishments, thereby enhancing the reliability of the study's findings.

**Table 1**

*Distribution of Respondents Per Hotel in Central Luzon*

Province	No. of Hotels	N	%	n
Bataan	2	43	2	7
Bulacan	1	11	1	2
Nueva Ecija	3	60	3	10
Pampanga	20	1369	69	222
Tarlac	3	75	4	12
Zambales	9	430	22	70
	38	1988	100	323

To achieve a representative sample, stratified random sampling was employed. Questionnaires were distributed proportionally based on the number of guests arriving at each hotel. This method ensured that each

guest had an equal chance of being selected, thereby reducing potential biases in the sample. The total number of respondents surveyed was 293, as determined by a G\*Power analysis to ensure sufficient statistical power for the study's objectives. This sample size allowed for robust analysis and reliable insights into the relationships between hotel attributes, service quality, and behavioral intentions.

**Data Collection Instrument** - The study employed a questionnaire that was adapted and modified from existing instruments to suit the research objectives. The questionnaire, with revisions made to align with the specific focus of the study, drew from established works by previous authors. The study used an adapted instrument divided into four sections. The first section gathered demographic details of the respondents, such as sex, age, civil status, whether they stayed at a DOT-accredited hotel, and their purpose of visit. The second section of the questionnaire assessed hotel attributes, including essentials, in-room amenities, website, high-speed internet access (HSIA), and breakfast. This part used an adapted questionnaire from Usta et al. (2011). The third section of the questionnaire evaluated service quality in terms of reliability, empathy, responsiveness, assurance, and tangibility. This part was adapted from Lee et al., (2018). The fourth section of the questionnaire, adapted from Borbon et al. (2022), assessed guests' behavioral intentions in terms of revisit intention, intention to recommend, willingness to pay more, and loyalty. All of these were evaluated using a 4-point Likert scale: 4 (Strongly Agree), 3 (Agree), 2 (Disagree), and 1 (Strongly Disagree).

To ensure that the questionnaire was well-aligned with the study's objectives, it underwent face-to-face validation with the research adviser. This validation process ensured that the instrument accurately captured the intended constructs. The questionnaire was also reviewed for grammatical accuracy to ensure clarity and precision in the questions. Further validation was conducted by experts in the field of hospitality management, including faculty members and managers from DOT-accredited hotels outside Region III. Their feedback was instrumental in refining the instrument and ensuring its relevance to the study. The questionnaire was validated by the following individuals from both industry and academe: a manager at Hotel 101 - Fort, a duty manager at Halo Hotel, and a professor from Mabalacat City College. The questionnaire underwent a comprehensive review by a grammarian, who assessed the validity of all the questions. Following this, the instrument was pilot-tested with 30 hotel guests from the National Capital Region who were not part of the main target group. The pilot testing helped identify any issues with the questionnaire and allowed for further refinements.

Reliability analysis was conducted to evaluate the internal consistency of the questionnaire. Results demonstrated strong internal consistency across the indicators: hotel attributes (Cronbach's alpha=0.968 for 5 subscales and 33 items), service quality (Cronbach's alpha=0.983 for 5 subscales and 33 items), and behavioral intention (Cronbach's alpha=0.938 for 4 subscales and 16 items). These results confirmed that the questionnaire was both valid and reliable for the study. Finally, the study secured ethics approval to ensure that all research activities adhere to ethical standards and guidelines for conducting research involving human participants.

**Data Gathering Procedure** - The researcher approached the data collection in an ethical manner. Preliminary data gathering was conducted by requesting initial information about the accredited hotels in the region with the help of the Department of Tourism office personnel in the region. This allowed the researcher to make the first contact and be able to present the objectives of the study. Moreover, the researcher administered the survey questionnaire randomly among qualified guests as respondents who checked in at the accredited hotels in Region 3 (Central Luzon), which served as qualifiers.

The researcher conducted the data gathering through personal contact and Google Forms with the hotel guests. In addition, the researcher assisted respondents in completing the survey when necessary. Before completing the survey, participants received a participant information document. It described the study's title and objective, the investigators' contact information, and the study's risks and benefits. This data collection was strictly observed in a practical, formal, and ethical manner. Since the researcher valued respect and integrity, the participants were assured that all information and data collected from the survey would be kept confidential and

secured in a flash drive, while printed survey questionnaires were stored confidentially. After the study was completed, all files and data were removed.

The hotel industry in the Central Luzon region was a significant contributor to the local economy. It comprised a diverse range of hotels, from large international chains to boutique establishments. These hotels catered to various types of guests, including tourists, business travelers, and local visitors. Understanding the dynamics of this industry was essential for evaluating service quality and behavioral intentions. Before distributing the questionnaire, ethical considerations and permissions were addressed. The study sought approval from the relevant authorities in the Department of Tourism in the Central Luzon region to ensure that data collection was conducted in compliance with industry regulations and standards. Collaboration with the industry was considered vital, as it ensured that the study was conducted with industry support and cooperation. Guests were informed about the study's objectives, and their participation was voluntary. Their willingness to collaborate underscored the importance of the research for improving services and safety in the region's hotels.

To ensure the highest data quality and ethical standards, the following best practices were employed during the distribution of the questionnaire: Respondents were selected randomly from qualified guests to avoid bias in the sample. Respondents were provided with a participant information document that outlined the study's purpose, risks, benefits, and contact information for the investigators. This ensured transparency in the research process. Prior to completing the survey, respondents were informed that participation was voluntary, and they had the right to decline or withdraw without consequences. To achieve a 100% response rate, the researcher employed either face-to-face or online data collection methods. Face-to-face surveys were conducted when guests were physically present in the hotels. Simultaneously, a Google Form version of the questionnaire was made available to guests who preferred to respond electronically or were not present during the initial contact. This multi-modal approach ensured that all qualified guests had an opportunity to participate, thus maximizing the response rate.

**Data Analysis** - Data were tabulated and analyzed using the Statistical Package for the Social Sciences (SPSS) software. To perform data analysis, the researcher, in collaboration with the statistician, used the following statistical tools: Weighted Mean and Ranking were used to assess the variables Hotel Attributes, Service Quality, and Behavioral Intention. Pearson Product-Moment Correlation Coefficient was applied to test the relationship between variables, and Multiple Linear Regression Analysis was used to examine the predictive influence of hotel attributes and service quality on behavioral intention. To determine the normality of the data distribution, both the Shapiro-Wilk Test and the Kolmogorov-Smirnov Test were employed.

**Ethical Consideration** - This study adhered to the ethical principles in writing research, such as maintaining its uprightness and integrity by citing the different authors of literature and studies included in the study. The selection of respondents for this study was handled with utmost confidentiality, following the principles of the Data Privacy Act of 2012 and ethical considerations. This included obtaining full consent, ensuring their privacy and anonymity, and conducting communication with honesty and transparency. The respondents were informed, through the consent letter, that the purpose of the study was to evaluate their perception of the hotels' hotel attributes, service quality, and behavioral intentions. It was also reiterated that their participation in the research effort was completely voluntary and that there were no known risks to their participation. They were informed that they could decline altogether or leave blank any questions they did not wish to answer. The researcher also clarified that no monetary compensation would be given to the respondents in exchange for their participation. The respondents were assured that their information and responses remained confidential and anonymous and would never be taken against them. With regard to data security, the respondents were assured that no other person would gain access to their information other than the researcher. They were also informed that their data were stored in a password-encrypted computer and in a private Google Drive and would be deleted after two years. The electronic link to the survey form was deactivated upon obtaining a sufficient number of valid responses.

### 3. Results and discussion

**Table 2**

*Summary Table on Hotel Attributes*

Hotel Attributes	Mean	Verbal Interpretation	Rank
Essentials	3.51	<i>Strongly Agree</i>	2
In-Rooms Amenities	3.49	<i>Agree</i>	3
Website	3.43	<i>Agree</i>	4
HSIA	3.41	<i>Agree</i>	5
Breakfast	3.52	<i>Strongly Agree</i>	1
Hotel Attributes OVERALL MEAN	3.47	<i>Agree</i>	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

Table 2 presents the Summary Table on Hotel Attributes which shows an overall mean of 3.47 ("Agree"). This result suggests that guests generally perceive the hotel attributes in Central Luzon Region III positively, but there's room to elevate the experience. This "Agree" level indicates that while guests aren't dissatisfied, exceeding their expectations could significantly improve behavioral intentions (like repeat bookings and recommendations).

The analysis reveals that among all hotel attribute categories, **Breakfast** 3.52 and **Essentials** 3.51 received the highest ratings, indicating that guests place significant value on these foundational elements of the hotel experience. The consistently high rating for breakfast service underscores its role not merely as a functional meal but as an experiential component that contributes to overall guest satisfaction. As highlighted in previous research, the food and beverage department—including breakfast—holds a strong and significant correlation with guest satisfaction (Rosario, 2022). A well-executed breakfast service, supported by friendly staff and a comfortable dining environment, enhances the guest's perception of value and hospitality. The high score for essentials, which typically include cleanliness, comfortable bedding, in-room safety, and basic utilities, affirms that these are non-negotiable standards expected by today's travelers. These form the baseline for satisfaction and significantly influence repeat patronage and word-of-mouth recommendations (Mina et al., 2019).

Conversely, the three lowest-rated attribute categories—**High-Speed Internet Access (HSIA)** 3.41, **Website** 3.43, and **In-Room Amenities** 3.49—highlight areas requiring strategic improvements. The relatively low rating for HSIA is particularly critical in the context of modern guest expectations, where digital connectivity is integral for both business and leisure travelers. As Jabara (2023) notes, seamless and reliable internet connectivity has become a decisive factor in hotel selection, with its absence potentially deterring technologically dependent guests. Similarly, the website serves as the first touch-point in the guest journey. A poorly designed or non-intuitive hotel website can not only discourage bookings but can also skew guest expectations, resulting in dissatisfaction upon arrival (Lacap, 2014). The hospitality industry's increasing reliance on technology necessitates ongoing digital investment, not only in infrastructure but also in user interface and experience design (Tyagi et al., 2019). Furthermore, the modest rating for in-room amenities suggests that while the basics may be present, guests may be looking for more personalized or value-added elements—such as updated appliances, modern design touches, or sustainable product offerings—that elevate the experience. Addressing these gaps is essential, as enhancing digital and in-room services contributes directly to guest satisfaction, loyalty, and competitive advantage (WHAI, 2024; Domingo, 2019).

**Table 3**

*Summary Table on Service Quality*

Service Quality	Mean	Verbal Interpretation	Rank
Reliability	3.52	<i>Strongly Agree</i>	5
Empathy	3.56	<i>Strongly Agree</i>	2
Responsiveness	3.53	<i>Strongly Agree</i>	4
Assurance	3.55	<i>Strongly Agree</i>	3
Tangibility	3.58	<i>Strongly Agree</i>	1
Service Quality OVERALL MEAN	3.55	<i>Strongly Agree</i>	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

Table 3 shows the overall service quality mean of 3.55 which indicates a "Strongly Agree" level of satisfaction. This suggests that, in general, guests have positive perceptions of the service quality provided by hotels in the region. Among the five SERVQUAL dimensions, **Tangibility** 3.58 and **Empathy** 3.56 emerged as the highest-rated, indicating that guests place strong value on the physical appearance of the hotel and the personalized care they receive. The high score for tangibility suggests that the visual appeal, cleanliness, and overall upkeep of the hotel's facilities are perceived positively by guests. As Rosario (2022) noted, the physical environment of a hotel—including its ambiance, architecture, and amenities—plays a significant role in shaping guests' perceptions of quality. These tangible elements often serve as the first impression and strongly influence guest expectations and satisfaction.

Empathy's high rating further emphasizes the importance of personalized service, staff attentiveness, and genuine concern for guest needs. Hotels that invest in staff training to develop interpersonal communication, active listening, and a customer-centric attitude can gain a competitive advantage through enhanced guest satisfaction. In a highly competitive hospitality industry like that in Pampanga, such intangible service qualities can foster stronger emotional connections and loyalty (Lacap, 2014). Evaluating service quality regularly is critical in identifying gaps in delivery and managing service more effectively. In contrast, the lowest-rated service quality dimension was **Reliability** 3.52. Reliability encompasses the hotel's ability to deliver consistent, accurate, and dependable service. A slightly lower score in this area suggests that while staff may be friendly and facilities well-maintained, inconsistencies in service execution—such as delays, unmet expectations, or errors—may still occur. Even minor lapses in reliability can diminish overall guest trust and satisfaction. Evaluating service quality regularly is critical in identifying gaps in delivery and managing service more effectively.

As supported by Liu et al. (2020), effective management leadership and engaged employees play a vital role in maintaining process consistency and service reliability. The dynamic capability view also underscores how management can align processes and human resources to strengthen operational performance. Berybe et al. (2021) highlighted that an understanding of service quality among hospitality providers—including those in home-stays and small-scale accommodations—is essential to elevate guest experience standards. Moreover, the ongoing issue of non-accreditation among many resorts in Batangas (Marasigan et al., 2020) further reinforces the need for standardization and commitment to consistent service delivery across all levels of hospitality operations. To remain competitive, hotels must address reliability concerns by streamlining operational procedures, enhancing staff accountability, and using guest feedback to reduce errors and inconsistencies. This would not only improve the lowest-rated dimension but also reinforce the strengths observed in tangibility and empathy.

Table 4 presents the results on the test of relationship between hotel attributes and service quality. The findings of the study reveal a significant relationship between hotel attributes and service quality, with all sub-variables exhibiting a strong positive correlation at the 0.01 level (2-tailed). The overall hotel attributes category demonstrates the highest correlation with service quality ( $r_s=.677$ ,  $p=0.000$ ), indicating that the collective impact of hotel attributes plays a crucial role in shaping guests' perceptions of service quality. Among the specific categories, HSIA (Hotel Smart Interactive Applications) ( $r_s=.618$ ), website ( $r_s=.601$ ), and breakfast services ( $r_s=.580$ ) exhibit high correlations with service quality, highlighting their influence on customer satisfaction. These results suggest that guests highly value digital convenience, online accessibility, and the quality of breakfast offerings in their overall hotel experience. Service reliability ( $r_s=.607$ ) and responsiveness ( $r_s=.607$ ) emerge as key drivers of service quality, emphasizing the need for hotels to focus on dependability and prompt service.

These findings align with the study of Parasuraman et al. (1988), which identified reliability and responsiveness as fundamental dimensions of service quality in the SERVQUAL model. The significance of website attributes ( $r_s = .601$ ) further supports the increasing importance of digital presence in the hospitality industry. The strong correlation between HSIA and service quality ( $r_s = .618$ ) underscores the growing reliance on technology in hotel operations.

**Table 4***Relationship between Hotel Attributes and Service Quality*

ESSENTIALS	$r_s$	$p$ -value	Interpretation
Reliability	.499**	0.000	HS
Empathy	.488**	0.000	HS
Responsiveness	.549**	0.000	HS
Assurance	.530**	0.000	HS
Tangibility	.492**	0.000	HS
Service Quality OVERALL MEAN	.555**	0.000	HS
<b>IN-ROOMS AMENITIES</b>			
Reliability	.538**	0.000	HS
Empathy	.477**	0.000	HS
Responsiveness	.517**	0.000	HS
Assurance	.519**	0.000	HS
Tangibility	.560**	0.000	HS
Service Quality OVERALL MEAN	.561**	0.000	HS
<b>WEBSITE</b>			
Reliability	.585**	0.000	HS
Empathy	.493**	0.000	HS
Responsiveness	.560**	0.000	HS
Assurance	.561**	0.000	HS
Tangibility	.556**	0.000	HS
Service Quality OVERALL MEAN	.601**	0.000	HS
<b>HSIA</b>			
Reliability	.535**	0.000	HS
Empathy	.587**	0.000	HS
Responsiveness	.589**	0.000	HS
Assurance	.596**	0.000	HS
Tangibility	.563**	0.000	HS
Service Quality OVERALL MEAN	.618**	0.000	HS
<b>BREAKFAST</b>			
Reliability	.538**	0.000	HS
Empathy	.563**	0.000	HS
Responsiveness	.524**	0.000	HS
Assurance	.522**	0.000	HS
Tangibility	.587**	0.000	HS
Service Quality OVERALL MEAN	.580**	0.000	HS
<b>OVERALL HOTEL ATTRIBUTES</b>			
Reliability	.607**	0.000	HS
Empathy	.584**	0.000	HS
Responsiveness	.607**	0.000	HS
Assurance	.605**	0.000	HS
Tangibility	.622**	0.000	HS
Service Quality OVERALL MEAN	.677**	0.000	HS

\*\**. Correlation is significant at the 0.01 level (2-tailed)*

These findings have several practical implications for the hotel industry. Given the strong correlation between reliability, responsiveness, and service quality, hotel management should invest in staff training programs that emphasize prompt and dependable service. Additionally, improvements in digital services, particularly website usability and smart applications, should be prioritized to enhance the guest experience. Hotels should also recognize the importance of breakfast services in shaping guest satisfaction and consider offering diverse, high-quality breakfast options. Future research should explore the moderating effects of demographic factors and cultural influences on service quality perceptions to provide a more comprehensive understanding of guest expectations.

The findings in Table 5 illustrate a statistically significant positive relationship between hotel attributes and behavioral intention, as indicated by the high correlation coefficients ( $r_s$ ) across various attributes and behavioral components. The overall hotel attributes demonstrate the strongest relationship with behavioral intention ( $r_s = .581$ ,  $p = 0.000$ ), suggesting that guests' perceptions of a hotel's features substantially influence their future engagement with the establishment. Among the specific behavioral intentions, loyalty exhibits the highest



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correlation across all hotel attributes, with a notable value of  $r_s = .579$  for overall attributes, reinforcing the critical role of hotel quality in fostering customer commitment.

**Table 5**

*Relationship between Hotel Attributes and Behavioral Intention*

ESSENTIALS	$r_s$	$p$ -value	Interpretation
Repurchase Intention	.505**	0.000	HS
Word of Mouth	.475**	0.000	HS
Willingness to Pay More	.447**	0.000	HS
Loyalty	.540**	0.000	HS
Behavioral Intention Overall	.533**	0.000	HS
<b>IN-ROOMS AMENITIES</b>			
Repurchase Intention	.482**	0.000	HS
Word of Mouth	.376**	0.000	HS
Willingness to Pay More	.373**	0.000	HS
Loyalty	.447**	0.000	HS
Behavioral Intention Overall	.457**	0.000	HS
<b>WEBSITE</b>			
Repurchase Intention	.519**	0.000	HS
Word of Mouth	.502**	0.000	HS
Willingness to Pay More	.465**	0.000	HS
Loyalty	.527**	0.000	HS
Behavioral Intention Overall	.552**	0.000	HS
<b>HSIA</b>			
Repurchase Intention	.485**	0.000	HS
Word of Mouth	.549**	0.000	HS
Willingness to Pay More	.407**	0.000	HS
Loyalty	.574**	0.000	HS
Behavioral Intention Overall	.555**	0.000	HS
<b>BREAKFAST</b>			
Repurchase Intention	.487**	0.000	HS
Word of Mouth	.514**	0.000	HS
Willingness to Pay More	.430**	0.000	HS
Loyalty	.563**	0.000	HS
Behavioral Intention Overall	.557**	0.000	HS
<b>OVERALL HOTEL ATTRIBUTES</b>			
Repurchase Intention	.548**	0.000	HS
Word of Mouth	.520**	0.000	HS
Willingness to Pay More	.445**	0.000	HS
Loyalty	.579**	0.000	HS
Behavioral Intention Overall	.581**	0.000	HS

\*\* Correlation is significant at the 0.01 level (2-tailed)

Notably, the website attribute holds the highest correlation with overall behavioral intention ( $r_s=.552$ ), repurchase intention ( $r_s=.519$ ), and word-of-mouth recommendations ( $r_s=.502$ ). Guests rely heavily on online platforms to assess hotel offerings, and a well-maintained website significantly enhances their perception of service quality and reliability, leading to increased behavioral engagement. Breakfast amenities also show a strong influence on behavioral intention ( $r_s=.557$ ), particularly in relation to guest loyalty ( $r_s=.563$ ) and word-of-mouth recommendations ( $r_s=.514$ ). Moreover, high-speed internet access (HSIA) reveals a substantial correlation with word-of-mouth ( $r_s=.549$ ) and loyalty ( $r_s=.574$ ). The significance of in-room amenities, while slightly lower than other attributes, remains positively correlated with behavioral intention ( $r_s = .457$ ). The relatively lower correlation values for in-room amenities in comparison to other factors suggest that while important, these features may not be the primary determinants of customer retention and advocacy. These findings reinforce the idea that hotel attributes serve as key drivers of guest behavior, directly influencing their future engagement with the establishment. Hotels seeking to improve customer retention and brand advocacy should prioritize investments in digital platforms, dining experiences, and high-speed internet services to enhance overall guest satisfaction.

**Table 6***Relationship between Service Quality and Behavioral Intention*

RELIABILITY	$r_s$	$p$ -value	Interpretation
Repurchase Intention	.610**	0.000	HS
Word of Mouth	.539**	0.000	HS
Willingness to Pay More	.400**	0.000	HS
Loyalty	.495**	0.000	HS
Behavioral Intention Overall	.547**	0.000	HS
EMPATHY			
Repurchase Intention	.573**	0.000	HS
Word of Mouth	.601**	0.000	HS
Willingness to Pay More	.398**	0.000	HS
Loyalty	.501**	0.000	HS
Behavioral Intention Overall	.558**	0.000	HS
RESPONSIVENESS			
Repurchase Intention	.518**	0.000	HS
Word of Mouth	.537**	0.000	HS
Willingness to Pay More	.438**	0.000	HS
Loyalty	.521**	0.000	HS
Behavioral Intention Overall	.540**	0.000	HS
ASSURANCE			
Repurchase Intention	.567**	0.000	HS
Word of Mouth	.534**	0.000	HS
Willingness to Pay More	.391**	0.000	HS
Loyalty	.488**	0.000	HS
Behavioral Intention Overall	.526**	0.000	HS
TANGIBILITY			
Repurchase Intention	.567**	0.000	HS
Word of Mouth	.517**	0.000	HS
Willingness to Pay More	.355**	0.000	HS
Loyalty	.428**	0.000	HS
Behavioral Intention Overall	.489**	0.000	HS
OVERALL SERVICE QUALITY			
Repurchase Intention	.605**	0.000	HS
Word of Mouth	.576**	0.000	HS
Willingness to Pay More	.433**	0.000	HS
Loyalty	.518**	0.000	HS
Behavioral Intention Overall	.574**	0.000	HS

\*\* Correlation is significant at the 0.01 level (2-tailed)

The results in Table 6 reveal a strong and statistically significant correlation between service quality dimensions and behavioral intention, as all relationships yield  $p$ -values of 0.000, indicating high significance at the 0.01 level. Among these dimensions, Reliability demonstrates the strongest association with Repurchase Intention ( $r_s = .610$ ) and Overall Behavioral Intention ( $r_s = .547$ ). This suggests that hotel guests prioritize consistency and dependability in service delivery, reinforcing the idea that reliable services build trust and encourage repeat patronage (Parasuraman et. al.,1988). Similarly, Empathy—which involves personalized service and staff attentiveness—exhibits the highest correlation with Word of Mouth ( $r_s = .601$ ), highlighting that guests are more likely to share positive experiences when they feel valued and understood (Ladhari, 2009). The significance of Responsiveness ( $r_s = .540$ ), Assurance ( $r_s = .526$ ), and Tangibility ( $r_s = .489$ ) also suggests that prompt service, staff confidence, and well-maintained physical facilities play vital roles in shaping guests' behavioral intentions. However, Tangibility shows the weakest correlation with Willingness to Pay More ( $r_s = .355$ ), indicating that while guests appreciate aesthetically pleasing environments, they do not necessarily equate superior physical attributes with higher spending willingness.

From a managerial perspective, these findings emphasize that hotels should adopt a comprehensive service quality approach, ensuring that all dimensions—reliability, empathy, responsiveness, assurance, and tangibility—are well-integrated into their service delivery. Since Reliability and Empathy have the strongest influence on behavioral intention, hotel managers should invest in staff training programs that emphasize consistency, personalized interactions, and attentiveness to guest needs. Additionally, enhancing Word of Mouth

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marketing strategies by leveraging positive guest experiences through social media, online reviews, and loyalty programs can further strengthen customer retention and acquisition.

This study underscores the critical role of service quality in influencing guest behavioral intentions, with key findings reinforcing the importance of reliability, empathy, and responsiveness in shaping guest decisions. The presence or absence of significant demographic differences offers further insight into the evolving nature of customer expectations in the hospitality industry, providing valuable guidance for both academic research and industry practice.

**Table 7**

*Predictors of Behavioral Intention*

Model		Coefficients <sup>a</sup>			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	0.187	0.127		1.471	0.142
	ES MEAN*	0.145	0.040	0.148	3.605	0.000
	IA MEAN	-0.093	0.049	-0.094	-1.899	0.058
	WE MEAN*	0.269	0.054	0.272	5.009	0.000
	HS MEAN	0.098	0.052	0.107	1.885	0.060
	BF MEAN*	0.216	0.052	0.226	4.158	0.000
	REMEAN	0.139	0.088	0.135	1.577	0.116
	EM MEAN*	0.363	0.136	0.348	2.676	0.008
	AS MEAN	-0.056	0.124	-0.053	-0.449	0.654
	TA MEAN	-0.107	0.085	-0.102	-1.259	0.209
	SERVICE QUALITY	-0.054	0.353	-0.048	-0.153	0.878

a. Dependent Variable: BEHAVIORAL INTENTION

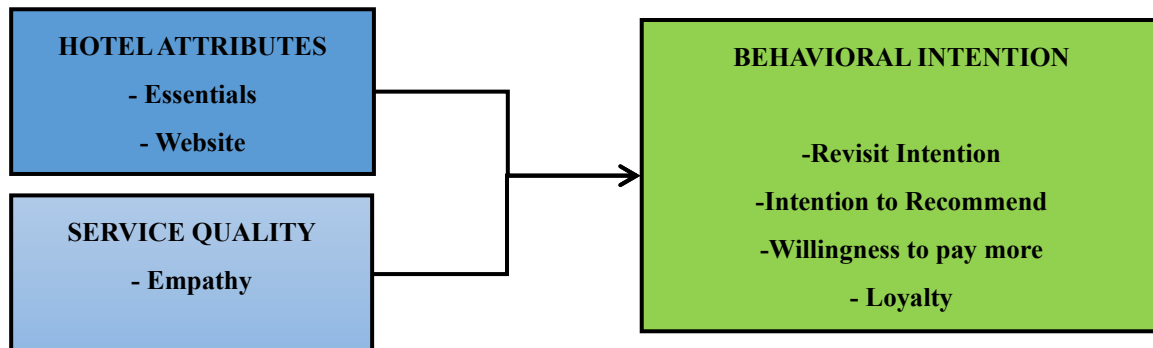
EXCLUDED VARIABLES: Hotel Attributes Overall and Responsiveness

\* good predictors of behavioral intention

Through linear regression analysis, the predictors of behavioral intentions were determined. Table 7 shows that the good predictors of behavioral intentions are three dimensions of hotel attributes, namely essentials, website, breakfast, and one dimension of service quality which is empathy, all with alpha levels of .000. The results of the linear regression analysis presented highlight significant predictors of guests' behavioral intention in the hotel industry. Among the variables analyzed, four emerged as statistically significant predictors at the  $p < 0.01$  level: Essentials (ES MEAN,  $\beta = 0.148$ ,  $p = 0.000$ ), Website (WE MEAN,  $\beta = 0.272$ ,  $p = 0.000$ ), Breakfast (BF MEAN,  $\beta = 0.226$ ,  $p = 0.000$ ), and Empathy (EM MEAN,  $\beta = 0.348$ ,  $p = 0.008$ ). These findings emphasize the critical role of specific hotel attributes and dimensions of service quality in shaping guest behavioral intentions, particularly their willingness to return, recommend, or positively evaluate a hotel.

The "Essentials" factor—which includes basic yet crucial elements such as cleanliness, safety, comfortable bedding, and room functionality—continues to be a fundamental determinant of guest satisfaction and repeat intention. Similarly, the hotel website (WE MEAN) plays a pivotal role in influencing customer behavior in the digital landscape. The growing trend of online bookings places heavy importance on a hotel's digital presence. The breakfast offering (BF MEAN) was also found to be a strong predictor of behavioral intention. Breakfast is increasingly recognized as a symbolic and experiential element of hotel stays, especially in leisure tourism. Among service quality dimensions, empathy (EM MEAN) emerged as a significant and influential predictor. Empathy in hospitality refers to personalized care, emotional attentiveness, and service staff's ability to understand guest needs. While "Service Quality" as a general measure and other attributes such as in-room amenities (IA), hotel staff (HS), and tangibles (TA) were included in the model, their influence was statistically non-significant. This could suggest that while these factors are important in the broader hospitality experience, they may not independently drive behavioral intention unless supported by other dimensions such as empathy and essentials.

Overall, this study reaffirms that tangible offerings (essentials, breakfast) and digital engagement (website quality), combined with personalized emotional service (empathy), are pivotal in influencing behavioral intentions among hotel guests. These findings offer practical implications for hotel managers aiming to enhance guest loyalty and satisfaction in an increasingly competitive and experience-driven hospitality landscape.



*Fig. 1 Guinto's Framework on Enhancing Hotel Guests Behavioral Intention*

### **Framework Description**

The conceptual framework presented in Figure 1 illustrates how the variables hotel attributes and service quality may influence behavioral intention. It is designed to explore how the internal factors within hotel operations—namely hotel attributes and service quality—can significantly influence the behavioral outcomes of guests.

In this model, hotel attributes specifically refer to three aspects: first, essentials which includes provision of toiletries, dining areas and cafes, second, websites which are modern, informative and easy to navigate and third, breakfast with attentive and friendly staff, appealing and appetizing breakfast meals with healthy options and spacious and comfortable breakfast dining areas. Service quality, on the other hand refers to the guests' evaluation of how service is delivered, focusing on empathy which encapsulates the way the hotel staff attend to and handle guests' concerns such as being friendly and welcoming to the guests, and immediately responding to the guests' concerns with understanding and compassion

Behavioral intention includes the likelihood of guests returning to the hotel, recommending it to others, or sharing positive experiences online. The arrows in the diagram indicate the relationships between hotel attributes and service performance as the independent variables and behavioral intentions as the dependent variable. The visual layout distinguishes the independent variables (hotel attributes and service quality) from the dependent (behavioral intention) variables, presenting a clear flow of influence. This framework serves as a valuable tool for understanding how operational and experiential factors contribute to guest loyalty and advocacy within the hospitality industry.

### **Theoretical Discussion**

This study's framework is grounded in three foundational theories that support the logical connections between constructs: the SERVQUAL model by Parasuraman et al. (1988), and the Theory of Planned Behavior (TPB) by Ajzen (1991). Each of these theories contributes to a comprehensive understanding of how hotel guests form evaluations and intentions based on their experiences.

The SERVQUAL model underpins the service quality component of the framework. It posits that service quality can be measured across five dimensions—tangibles, reliability, responsiveness, assurance, and empathy—which are all integral to guest perceptions. In the context of this framework, delivering high-quality service along these dimensions enhances the overall service experience and contributes positively to guest

satisfaction. On the other hand, the Theory of Planned Behavior provides a behavioral lens through which the link between satisfaction and behavioral intention can be interpreted. TPB suggests that behavior is guided by intention, which is shaped by attitudes, subjective norms, and perceived behavioral control. In this framework, guest satisfaction informs the attitudinal component, strengthening the intention to engage in favorable post-purchase behavior. For instance, a satisfied guest is more likely to believe their decision was correct, feel confident in repeating it, and perceive social support for endorsing the hotel to others.

Collectively, these theories explain the cognitive, emotional, and social mechanisms through which hotel features and service delivery influence guest decision-making. The framework, therefore, rests on a robust theoretical foundation that integrates evaluation and behavioral perspectives.

### ***Operational Discussion***

From a practical standpoint, the proposed framework provides actionable insights for hospitality managers aiming to enhance guest satisfaction and encourage positive behavioral outcomes. It underscores the critical importance of managing both the tangible and intangible aspects of the guest experience. Hotel managers must ensure that the physical attributes of the property—including cleanliness, facilities, comfort, and aesthetics—meet guest expectations and reinforce the hotel's market positioning. Likewise they must also ensure the provision of modern and functional website and healthy morning meals and that these services meet the needs of older guests who stay in hotels for family and leisure.

Equally important is the delivery of high-quality service. This involves staff being trained to demonstrate empathy, resolve issues promptly, and deliver consistent and professional service interactions. Regular service audits, guest feedback mechanisms, and continuous staff development programs are essential tools for maintaining service quality. Hotels may also utilize customer satisfaction surveys, comment cards, and online review analysis to gather insights and identify areas for improvement. Moreover, hotels should consider investing in technologies and systems that support service personalization. By aligning operations with guest expectations, hotels can foster positive experiences that translate into satisfaction and behavioral loyalty. Metrics such as repeat visit rates, Net Promoter Scores (NPS), online review scores, and customer lifetime value can be used to assess the effectiveness of the framework in practice. Ethical practices must also be observed in the process, ensuring authenticity in service delivery and transparency in guest communications. Ultimately, this framework serves as a strategic guide for enhancing the guest experience and driving sustainable customer loyalty. It is adaptable across various types of accommodation providers, from budget to luxury, and remains relevant in both traditional and digital service environments.

### **4. Conclusion and recommendation**

Guests highly valued clean, well-maintained, and visually appealing hotels with professionally presented staff, requiring continuous investment in these areas. Tangibility aspects such as ambience, external appearance, and cleanliness must be enhanced while maintaining a balance between quality and operational cost. Guests showed high satisfaction and willingness to pay more or recommend hotels, but management must implement guest retention strategies to build long-term loyalty. Older guests gave more favorable feedback, suggesting the need for age-appropriate service enhancements to meet varied expectations. Behavioral intentions were strongly linked to hotel attributes and service quality, emphasizing the importance of consistent service delivery. Essentials (ES), Website (WE), Breakfast (BF), and Empathy (EM) emerged as the strongest predictors of positive guest behavioral intentions. A development plan is proposed to enhance service quality and guest loyalty, helping Region III hotels remain competitive in a dynamic hospitality environment.

Based on the study's highest-rated results, it is recommended that hotel management further enhance tangible aspects of service quality, as, indicating that well-maintained facilities, visually appealing amenities, and professional staff appearance positively impact guest perception. Investing in modernized hotel interiors, upgraded in-room features, and aesthetically pleasing public spaces which can further elevate guest experiences

and maintain a competitive edge in the industry. Since breakfast emerged as the highest-rated hotel attribute, hotels should leverage this strength by diversifying breakfast offerings, ensuring high-quality ingredients, and incorporating dietary preferences to enhance guest satisfaction and attract more travelers. Since guests were willing to recommend the hotel due to service quality, hotel management may consider engaging in strategies to maintain excellent service standards. Hotels may implement standardized service protocols and continuous training programs focused on enhancing service consistency, accuracy, and promptness in addressing guest concerns. Maintaining high service quality and enhancing key attributes can strengthen brand reputation, increase customer loyalty, and drive long-term profitability in the hospitality industry. Hotel management may consider the need for enhanced guest retention strategies such as personalized services, loyalty programs, improved service consistency, and exclusive perks for repeat customers. Providing added value without significantly increasing costs can encourage guests to perceive the hotel as worth the additional expense. Hotel management may consider investing in upgrading internet infrastructure by increasing bandwidth capacity and installing additional access points in guest rooms and public areas and adjusting communication channels to align with the more traditional preferences of the older travelers. This will enhance connectivity and improve guest satisfaction, particularly for business travelers and digital-dependent guests. Hotel employees may be engaged in targeted training programs that emphasize the importance of service quality dimensions—particularly reliability, empathy, and responsiveness—as these significantly influence guests’ behavioral intentions such as repurchase, word of mouth, and willingness to pay more. By empowering staff with practical strategies to deliver consistent, personalized, and prompt service, hotels can foster stronger guest loyalty and enhance overall customer satisfaction. This employee-centered approach not only improves service delivery but also contributes to sustained positive behavioral outcomes among guests. Future research may focus exclusively on five-star hotels to identify specific areas for improvement in terms of service quality, hotel attributes, and other relevant operational aspects. This will provide deeper insights into the strengths and gaps within luxury hotel segments and contribute to the continuous enhancement of high-end hospitality services. Additionally it may utilize other variables and explore deeper qualitative insights into guest expectations to further refine service and marketing.

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# Career development, employee retention and work engagement among millennials: Basis for improved talent development framework

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## Abstract

This study explored the interconnections between career development, work engagement, and employee retention within organizations. As the modern workforce evolves, understanding the factors that influence employee's satisfaction and commitment has become paramount. Career development initiatives, including training programs, mentorship, and clear advancement pathways, are shown to significantly enhance work engagement, leading to increased productivity and job satisfaction. Furthermore, engaged employees are more likely to exhibit loyalty to their organizations, thereby improving retention rates. The research respondents are 420 millennial employees working in different IT Companies in Metro Manila. A survey questionnaire was used for this data collection. The findings indicated that there is strong evidence in work engagement amongst employees in terms of cognitive, affective, and behavioral engagement, a significant relationship between career development, employee retention and work engagement, and a high significant relationship between positive work environment and culture and employee well-being towards work engagement as well as work-life integration and work engagement. Understanding the interplay between career development, employee retention, and work engagement is essential for creating a robust talent development framework within organizations. Each of these factors significantly influences how talent is nurtured and retained, ultimately impacting organizational success. Career development initiatives help align individual aspirations with organizational objectives. High employee retention rates reduce the costs associated with recruiting and training new hires. Organizations that focus on retaining talent through effective development programs can significantly lower turnover expenses. Engaged employees are more likely to perform at higher levels, contributing to the organization's success. Their commitment to their roles often translates into better service delivery and innovation. Integrating these factors will effectively integrate career development, employee retention, and work engagement into a talent development framework for the perusal of the organizations. Furthermore, by focusing on these implications and strategies, organizations can create a comprehensive talent

development framework that nurtures talent, enhances employee's satisfaction, and drives overall success.

**Keywords:** career development, employee retentions, improved talent development framework, millennials, work engagement

## **Career development, employee retention and work engagement among millennials: Basis for improved talent development framework**

### **1. Introduction**

A talent development framework is a fundamental component for organizational success in the contemporary business environment. It serves as a strategic tool within Human Resource Management (HRM) that enhances recruitment, retention, and employee satisfaction. By implementing such a framework, companies can ensure compliance with labor laws and promote diversity and inclusion, thereby mitigating potential legal risks. Additionally, the integration of technology and data analytics allows for personalized learning initiatives that prepare employees to adapt to rapidly evolving workplace demands (Chilcote, 2025). The globalized workforce presents challenges in attracting and retaining top talent, making a robust talent management framework indispensable for competitiveness. These elements collectively enable organizations to maintain a skilled workforce aligned with strategic objectives.

Millennials are individuals who were born between 1981 to 1996. This generation is demarcated to facilitate meaningful analysis of social and cultural trends differentiating them from Generation Z. As digital natives, Millennials matured during significant technological advancements, particularly in Information and Communication Technology (ICT), shaping their interaction with the world around them. This generation is notably better educated than prior cohorts; approximately 39% hold at least a bachelor's degree compared to only 15% of the Silent Generation. Millennials also display unique socio-economic behaviors such as delayed marriage and home-ownership and extended cohabitation with parents. Millennial employees in IT companies represents the largest segment of the workforce, making their perspectives highly relevant to understanding workplace trends and challenges.

As digital natives, millennials are highly adaptable to technological advancements and innovation, which are crucial in the fast-evolving IT industry (Hollar et al., 2022). Their work preferences such as the demand for flexibility, career growth, and a strong work-life balance significantly influence company policies and organizational culture. By studying millennial employees, businesses can gain valuable insights into employee's engagement, job satisfaction, and retention strategies, ultimately helping IT companies create a more productive and supportive work environment. Focusing on career development, employee retention, and work engagement among millennials as a basis for an improved talent development framework will contribute to the development of a more effective talent development framework. Millennials make up the largest segment of the workforce in many organizations today, yet retaining them remains a significant challenge (Farooq et al., 2020).

The study focused on the following key areas: Career development to explore through learning and development opportunities, career path planning, and fostering personal and professional growth for millennial employees. As millennial employees, they are constantly faced with choices that will impact their future careers, making it essential to be proactive in developing their professional selves (Hassan et al., 2020).

As millennials enter the workforce, there is a growing emphasis on the importance of career development, work engagement and employee retention. This generation values personal growth and fulfillment in their professional lives, making it crucial for employers to prioritize opportunities for advancement and skill-building. Career development allows millennials to set goals and create a road-map for their future success. Employee retention is a critical aspect of organizational success that requires careful attention and strategic planning. In today's competitive business environment, companies are constantly striving to retain their top talent to maintain a competitive edge and drive innovation. High turnover rates can result in increased recruitment costs, decreased productivity, and loss of valuable institutional knowledge. Work engagement is a vital aspect of employee performance and organizational success. It refers to the level of energy, dedication, and enthusiasm that

employees bring to their jobs on a daily basis. Engaged employees are more likely to go above and beyond in their roles, leading to higher productivity, job satisfaction, and overall well-being. By investing in an improved talent development framework positively correlated with job performance and organizational outcomes. Organizations can foster work engagement by creating a positive work environment, providing opportunities for growth and development, recognizing and rewarding employee's contributions, and promoting a healthy work-life balance. Given that millennials value work-life balance and a supportive workplace culture, these factors play a crucial role in retaining top talent; and work engagement to describe the lens of cognitive, affective, and behavioral engagement. Understanding the different dimensions of work engagement will help organizations create an environment where millennials feel motivated, emotionally invested, and actively involved in their work.

The research examined how these factors interrelate, particularly how career development initiatives, retention strategies, and engagement efforts impact one another to propose an improved talent development framework, offering organizations evidence-based recommendations to enhance their talent management strategies. This framework aimed to align organizational objectives with the specific needs and preferences of millennial employees, ultimately improving retention and engagement levels. Through this research, the researcher aimed to provide organizations with the tools and insights necessary to better understand and address the challenges of developing, retaining, and engaging millennial talent. The resulting framework will serve as a foundation for companies to cultivate a more dynamic, engaged, and loyal workforce.

**Objectives of the Study** - The study aimed to promote a talent development framework which serves as a strategic objective within organizations, fundamentally enhancing both employee's capabilities and overall organizational performance. Specifically, the study determined the career development as to learning and development opportunities, career path planning and personal and professional growth; assessed employee retention as to positive work environment, employee well-being, and work-life integration; described the different work engagement in terms of cognitive engagement, affective engagement and behavioral engagement, tested the significant relationship among career development, employee retention and work engagement; and developed an improved talent development framework.

## 2. Methods

**Research Design** - This study adopted the descriptive-quantitative research method. This study is descriptive because it described the career development, employee retention and work engagement among millennials employed amongst the different IT companies. The data are elicited from the employees using the questionnaire-checklist. Quantitative approach uses numbers as its basis for making generalizations about a practice especially on career overview. Descriptive design is being used when the goal is to accurately describe the characteristics, trends, and patterns of a population, situation, or phenomenon, without manipulating variables or seeking to establish causal relationships. It is particularly useful in the early stages of research or when you want to understand a topic in depth before moving to more complex research designs. This means that numerical data generated from the respondents using questionnaire-checklist are utilized to carry out statistical analysis.

**Participants of the Study** - The participants in this study are millennial employees currently employed at six IT companies in Metro Manila, with a total of 420 participants. To mitigate bias, the researcher purposively selected six companies from a pool of sixteen IT companies in Metro Manila. The total participant count was derived from the millennial employees within these chosen companies. Millennial Employees comprise approximately 40–70% of the workforce in each of the selected companies. Company A has 140 Millennial employees out of 200 total employees, Company B has 100 Millennial employees out of 162 total employees, Company C has 20 Millennial employees out of 35 total employees, Company D has 20 Millennial employees out of 50 employees, Company E has 40 Millennial employees out of 60 total employees, and Company F has 100 millennial employees out of 150 total employees. These details were provided by the HR Department from

the chosen IT Companies. The researcher used total population sampling. Total population sampling is a research method that involves examining the entire population that possesses specific characteristics relevant to a study. This technique is often categorized as a purposive sampling method, where researcher chose to include every member of a small, well-defined population in their study. This approach is particularly useful when the population size is small enough that studying the entire group is feasible and necessary for obtaining accurate results. Total Population sampling eliminates sampling bias by including the entire population, researchers can avoid biases that may arise from selecting a sample. This method allows for a thorough understanding of the population, as all relevant data points are collected and is particularly beneficial when studying groups with uncommon traits, ensuring that no significant data is overlooked.

**Instrument of the Study** - The questionnaire was adapted and modified to identify the career development, employee retention and work engagement among millennials employed amongst the different IT companies within Metro Manila. The questionnaire consists of three parts. Part I will discuss the career development of the employees which is divided into learning and development opportunities, career path planning and progression, and personal and professional growth. The Part II of the questionnaire consists of the employee retention divided into positive work environment and culture, employee well-being, and work-life integration and Part III consists of work engagement which will be divided into cognitive engagement, affective engagement and behavioral engagement. The researcher informed and asked the respondents for the disclosure of information and by the respondent's permission that they are willing or not willing to disclose identification such information. Any secondary data and sources used for this research will be acknowledged with appropriate references. The researcher used a 4-Point Likert Scale questionnaire format shows as: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; and 1.00-1.49=Strongly Disagree.

**Table 1**

*Reliability Summary Table*

Indicators	Cronbach Alpha	Remarks
<b>Career Development, Employee Retention and Work Engagement among Millennial's Instrument</b>	.975	Excellent
<b>Per variable</b>		
<b>Career Development</b>	.947	Excellent
Learning and Development Opportunities	.913	Excellent
Career Path Planning and Progression	.856	Good
Personal and Professional Growth	.846	Good
<b>Employee Retention</b>	.964	Excellent
Positive Work Environment and Culture	.940	Excellent
Employee Well-Being	.925	Excellent
Work-Life Integration	.855	Good
<b>Work Engagement</b>	.970	Excellent
Cognitive Engagement	.923	Excellent
Affective Engagement	.943	Excellent
Behavioral Engagement	.900	Excellent

George and Mallery (2003) provide the following rules of thumb:> .9 – Excellent,> .8 – Good,> .7 – Acceptable,> .6 – Questionable,> .5 – Poor, and < .5 – Unacceptable

These determine the level of agreement and disagreement, any approval of the target respondents. The result of the Reliability Test of the 4-Point Likert Scale is used to determine the career development, employee retention and work engagement among millennials employed amongst the different IT companies within Metro Manila.

**Data Gathering Procedure** - In able to collect the necessary data coming from the respondents who are the millennials employed in the different IT companies in Metro Manila, the researcher first finalized the questionnaire needed for the conduct of the survey. Then she submitted the questionnaire to her adviser to be checked and validated. Upon validation of the adviser, the researcher complied a letter approved by the adviser

and the Dean to conduct the survey for the research. Upon the approval of the letter, the researcher forwarded these letters to the different IT companies in Metro Manila. These letters were received by the Human Resource Management Office and subject for approval. The researcher explained the purpose, benefit and risks in partaking in the study about the career development, employee retention and work engagement among millennials employed amongst the different IT companies within Metro Manila. Every respondent from the different IT companies was notified about this study that they participated. Considering ethical aspect of research, sufficient time was given to every respondent for their point of view by answering research questions. A consent form was given to the respondents to answer and to ensure appropriate permission using their information for research purposes. Confidentiality of any given information was assured to the respondents and respected. It was anticipated that each survey session would take at least 5 to 10 minutes for 1 respondent. Upon the approval of the company, the conduct of the survey pushed through. Thereafter, the researcher began sending the link of the google form to allow their employees to answer questionnaire in the google link for the purpose of their study.

**Data Analysis** - Weighted mean and rank were used to determine the career development as to learning and development opportunities, career path planning and progression and personal and professional growth; to assess employee retention as to positive work environment and culture, employee’s well-being and work-life integration; and to describe the work engagement in terms of cognitive engagement, affective engagement and behavioral engagement. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

**Ethical Consideration** - The ethical guidelines on the research study are going to be respected. This is outlined as the full informed consent of the respondents to the research, respect for privacy, confidentiality, and anonymity, with awareness of the right of withdrawal from this research at any time if so, wished by the respondents. Information that could identify individual respondents or the institutions in which they work will not be provided in the information about the respondents given throughout this report. To maintain the objectivity of the study, the results of the study taken were not used directly or indirectly against them. The data collected in this study was used solely for answering the purpose, benefits and risks of the career development, employee retention and work engagement among millennials employed amongst the different IT companies within Metro Manila. The study also underwent the ethics review process under the protocols of the Research and Evaluation Center of the university. A thorough review of the study design, methodology, and potential risks to participants was done by the center before any research can begin. By adhering to ethical guidelines, the researchers can protect the rights and dignity of individuals involved in their studies. It prevents harm to participants, ensures that informed consent is obtained, and upholds the integrity of the research being conducted to ensure that all actions done by the researchers is in accordance to the provision of the Data Privacy Act of 2012 which ensure the confidentiality of the information and the rights to privacy of the respondents to the conduct of this study.

### 3. Results and discussion

**Table 2**

*Summary Table of Career Development*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Learning and Development Opportunities	3.33	Agree	1.5
Career Path Planning and Progression	3.20	Agree	3
Personal and Professional Growth	3.33	Agree	1.5
Composite Mean	3.29	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

Table 2 shows the summary table of career development in terms of learning and development opportunities,

career path planning and progression, and personal and professional growth. It has a composite mean of 3.29 and the respondents generally agreed on all dimensions of career development. The respondents agreed that all of the indicators are important part of career development. In the field of career development, it is crucial to understand the importance of learning and development opportunities, career path planning and progression, and personal and professional growth. Businesses that place a high priority on these components create an atmosphere that encourages employee’s development and engagement. Hosen et al. (2024) assert that while successful training improves staff skills and adaptation to changing industry norms, insufficient training can result in decreased service quality and productivity. This emphasizes the need for ongoing career development as a way to guarantee high-quality service delivery and preserve competitive advantage. Additionally, organized career path planning is essential for coordinating personal ambitions with corporate objectives. For successful career development, Terwilliger (2023) stressed the significance of evaluating job requirements, individual goals, and community needs. Employers can proactively develop talent by implementing tools like Individual Development Plans (IDPs), which assist staff in defining attainable goals. Furthermore, funding educational opportunities is crucial for both professional and personal development. Career development programs increase employee retention and job satisfaction while giving staff members critical skills that greatly aid in their internal promotion.

Learning and Development Opportunities and Personal and Professional Growth garnered equal rating with the highest mean value of 3.33. While Career Path Planning and Progression garnered the lowest ranking with a weighted mean of 3.20. This is because employees may perceive a lack of clear career progression pathways and insufficient support for long-term career development within their organizations. In many cases, companies may have vague or inconsistent career progression frameworks that do not provide clear guidelines for advancement. Employees often face challenges in understanding how to move forward in their careers, leading to frustration, stagnation, and dissatisfaction with their career growth prospects. Furthermore, in fast-paced industries like IT, employees may feel that career progression is often based more on immediate project needs or technical skill advancement rather than a structured, long-term career plan. As a result, employees may find it difficult to envision a clear path for growth or progression within the company, especially if organizational goals are perceived as misaligned with personal career aspirations. Employers who prioritize career development not only benefit from a more skilled workforce but also create a positive work environment that promotes continuous learning and growth (Thakur, 2022).

**Table 3**

*Summary Table of Employee Retention*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Positive Work Environment and Culture	3.41	Agree	1
Employee Well-being	3.24	Agree	3
Work-life Integration	3.38	Agree	2
Composite Mean	3.34	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

Table 3 shows the summary table of employee retention in terms of positive work environment, employee’s well-being, and work-life integration. The result shows that the respondents agreed that all of the three elements are important in employee retention and should be practiced by the companies. The study conducted by Sheshadri et al. (2024) supports the conclusion that in the digital age, work-life integration, a healthy workplace culture, and employee well-being have become important factors in improving employee retention. Work-life balance and job happiness are strongly correlated, according to research, and this has a direct effect on an organization's capacity to retain talent. Offering flexible work schedules can greatly increase job satisfaction in industries like information technology, where there is intense competition for qualified workers. This flexibility makes it possible for workers to balance their personal and professional obligations, creating a more satisfying workplace that encourages loyalty and lowers attrition rates. Furthermore, ignoring work-life integration may have a negative impact on workers' well-being. According to Smith (2025), a sizable portion of workers said they would be willing to quit employment that interfere with their personal lives. This figure emphasizes how

important it is for businesses to foster work environments that value employees' time and encourage balance. By showcasing a dedication to employee's welfare, implementing tactics like flexible scheduling and remote work choices not only increases productivity but also draws in top talent (Lail, 2024).

Work- life Integration ranked number 2 with a mean value of 3 and interpreted as agree. The result shows that a positive work environment holds greater importance than work-life integration due to its direct influence on employee's well-being and organizational success. Employees spend a substantial portion of their lives at work estimated at 90,000 hours for the average US adult making the quality of workplace culture critical. A supportive and healthy culture fosters job satisfaction, reduces turnover, and enhances productivity. In contrast, poor workplace environments can lead to stress, disengagement, and diminished company performance. Thus, cultivating positivity at work not only benefits individuals but also drives business outcomes (lparsons, 2022).

While employee's well-being garnered the lowest ranking with a weighted mean of 3.24. The result shows that positive work environments and effective work-life integration are increasingly recognized as critical factors that surpass traditional notions of employee's well-being in fostering sustainable organizational success. Work-life integration goes beyond mere balance by allowing employees to fluidly manage their responsibilities across domains, reducing stressors that can undermine well-being. The synergy between a supportive workplace culture and integrated life management creates an ecosystem where employees feel valued and empowered, which is essential for long-term organizational resilience. Therefore, prioritizing positive work environments alongside seamless work-life integration arguably yields more substantial benefits than focusing solely on the narrower construct of employee's well-being.

**Table 4**

*Summary Table of Work Engagement*

<b>Indicators</b>	<b>Weighted Mean</b>	<b>Verbal Interpretation</b>	<b>Rank</b>
Cognitive Engagement	3.41	Agree	2
Affective Engagement	3.48	Agree	1
Behavioral Engagement	3.39	Agree	3
Composite Mean	3.43	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 4 shows the summary table of work engagement in terms of cognitive, affective and behavioral engagement. The result shows that the respondents agreed that all of the three elements are important in work engagement and should be practiced by the companies having a composite mean value of 3.43. The study's findings demonstrate that it is impossible to overestimate the significance of behavioral, affective, and cognitive involvement in the workplace. Employees' mental focus and attentiveness on their work are referred to as cognitive engagement (Spector, 2023). This component is essential because it allows workers to efficiently process information and make significant contributions to the objectives of the company. Employees are more inclined to put effort into their job and create a nice work atmosphere when they feel good about their roles.

Employees' visible activities in carrying out their duties, such as commitment and perseverance, are reflected in behavioral engagement (Huang et al.,2022). These three aspects must be addressed comprehensively in order for workplace engagement techniques to be effective; ignoring one can result in insufficient involvement (Spector, 2023). For example, an employee may put up a lot of work but be bored or dissatisfied, which causes them to lose cognitive attention. For optimum performance and general employee's well-being, companies should create an atmosphere that supports all three types of engagement.

Cognitive Engagement ranked number 2 with a mean value of 3.41 and interpreted as agree. Affective engagement is often considered more impactful than cognitive engagement in fostering meaningful learning experiences because it involves emotional connections that motivate and sustain student involvement. While cognitive strategies are essential for mastering content, affective factors provide the necessary foundation for sustained effort.



While behavioral engagement garnered the lowest in rank with a weighted mean of 3.39. Affective and cognitive engagement are often considered more impactful than behavioral engagement because they encompass deeper psychological processes that influence learning quality. Affective engagement involves students' emotional responses and motivation toward learning, fostering a personal connection with the material. These dimensions go beyond mere participation or compliance, which characterize behavioral engagement, by promoting intrinsic motivation and meaningful comprehension. Behavioral participation can occur without genuine interest or cognitive effort, limiting deep learning. In contrast, affective engagement enhances students' motivation and well-being by creating positive emotional experiences linked to their studies.

**Table 5**

*Relationship Between Career Development and Employee Retention*

Variables	Rho	p-value	Interpretation
<b>Learning and Development Opportunities</b>			
Positive Work Environment and Culture	.189**	<.001	Highly Significant
Employee Well-being	.327**	<.001	Highly Significant
Work-life Integration	.263**	<.001	Highly Significant
<b>Career Path Planning and Progression</b>			
Positive Work Environment and Culture	.225**	<.001	Highly Significant
Employee Well-being	.383**	<.001	Highly Significant
Work-life Integration	.302**	<.001	Highly Significant
<b>Personal and Professional Growth</b>			
Positive Work Environment and Culture	.255**	<.001	Highly Significant
Employee Well-being	.305**	<.001	Highly Significant
Work-life Integration	.218**	<.001	Highly Significant

*Legend: Significant at p-value<0.01*

Table 5 presents the relationship between career development and employee retention. The findings indicate that a positive work environment and culture have a highly significant correlation with all three career development factors: learning and development opportunities (rho = .189, p < .001), career path planning and progression (rho = .225, p < .001), and personal and professional growth (rho = .255, p < .001).

Similarly, employee's well-being exhibits a strong and highly significant association with these factors, showing the highest correlation coefficients across all categories: learning and development opportunities (rho = .327, p < .001), career path planning and progression (rho = .383, p < .001), and personal and professional growth (rho = .305, p < .001). Work-life integration is also significantly linked to career development aspects, with notable correlations for learning and development opportunities (rho = .263, p < .001), career path planning and progression (rho = .302, p < .001), and personal and professional growth (rho = .218, p < .001).

The result shows that for a business to succeed, career development and employee retention are closely related. Effective career development programs dramatically increase employee's engagement, which lowers turnover rates, according to numerous studies (Martin et al., 2022). Businesses that make investments in customized career progression possibilities not only satisfy the desires of individual workers but also match these aspirations with the aims of the company, resulting in a win-win situation.

Training and mentorship programs are examples of career development efforts that support employees' professional development and happiness. Employee's loyalty and a desire to stay with the company are more likely when they believe their employers are dedicated to their professional growth (Ali, 2020). On the other hand, when employees look for outside possibilities that offer better chances for progress, the lack of such opportunities may result in a higher turnover rate (Amri, 2023). Therefore, to promote retention, firms need to give strategic career development frameworks top priority. High turnover also has financial repercussions, which emphasize how crucial it is to fund career advancement. In addition to saving money on hiring, keeping talented workers helps organizations maintain institutional knowledge that is essential for long-term performance

(Kwenin et al., 2025). Therefore, improving employee retention and overall organizational success requires incorporating thorough career development methods into human resource management strategies.

Table 6 shows the relationship between career development and work engagement across cognitive, affective, and behavioral dimensions. The results indicate that learning and development opportunities are significantly associated with cognitive engagement ( $\rho=.109$ ,  $p=0.025$ ) and highly significantly correlated with both affective engagement ( $\rho=.179$ ,  $p<.001$ ) and behavioral engagement ( $\rho=.315$ ,  $p<.001$ ). Similarly, career path planning and progression shows a significant relationship with cognitive engagement ( $\rho=.100$ ,  $p=0.041$ ), while its correlation with affective engagement ( $\rho=.191$ ,  $p<.001$ ) and behavioral engagement ( $\rho=.241$ ,  $p<.001$ ) is highly significant. Meanwhile, personal and professional growth is significantly linked to all three dimensions of work engagement: cognitive engagement ( $\rho=.116$ ,  $p=0.017$ ), affective engagement ( $\rho=.125$ ,  $p=0.011$ ), and behavioral engagement ( $\rho=.125$ ,  $p=0.010$ ).

**Table 6**

*Relationship Between Career Development and Work Engagement*

Variables	rho	p-value	Interpretation
<b>Learning and Development Opportunities</b>			
Cognitive Engagement	.109*	0.025	Significant
Affective Engagement	.179**	<.001	Highly Significant
Behavioral Engagement	.315**	<.001	Highly Significant
<b>Career Path Planning and Progression</b>			
Cognitive Engagement	.100*	0.041	Significant
Affective Engagement	.191**	<.001	Highly Significant
Behavioral Engagement	.241**	<.001	Highly Significant
<b>Personal and Professional Growth</b>			
Cognitive Engagement	.116*	0.017	Significant
Affective Engagement	.125*	0.011	Significant
Behavioral Engagement	.125*	0.010	Significant

*Legend: Significant at p-value<0.01/0.05*

The outcome demonstrates the need of researching the connection between career advancement and job satisfaction, especially in modern organizational settings. There are many aspects of career development, such as chances for advancement, skill improvement, and growth. Furthermore, actual data from study of Vui-Yee et al., (2020) carried out in various contexts further supports the relationship between career advancement and work engagement. a strong favorable relationship between work engagement and career development programs. These results demonstrate that companies that place a high priority on employee’s development through mentorship and training initiatives not only improve individual skills but also foster a motivated workforce. This link is mediated by elements like person-organization fit. As previously mentioned, workers who have a sense of belonging to their company are more engaged at work. This implies that the advantages of career development programs can be increased by creating an atmosphere where workers feel appreciated and in line with company objectives

**Table 7**

*Relationship Between Employee Retention and Work Engagement*

Variables	rho	p-value	Interpretation
<b>Positive Work Environment and Culture</b>			
Cognitive Engagement	.203**	<.001	Highly Significant
Affective Engagement	.197**	<.001	Highly Significant
Behavioral Engagement	.186**	<.001	Highly Significant

<b>Employee Well-being</b>			
Cognitive Engagement	.125*	0.010	Significant
Affective Engagement	.173**	<.001	Highly Significant
Behavioral Engagement	.323**	<.001	Highly Significant
<b>Work-life Integration</b>			
Cognitive Engagement	.130**	0.007	Significant
Affective Engagement	.147**	0.002	Significant
Behavioral Engagement	.217**	<.001	Highly Significant

Legend: Significant at  $p$ -value<0.01/0.05

Table 7 indicates the relationship between employee retention factors and work engagement, highlighting significant correlations across cognitive, affective, and behavioral dimensions. A positive work environment and culture is highly significantly associated with cognitive engagement ( $\rho=.203$ ,  $p<.001$ ), affective engagement ( $\rho=.197$ ,  $p<.001$ ), and behavioral engagement ( $\rho=.186$ ,  $p<.001$ ). Similarly, employee’s well-being shows a significant correlation with cognitive engagement ( $\rho=.125$ ,  $p=0.010$ ) and highly significant relationships with affective engagement ( $\rho=.173$ ,  $p<.001$ ) and behavioral engagement ( $\rho=.323$ ,  $p<.001$ ). Additionally, work-life integration is significantly linked to cognitive engagement ( $\rho = .130$ ,  $p = 0.007$ ) and affective engagement ( $\rho = .147$ ,  $p = 0.002$ ), while demonstrating a highly significant correlation with behavioral engagement ( $\rho = .217$ ,  $p < .001$ ).

The outcome demonstrates that companies looking to keep a steady workforce must pay close attention to the connection between employee’s engagement and retention. According to research, engaged workers who feel good and are more competent have a big role in keeping talent on board (Randle, 2022). Higher job satisfaction and lower turnover rates are the results of engaged employees' greater propensity to exhibit behavioral, emotional, and cognitive commitment to their jobs. As a result, companies ought to actively promote involvement by implementing focused tactics that improve the working environment. Work engagement acts as a mediating factor between total compensation and employee retention, according to a study by Yao et al. (2022). This shows that when workers believe their rewards are sufficient and satisfying, their engagement levels increase and they are more likely to stay with the company.

Furthermore, successful retention tactics depend on cultivating employee’s engagement. High levels of engagement improve overall organizational performance in addition to lowering attrition (Radley, 2022). Organizations can foster a culture of long-term employee’s loyalty by giving top priority to elements like workplace culture and onboarding experiences in addition to competitive pay packages.



Figure 1: Improved Talent Development Framework

Understanding the inter-connectedness of career development, work engagement, and employee retention is crucial for creating an effective talent development framework. Each element plays a vital role in enhancing organizational performance and employee satisfaction.

Career Development is a catalyst for growth. It is essential for fostering an environment where employees can envision long-term growth within the organization. When organizations invest in career progression programs, employees feel valued and supported, which leads to increased motivation, engagement, and

productivity. Findings from the study indicated that employees view opportunities for career advancement as a key factor in their decision to stay with an organization. A well-structured career development framework also promotes skills alignment, ensuring that employee goals are in harmony with business objectives, thus improving satisfaction and reducing turnover. Additionally, organizations that prioritize career development foster a culture of continuous learning, enabling their workforce to adapt to evolving industry demands and strengthening overall capabilities.

Work Engagement is the driving force behind exceptional employee performance. It reflects how employees perceive their roles and the level of support they receive from the organization. Engaged employees tend to be more productive, innovative, and committed to the success of their teams and the company as a whole. Companies that emphasize engagement strategies consistently report higher productivity and lower turnover rates. When employees feel respected, valued, and connected to their work, they are far less likely to leave. Work engagement also enhances job satisfaction, which in turn reinforces loyalty and organizational commitment.

Employee Retention is the outcome of well-executed engagement and development strategies. In today's competitive labor market, retaining talent has become a strategic priority. High turnover can be costly both financially and operationally. Organizations that invest in employee learning and career development experience significantly better retention outcomes. Research shows that employees are more likely to remain with companies that actively support their professional growth. In addition to retention, such investment improves talent attraction, as development-focused organizations are seen as more desirable employers. Companies with strong training and development programs not only attract top talent but also report higher income per employee and stronger overall performance. Preventing turnover by addressing the lack of career development opportunities is a practical and impactful approach to sustaining a stable workforce.

In summary, the relationship between career development, work engagement, and employee retention is central to building a motivated, committed, and high-performing workforce. By prioritizing these areas, organizations can foster a culture of growth, increase job satisfaction, and strengthen their competitive edge in the market. A well-rounded talent development framework ensures long-term success by aligning organizational goals with the aspirations and well-being of its employees.

#### **4. Conclusions and recommendations**

Based on the findings of the study, the researcher came up with the following conclusions: The respondents generally agreed on the career development provided by the IT companies. The respondents generally agreed on the employee retention provided by the IT companies. The respondents generally agreed on the work engagement provided by the IT companies. There is a highly significant relationship between career development and employee retention and significant relationship between career development and work engagement. An improved talent development framework was developed to enhance career development opportunities, boost employee retention, and foster greater work engagement within this specific generation.

The Human Resource Management Office may consider using personalized learning platforms, inclusion of comprehensive training programs, and crafting mentorship opportunities in order to cater various career development goals where experienced employees of the company guide new team members. The company may invest in the employees' personal and professional growth through courses, seminars, workshops, and self-paced learning opportunities to provide the employees a dynamic career plan that aligns professional path with the personal goals and values. The company may consider the inclusion of flexible work policies which implements flexible work arrangements, such as remote work options or hybrid models. The improved talent development framework may be utilized by IT companies to adapt to the changing business landscape. Future researchers may examine how the rise of remote work opportunities has influenced Millennial retention rates and engagement levels. This study can contribute valuable knowledge for organizations seeking to effectively attract, develop, and retain Millennial talent, leading to improved talent development frameworks and organizational success.

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# Influence of the Smart Tourism Technologies (STT) on the tourists' experience in Cavite: COVID-19 pandemic context

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## ***Abstract***

The COVID-19 pandemic and the acceleration of technology in the tourism industry are both game-changers in the tourists' experience in the current time. This study aimed to determine the influences of Smart Tourism Technologies (STT) on the tourists' experience with Cavite tourist attractions amidst the COVID-19 pandemic. It examined the Smart Tourism Technologies the tourists frequently use and their experiences to create an action plan for a Smart tourist attraction using STT. The study used a mixed-method approach and the results were analyzed using Pearson correlation and t-test for the quantitative data and thematic analysis for the qualitative data. The results showed that the most used Smart Tourism Technologies are ubiquitous connection, mobile devices and applications, and the Internet of Things. Even during the COVID-19 pandemic, the tourists were satisfied with their experience in the Cavite tourist attractions. The analysis also indicated the relationship and influence of Smart tourism technologies on tourists' experience, thereby concluding that integrating Smart Tourism Technologies in tourist attractions could also elevate the tourists' experience and satisfaction. Thus, the researcher proposed an action plan for the transformation to Smart tourist attractions to provide a seamless service process using STT, thereby preserving the authentic touristic experience, transforming to a better industry, and mitigating the impacts of the health emergency.

***Keywords:*** Smart Tourism Technologies (STT), tourists' experience, COVID-19 pandemic

## **Influence of the Smart Tourism Technologies (STT) on the tourists' experience in Cavite: COVID-19 pandemic context**

### **1. Introduction**

There are two events that disrupted the entire tourism industry at the current time. The first one is the extensive impact of the COVID-19 pandemic, causing countries to close borders, heighten travel restrictions, resulting in an economic decline globally. In fact, the World Tourism Organization(2021) recorded a 73% drop in international tourism for 2020, accumulating a loss of \$1.3 trillion of export revenues due to the health emergency. The second disruption is the acceleration of the usage of information and communications technology (ICT) in the tourism industry, transforming to the use of smart tourism technology in the new normal.

Consequently, the COVID-19 pandemic caused the world to reconsider how people live, work, think, and travel (Villacé-Molinero et al.,2021) because of its increased impact on the tourism industry. One of the changes it brought was how it heightened tourist awareness around cleanliness and safety, local travel, and sensitivity to crowd-magnet attractions (Sampson et al.,2020), forcing businesses to balance safety and profits while using technological innovation to adapt. Both disruptions must be considered in generating new experiences to adapt to the existing circumstances such as travel restrictions, lock downs, and decreasing tourist arrivals. Thus, the tourism industry must utilize all the available and applicable resources and technology to redesign and enhance the tourists' experience in the most ingenious way usable to the tourists and appropriate to the new normal. The solution must account for the tourists' changed behavior and reduce perceived travel risks while adhering to the minimum health and safety standards, paving the way to the tourism industry's recovery, sustainability, and the enhancement of the tourist experience. Expectations and performance can significantly influence experiences (Gelbman, 2021), where tourist satisfaction also plays an integral part. Satisfaction occurs when tourist expectations are met or exceeded by the actual or perceived performance (Sie et al.,2018; Blackwell et al.,2007), where tourism products, especially the core and facilitating products, must be constantly redesigned to fit the tourists' needs and preferences at present.

As a result, Smart Tourism Technologies (STT) appears to be the apparent resolution. Smart Tourism Technology is defined as all technological media that visitors employ during the entire stages of their decision-making and travel journey (Khan et al.,2017). Although the tourist experience is a core construct in smart tourism, previous studies focused only on business-centric STTs, thereby overlooking the concept (Neuhofner et al.,2018). Thus, this study aims to address this gap by determining the influence of smart tourism technologies from the tourists' perspective.

In smart tourism, technology is seen as an infrastructure rather than an individual information system (Gretzel et al.,2015) that tourists are already using in the whole travel phase. The prevalence of smart devices combined with social media, cloud computing, networking, artificial intelligence, QR codes, mobile applications, online payments, and the internet has become the norm in the new normal (Pai et al., 2020). More than ever, it allows many transactions to happen contactless, promoting, above and foremost, health and safety, efficiency, and tourist experience. The opportunities for these tools are endless. However, the tourists' perspective, as end-users of the smart tourism technology and a co-designer in their own tourist experience, plays a vital role in the success of its integration (Gretzel et al., 2015; Chung et al.,2015; Shen et al.,2020b).

At present, the Philippines is only at its starting point towards this journey by launching a smart application, "Travel Philippines," and conducting its first hybrid event entitled "Accelerating Digital Technologies for Sustainable and SMARTourism" (San Juan, 2021). While the country's smart tourism technologies differ significantly from those in other countries, it is clear that Filipinos have already been utilizing STTs while traveling (Nanca et al., 2018). Thus, this study could also chart the growth of smart tourism technologies and the



tourism industry's pivot toward recovery.

While the role of technology in tourism has affected the industry and its users, modifications to its application to the tourism industry specifically remain lacking. However, it also provides a number of opportunities for the study to provide pertinent and necessary information about its path to a technological revolution. The requirement to comprehend tourists' perspectives could result in the industry's recovery and transformation into a more user-centric and efficient entity. The emerging phenomena, along with the changed behavior and preferences of tourists, calls for the knowledge advancement on smart tourism technology in the Philippines. Despite this fact, there is only one research regarding the topic that has been published in the Philippine setting (Maestro et al., 2019) and none in regards to the COVID-19 pandemic context. This is where the current study aims to address the knowledge gap.

The study aimed to know the influence of smart tourism technologies on tourists' experience in the tourist attractions in Cavite during the COVID-19 crisis. Understanding its influence could provide greater potential to be able to maximize its usage. It could also provide significant data on necessary smart tourism technologies to establish a smart tourist attraction in Cavite using smart tourism technologies.

**Objectives of the Study** - The primary objective of this study is to determine the influence of Smart Tourism Technologies (STTs) on the overall tourist experience in various tourist attractions in Cavite amidst the COVID-19 pandemic. Specifically, the study aims to describe the demographic profile of tourists based on age, sex, educational attainment, employment status, and frequency of visits to tourist attractions in Cavite. It also seeks to assess how tourists use Smart Tourism Technologies when visiting attractions, particularly in terms of Internet of Things (IoT), mobile devices and applications, ubiquitous connection, artificial intelligence (AI), virtual reality (VR), and wearable technology. Furthermore, the study aims to explore tourists' experiences when visiting these attractions during the pandemic, and to determine whether there is a significant relationship between the use of Smart Tourism Technologies and the tourists' demographic profile, as well as between the use of these technologies and their overall tourist experience. Additionally, the study intends to identify the perceived advantages and disadvantages of utilizing Smart Tourism Technologies in tourist attractions. Lastly, it aims to propose an action plan to support the development of smart tourist attractions in Cavite, leveraging Smart Tourism Technologies to enhance the visitor experience and promote sustainable tourism growth in the region.

## 2. Methods

**Research Design** - The study employed the descriptive-correlational method of research and used both qualitative and quantitative approaches to describe the influence of smart tourism technologies on the tourists' experience on the tourist attractions in Cavite during the COVID-19 pandemic. The researcher specifically used the mixed method of research due to its central premise of the synergy use of quantitative and qualitative methodologies to have better understanding of research problems and complex phenomena than either approach alone (Creswell et al., 2017; Molina-Azorin, 2016). This type of research deals with the opinions, perceptions, and attitudes of a chosen population in which the study is explored. According to Calderon et al. (2018), descriptive research functions as a fact-finding exercise that results in a sufficient and correct interpretation of the data. This approach is best suitable for this research because it emphasizes what exists, such as contemporary circumstances, behaviors, events, and occurrences, and ensures that the findings will be grounded in the tourists' experiences wherein triangulation and complementarity could be applied. Data were obtained using the questionnaire and interview guide as the primary instruments. The study used the embedded design wherein the qualitative findings strengthened or expounded the quantitative results.

**Research Locale** - The locale of the study is Tagaytay City and Alfonso, Cavite. The two towns are located in the upland area of the Tourism Nodal Point in the province. The areas were chosen due to the greater number of tourist arrivals they attract compared to other towns in the province. They also have the most significant number of operating tourist attractions despite the COVID-19 pandemic.

**Respondents of the Study and Sampling Technique** - The participants for the quantitative approach were the tourists who visited operating tourist attractions in Alfonso and Tagaytay, Cavite, from March 2020 to September 2021. They must at least be 18 years old and above to participate in this study. Participants who contributed to the qualitative interview were tourists who visited the towns multiple times and stakeholders such as managers or employees of tourist attractions in the vicinity. The tourist attractions that contributed to the interview are Museo Orlina, Skyranch Tagaytay, Sonya's Garden, and Queen's Strawberry Farm. The mixed-method was utilized to ensure that the quality of findings is valid and congruent with either approach. A semi-structured online interview was conducted to get the qualitative data due to the surge in COVID-19 cases, IATF restriction, limited tourists visiting Cavite, and limited operating attractions. A simple random sampling was employed in the study to select the respondents for the quantitative data. The Raosoft sample size calculator was among the better-known ones. Given its ease of use, this calculator has been frequently applied in social science research (Amzat et al., 2017; Mazanai et al., 2012; Nakku et al., 2019), proving its undoubted usefulness in determining sample size.

The estimated tourist population size from March 2020 up to September 2021 was 60,000. The researchers used the Raosoft sample size calculator that resulted in the sample size of 300 respondents who were the tourists who visited operating tourist attractions in Alfonso and Tagaytay, Cavite and must have used any smart tourism technologies while traveling to the tourist attractions with 95% confidence level, 5% margin of error, and 50% response distribution. The researcher disseminated 300 survey questionnaires for the study, but then, only 205 were successfully answered and completed upon retrieval of the survey questionnaire. The 300 respondents with a 5% margin of error were the actual plan, but due to the pandemic, the researcher gathered only 204 survey questionnaires with a 6.81% or 7% margin of error. The changes from 5% to 7% margin of error have no significant impact on the overall results of the study.

The qualitative data was collected via one-on-one online interviews via the platforms, Zoom and Facebook Messenger, using purposive and convenience sampling techniques. The main purpose of the survey was to estimate with a significant decision the percentage of the population that had a specific attribute by collecting from a small portion of the total population (Fraenkel et al., 2018). It was conducted using an inductive approach wherein the researcher used the interview guide. When the sample data was completed, it was transcribed, arranged, and organized to text format systematically. The data was analyzed using content analysis for common patterns or themes.

**Research Instrument** - A self-made survey questionnaire and interview guide were used to gather the needed data. To guarantee the integrity of and quality of the data collected, the researcher ensured that the participants were aware of the criteria for the needed respondents. It was also followed by a brief discussion of the study, including what the participants could expect from the questionnaire and informed consent in the data collection. When they agreed, participants proceeded to answer the survey questionnaire, which was checked by the researcher for completion and subjected to statistical treatment. Specifically, the parts of the survey questionnaire are as follows:

The first part is the demographic profile of the respondents. The demographic questions provided context for the collected survey data, allowed the researcher to describe the participants better and analyze their responses. It was based on the study of Shen et al. (2020) regarding the significance of sex, age, employment status, and frequency of visits to smart technologies. The second part queries the smart tourism technologies used by the tourists in the tourist attractions in Cavite using a Likert scale in frequency. Smart Technologies were characterized in six (6) categories: a) Internet of Things; b) Mobile Devices and Applications; c) Ubiquitous Connectivity d) Artificial Intelligence; e) Wearable Technology; and f) Virtual Reality (VR). The data in the Smart Tourism Technologies were gathered from several sources (Shen et al., 2020a; Buonincontri et al., 2016; Buhalis et al., 2019; Serravalle et al., 2019; Khan et al., 2017; Neuhofer et al., 2015) and was collated by the researcher accordingly. The third part determined the tourists' experiences using a 5-point Likert scale of satisfaction to measure the variables.

There were two interview guides for the qualitative instrument for the tourists and managers/employees of tourist attractions. The qualitative data was collected via online interviews to evaluate how smart tourism technologies influenced the tourists' and employees' experience in the operation of the tourist attraction. The interview process started with an explanation of the process and topic as elaborated in the interview guide. The participants were also briefed on their rights as voluntary participants, interview recording, data privacy, and confidentiality. When they provided their consent, the formal interview proceeded. The interview questions began with the awareness of the subject, its influence on the participants, advantages and disadvantages, future plans, and recommendations for a smart tourist attraction. One-on-one in-depth interviews used the interview guide view guide were utilized. The survey questionnaire and interview guide were validated by three experts on the related topic. Pilot testing was also conducted to assure the reliability of the instrument.

**Validation and Reliability** - The content of the research instruments was validated to ensure that it measures what it is intended to measure. Validity refers to the degree to which the requirements of scientific research methods were adhered to during the process of producing study findings (Dudovskiy, 2018). To ensure the validity of the research instruments, there are three sets of expert validators. The first juror has a Ph.D. in Management and Public Administration with a BS in Hotel & Restaurant Management, a journal peer reviewer in the Asian Society of Teachers for Research (ASTR) journal, and a college dean and president in a university. His experience in the industry, academe, and as a researcher and peer reviewer for 17 years shows exemplary expertise in the research field. The second validator is a statistician with a master's degree with proficient experience in statistics and the academe, ensuring that the statement of the problems is answerable by the results of the instruments. The third validator is a senior tourism officer based in Los Angeles who is currently enrolled in a master's program in tourism management. Her experience in the tourism industry field as a senior tourism officer and frequent traveler provided her with sufficient knowledge and skills invalidating the instruments answerable and relatable by the participants.

Reliability refers to the consistency in measuring instruments (Grinnel et al., 1994). According to Morgan et al. (1998), Cronbach's alpha is the most used type of internal consistency reliability. Cronbach's alpha coefficient was calculated and posted a 0.97 score and inferred as excellent; thus, the reliability was considered relatively high. The coefficient alpha values equal to or above 0.70 are acceptable reliability indicators and are considered relatively high, and it is deemed to be internally consistent and reliable. To ensure the survey instrument's reliability, consistency, and validity, it underwent pilot testing after approval by validators before the data gathering. Cronbach's alpha coefficient generated a value of 0.92001745 as a pre-test with 30 respondents with 45 item questions. The reliability analysis determined that the scales had a high degree of internal consistency. To determine the internal consistency of the questionnaire, the researcher used the Cronbach's Alpha Reliability Coefficient for Likert type scales data analysis tool. A strong correlation implies a high degree of internal consistency; consequently, the assessed questionnaire is unquestionably trustworthy and construct valid, as evidenced by the following results.

**Table 1**

*Reliability Statistics for Pilot Testing*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
<b>.920</b>	<b>.920</b>	<b>45</b>

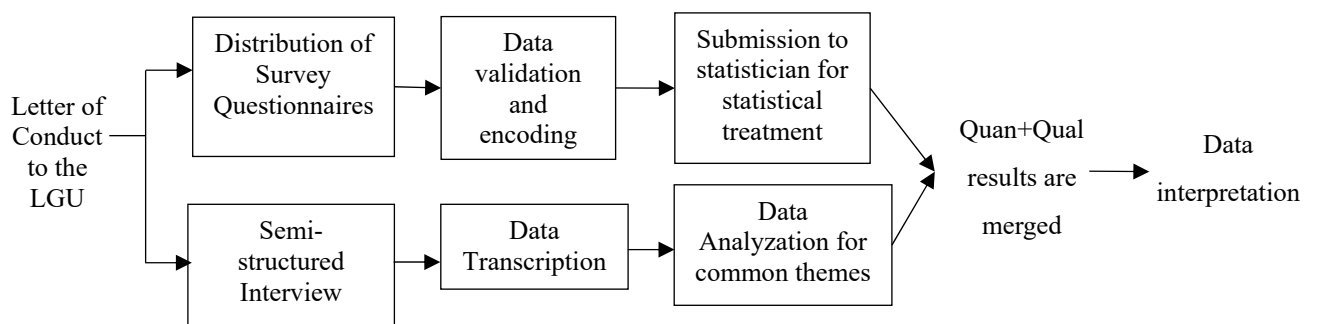
*George and Mallery (2010) provided the following rules of thumb: “>.9 – Excellent, >.8 – Good, >.7 – Acceptable, >.6 – Questionable, >.5 – Poor, and <.5 – Unacceptable*

Hence, this questionnaire unquestionably is reliable since the  $\alpha$  is 0.920. The result of the reliability statistics was high,  $\alpha=0.92001$ . Each item contributed to the questionnaire's reliability and construct validity. Reliability analysis was conducted on the perceived task values scale, which had 45 items completed by 30 respondents. Cronbach's alpha exhibited the questionnaire to reach acceptable reliability,  $\alpha = 0.920$ . Most items emerged to be worthy of retention, resulting in a decline in the alpha if deleted. It also noted that an alpha of .920 indicated that the researcher had Cronbach's alphas exceeded the test value of more than the acceptable value of

0.70 and was observed as a reasonable goal. Interview Method. To substantial the quantitative research findings, the interview method was utilized for gathering data in qualitative research. Indirect individual interviews with the respondents were also conducted.

**Ethical Considerations** - According to Maxwell (2013), ethics refers to the practice of safeguarding the welfare and rights of people who consent to engage in research. Tourists, respondents, and other participants' welfare relate to balancing the risks against benefits in providing answers to prevailing issues or gaining insights into an issue. Several ethical considerations were considered to ensure that the study was conducted in an appropriate manner (Babbie, 2012). To comply with ethical considerations, survey questionnaire respondents and interviewees were provided with informed consent before the conduct of the study. Respondents would have to choose "yes" in the Google form, indicating they willingly agreed to participate in the study to proceed to the formal questionnaire, and interviewees would have to give their verbal consent to be included in the study. The informed consent includes information that their participation is entirely voluntary without any pressure or coercion. However, all information relating to their identity will be kept confidential, including their anonymity and privacy. The data provided to the study will be kept accurate and non-biased. The consent also included the average duration of answering the questionnaire or the conduct of the interview, the name of the researcher, and email address. Providing their consent was also included acknowledging and agreeing to the collection and usage of their personal data for documentation, data analysis, and interpretation, which will be kept/stored by only the researcher for three (3) years as outlined in the Data Privacy Act of 2012. Once agreed, the research purpose and process will be explained to them.

#### **Data Gathering Procedures**



*Fig. 1 Data Gathering Procedure*

The researcher prepared a request letter to conduct a survey and reached out to the respondents, respectively. The data gathering of quantitative and qualitative information is concurrent wherein both methods were incorporated in the study, and the information was integrated to interpret both results to find congruent findings. The dominant data is quantitative, wherein qualitative augmented its interpretation by analyzing the common themes. The survey questionnaires were distributed to the respondents in an online format using Google Forms. To guarantee the integrity of and quality of the data collected, the researcher ensured that the participants were aware of the criteria for the needed respondents. The participants were also given appropriate information about the study and informed of legally required data protection information. Consent was acquired before proceeding to the actual survey questions. The results from the survey questionnaires were encoded, tallied, and validated by the researcher and submitted to the statistician for the statistical treatment of data.

For the qualitative data, the researcher conducted individual interviews via online platforms using the interview guide with the participants. Online platforms that were used were Facebook Messenger, Zoom, and e-mail. The interview started with a brief discussion of the study and the data privacy act. It was followed by acquiring the consent for the interview and recording. After interviewing at least 10 participants, tapped using purposive or convenience sampling, which consisted of tourists and employees, the researcher followed the procedures under thematic analysis to analyze the data. First, familiarization was conducted, which included audio transcription with clean verbatim of the interviews to develop an interview transcript for each common

question. The next step required coding, including highlighting relevant phrases and sentences to generate themes for the third step. This step included identifying the patterns to develop themes that were reviewed, defined, and named. During these processes, the researcher used Quirkos, a qualitative data analysis software, to enable efficient coding, themes generation, and analysis for each question. It involved repeated reading and analysis of the interview transcripts, highlighting relevant phrases and statements dragged to the existing theme or the generation of a new theme in the canvas view of the software. After each transcript for each interview question was coded and categorized into their relevant themes, a summary report was generated so that the re-narrated so that the researcher could review, analyze the most significant themes included in the study. The data was also analyzed and transcribed using only the alias of the participants to reduce or remove prejudice in assessing their answers based on their identity.

The results from the quantitative results and qualitative findings were merged appropriately for data interpretation.

**Statistical Treatment of Data** - The quantitative data collected were treated statistically using the respondent's answers and opinions. This study used a percentage and ranking for the socio-demographic profile of 205 respondents that contributed to the data-gathering process and a 5-point Likert scale method—the statistical treatment evaluated the data gathered from the survey questionnaires. To interpret the data pertaining to the demographics of the respondents, the smart tourism technologies, and the tourism experience, the one-variable table was used. After collecting the questionnaires, the researcher tabulated and encoded the responses of the tourists or respondents. Descriptive statistics was used to make a meaningful quantitative analysis of the data gathered. To determine the descriptive summary of the influence of smart tourism technology and the tourist experience, the mean and the standard deviation were utilized. Weighted mean was used to measure the general response of the survey samples, whether they agree to a given statement or not. Standard deviation was used to calculate the set of data and the distance away from the mean. The center is considered the most typical.

Likert Scale was utilized to know the most frequent used of Smart Tourism Technologies by the participants and was interpreted using the table below.

Value	Range	Interpretation
5	4.51 – 5.00	Always
4	3.51 – 4.50	Often
3	2.51 – 3.50	Sometimes
2	1.51 - 2.50	Rarely
1	1.00 - 1.50	Never

To find the degree of satisfaction in the tourists' experience, the 5-point Likert Scale was also used.

Value	Range	Interpretation
5	4.51 – 5.00	Very satisfied
4	3.51 – 4.50	Satisfied
3	2.51 – 3.50	Neutral
2	1.51 - 2.50	Dissatisfied
1	1.00 - 1.50	Very Dissatisfied

Likert Scale is known as attitude measurement; wherein subjects are asked to evaluate a set of attitude statements using scales with common categories. Pearson-Correlation was utilized to determine the significant relationship between the demographic profile and the Smart Tourism Technologies. It was also utilized to identify the significant relationship between the Smart Tourism Technologies used and tourists' experience.

The relationships between the variables were interpreted the following descriptions:

- $\pm 1.0$  = Perfect Positive Correlation/Perfect Negative Correlation
- $\pm .80 \rightarrow \pm .99$  = Very High Positive Correlation/ Very High Negative Correlation
- $\pm .60 \rightarrow \pm .79$  = High Positive Correlation/ High Negative Correlation

$\pm.40 \rightarrow \pm.59$  = Moderate Correlation/ Marked Relation

$\pm.20 \rightarrow \pm.39$  = Low Correlation / Substantial Relation

$\pm.01 \rightarrow \pm.19$  = Slight Correlation / Negligible Relation

To determine the significant relationship between the tourists' usage of each Smart Tourism Technologies and the variables under demographic profile and tourists' experience at 0.05 level of significance, the T-test was used. In this formula,  $t$  is the t-value,  $x_1$  and  $x_2$  are the means of the two groups being compared,  $s_2$  is the pooled standard error of the two groups, and  $n_1$  and  $n_2$  are the number of observations in each of the groups. A larger t-value shows that the difference between group means is greater than the pooled standard error, indicating a more significant difference between the groups. The Statistical Package for the Social Sciences (SPSS) was also utilized to interpret the data gathered.

### 3. Results and discussion

As shown in Table 2, out of 205 respondents, 53.66 percent or 110 respondents, were in the range of 18-27 years old. According to World Youth Student and Educational Travel Confederation (2016), young people at this age are interested in traveling because of leisure, freedom, exploration, tremendous socio-economic opportunities, and social interaction. Furthermore, this is the age bracket of young adults or people who want to try new things and other cultures. In fact, youth travel has become one of the fastest-growing segments in global tourism, representing 23% of the total population of international travelers.

**Table 2**  
*Profile of the Respondents*

Variable	Frequency	Percentage
Age		
18-27 years old	110	53.66
28-37 years old	43	20.98
38-47 years old	33	16.10
48-57 years old	15	7.32
58 years and above	4	1.95
<b>TOTAL</b>	<b>205</b>	<b>100</b>
Gender		
Male	86	41.95
Female	119	58.05
<b>TOTAL</b>	<b>205</b>	<b>100</b>
Employment Status		
Employed	99	48.29
Retired	6	2.93
Student	71	64.63
Self-Employed	23	11.22
Unemployed	12	5.85
<b>TOTAL</b>	<b>205</b>	<b>100</b>
Educational Attainment		
Postgraduate Level	85	41.46
College Level	97	47.32
Vocational/Diploma	7	3.41
High school Diploma	16	7.80
Elementary Diploma	0	0
<b>TOTAL</b>	<b>205</b>	<b>100</b>
Frequency of Visit to Tourist Attractions		
Once	66	32.20
Twice	55	26.83
3-4 times	44	21.46
More than 5 times	40	19.51
<b>TOTAL</b>	<b>205</b>	<b>100</b>

As to gender, female tourists dominated the attractions amidst the COVID-19 pandemic in Cavite with 58.05 percent or 119 respondents compared to 41.95 percent or 86 male respondents. Shrikant (2019), Marcus (2016), and Ferries, (2021) said that females have traveled exponentially during the past years. Ferries (2021) added that even if the female travel with a partner or a group, 80 percent of travel decisions are made by women. As to

employment status, 48.29 percent or 99 respondents were employed. This result is concurrent with the recent survey conducted by the Department of Tourism (2020). Furthermore, this finding revealed that most of the respondents felt relaxed while at the tourist attractions, especially after work, to ease stress and spend their extra time for recreation. It also implied their financial ability and desire to travel during their rest days. For the frequency of visits, 32.30 percent or 66 respondents visited the tourist attractions at least once during the COVID-19. As revealed by Salvador (2017), Cavite's strategic location made it a popular destination for a quick vacation. It also implies that tourist attractions in Cavite are considered necessary for public mental health and provide opportunities to ease the boredom and cabin fever intensified by the pandemic and isolation.

Based on Table 3, the respondents sometimes use the "QR Code (Quick Response)" over other Smart Tourism Technologies during the COVID-19 pandemic with a weighted mean of 3.45. Choi (2020) said that QR Codes help streamlines the necessary steps in the traveler's journey while enabling contactless capabilities. It implies that during the COVID-19 crisis, QR codes usage has surged for contactless payments, delivery, and contactless pickup. However, the respondents rarely use "NFC (Near Field Communication)" under location-based services with a weighted mean of 2.04. This finding implies that most of the respondents are not aware or familiar with the use of NFC despite its presence in various contactless technologies (Liu et al.,2020) implying the need to introduce this service more often to recognize this STT.

**Table 3**

*Mean Scores on the Smart Tourism Technologies used by Tourists in the Tourist Attractions Amidst the COVID-19 Pandemic Based on Internet of Things*

Indicators	MEAN	SD	INTERPRETATION
Location-Based Services			
GPS (Global Positioning System)	3.41	1.30	Sometimes
QR Code (Quick Response)	3.45	1.34	Sometimes
RFID (Radio-Frequency Identification)	2.86	1.38	Sometimes
NFC (Near-Field Communication)	2.04	1.46	Rarely
Smart Sensors			
Thermal Scanner	4.16	1.16	Often
Light Motion Sensors	3.16	1.31	Sometimes
Sensor Faucet	3.36	1.20	Sometimes
Automatic Flush	3.04	1.35	Sometimes
Smart devices and appliances			
Smart devices and appliances	4.26	0.94	Often
OVER-ALL COMPOSITE MEAN	3.31	1.27	Sometimes

*Legend: Always= 4.51-5.00 Often= 3.51-4.50 Sometimes= 2.51-3.50 Rarely=1.51-2.50 Never=1.00-1.50*

In terms of Smart Sensors, the respondents often use "Thermal Scanners" with the weighted mean of 4.16. This result implies the effective implementation of temperature checks under the minimum health & safety protocols in various establishments in compliance with the Republic Act (RA) No. 11469 or the Bayanihan to Heal as One Act to mitigate the COVID-19 virus in the new normal. The respondents also often use "Smart Devices and Appliances" with the weighted mean of 4.26. Smart devices combined with other technologies have become the norm in the new normal (Pai et al.,2020). It also implies the widespread integration of smart devices and appliances into everyday life.

Table 3 denotes that the majority of the indicators under the usage of the Internet of Things have an overall mean of 3.31 with an equivalent verbal interpretation of "Sometimes," which means that tourists already had an experience using these devices as supported by Neuhofer et al. (2018) on how the progressive development of the Internet of things could also deliver experience enhancement.

**Table 4**

*Mean Scores on the Smart Tourism Technologies used by Tourists in the Tourist Attractions Amidst the COVID-19 Pandemic Based on Mobile Devices and Applications*

Indicators	MEAN	SD	INTERPRETATION
Mobile Devices			
Smartphones	4.82	0.48	Always
Tablets	2.92	1.40	Sometimes

Social Media Applications			
Facebook	4.62	0.75	Always
Instagram	3.90	1.41	Often
Twitter	2.94	1.51	Sometimes
YouTube	4.11	1.00	Often
Tiktok	3.09	1.55	Sometimes
Travel-related Applications			
TripAdvisor	2.15	1.30	Rarely
Klook	3.47	1.50	Sometimes
Waze	3.78	1.29	Often
Google Applications	3.95	1.25	Often
Travel Philippines	2.01	1.45	Rarely
Payment Applications			
GCash	4.20	1.08	Often
Paymaya	2.75	1.47	Sometimes
Banking Applications	3.57	1.51	Often
OVER-ALL COMPOSITE MEAN	3.49	1.26	Sometimes

Legend: Always= 4.51-5.00 Often= 3.51-4.50 Sometimes= 2.51-3.50 Rarely=1.51-2.50 Never=1.00-1.50

Based on Table 4, the respondents always use “Smartphones” with the highest weighted mean of 4.82 under the indicator-mobile devices. This finding proves that Filipinos rely on smartphones in everyday transactions. This finding is further supported by Wang et al. (2011), wherein tourists have found smartphones useful in helping them visit more places, have a richer experience, and enjoy higher satisfaction with their trips overall. However, the respondents sometimes use “Tablets” with the lowest weighted mean of 2.92. In general, the participants prefer using smartphones over tablets because of their portability and versatile usability.

Under Social Media Applications, the respondents always use “Facebook”, garnering the highest weighted mean of 4.62. This finding implies that Filipinos' friendly nature and craving for interaction have expanded to Facebook, supported by its 49 million users (Philippine Daily Inquirer, 2020). Under travel-related applications, the respondents often utilized “Google Applications” with the highest weighted mean of 3.95, probably due to the variety of products and services Google offers from navigational applications, data documentation, and search engines. The respondents also often use “Waze” with the weighted mean of 3.78. This implies that most of the respondents regarded these applications as the most helpful in terms of their informativeness and convenience. Under the payment applications, the respondents often utilize “Gcash” with the highest weighted mean of 4.20. It implies that Gcash has become a norm during the COVID-19 pandemic that it became the nation's largest mobile money services provider, with users surging to 150% in March 2020 (Endo, 2020). It denotes that most of the indicators under mobile devices and applications have an overall mean of 3.49 with an equivalent verbal interpretation of "Sometimes," which means that tourists had been using these mobile devices and applications in their typical travel transactions.

**Table 5**

*Mean Scores on the Smart Tourism Technologies used by Tourists in the Tourist Attractions Amidst the COVID-19 Pandemic Based on Ubiquitous Connection*

Indicators	MEAN	SD	INTERPRETATION
Ubiquitous Connection			
a. Wi-Fi	4.85	0.48	Always
b. Mobile Data	2.98	1.40	Sometimes
OVER-ALL COMPOSITE MEAN	3.92	0.94	Often

Legend: Always= 4.51-5.00 Often= 3.51-4.50 Sometimes= 2.51-3.50 Rarely=1.51-2.50 Never=1.00-1.50

Based on Table 5, the respondents always use “Wi-Fi” with the highest weighted mean of 4.85 under Ubiquitous Connection. However, the respondents sometimes use “Mobile Data” with the lowest weighted mean of 2.98. This finding implies that most of the respondents chose to connect via Wi-Fi instead of mobile data for faster connection while traveling, which was also supported by the survey conducted by Amadeus (2017) on Filipinos' preference of connection. Combined with smartphones and applications, the tourist would be able to fully maximize the use of smart tourism technologies, significantly improving the experience of the tourists due to its provision of omnipresent use of information, which gives way to one of the overall concepts of smart



tourism (Li et al., 2017).

**Table 6**

*Mean Scores on the Smart Tourism Technologies used by Tourists in the Tourist Attractions Amidst the COVID-19 Pandemic Based on Artificial Intelligence*

Indicators	MEAN	SD	INTERPRETATION
Artificial Intelligence			
A. Virtual Assistants			
Siri	2.02	1.39	Rarely
Alexa	1.44	0.84	Never
Google Assistant	2.85	1.43	Sometimes
B. Automated Chatbots			
Automated Chatbots	2.67	1.21	Sometimes
C. Search and Recommendation Algorithms			
Search and Recommendation Algorithms	2.72	1.20	Sometimes
OVER-ALL COMPOSITE MEAN	2.34	1.21	Rarely

Legend: Always= 4.51-5.00 Often= 3.51-4.50 Sometimes= 2.51-3.50 Rarely=1.51-2.50 Never=1.00-1.50

Based on Table 6, the respondents sometimes utilized Google Assistants with the highest weighted mean of 2.85 among the indicators under Artificial Intelligence. However, the respondents never use Alexa with the lowest weighted mean of 1.44. This finding implies that most of the participants have already encountered these artificial intelligence technologies but rarely used them despite their existence in various smart tourism technologies proving Nanca et al. (2018) on how artificial intelligence technologies are more business-centric than user-centric.

**Table 7**

*Mean Scores on the Smart Tourism Technologies used by Tourists in the Tourist Attractions Amidst the COVID-19 Pandemic Based on Wearable Technology*

Indicators	MEAN	SD	INTERPRETATION
Wearable Technology			
Smartwatch	2.92	1.56	Rarely
Bluetooth Headset	3.28	1.48	Sometimes
OVER-ALL COMPOSITE MEAN	3.1	1.52	Sometimes

Legend: Always= 4.51-5.00 Often= 3.51-4.50 Sometimes= 2.51-3.50 Rarely=1.51-2.50 Never=1.00-1.50

Based on Table 7, the respondents sometimes use "Bluetooth Headset" with the highest weighted mean of 3.28. This finding implies that most respondents are familiar with Bluetooth headsets and have been using them while traveling. In fact, Zeadally et al. (2019) supported these findings regarding how Bluetooth headsets will continue to exist in the foreseeable future.

**Table 8**

*Mean Scores on the Smart Tourism Technologies used by Tourists in the Tourist Attractions Amidst the COVID-19 Pandemic Based on Virtual Reality*

Indicators	MEAN	SD	INTERPRETATION
Virtual Reality			
Virtual Reality (VR)	2.45	1.37	Rarely
OVER-ALL COMPOSITE MEAN	2.45	1.37	Rarely

Legend: Always= 4.51-5.00 Often= 3.51-4.50 Sometimes= 2.51-3.50 Rarely=1.51-2.50 Never=1.00-1.50

On Table 8, respondents rarely use Virtual reality (VR) with the weighted mean of 2.45. This is the lowest mean among smart tourism technologies under study, implying that its progress in tourism in the Philippines is significantly slower than its growth in gaming (Barreiro, 2019) and education (Buenaobra et al., 2018).

**Table 9**

*Mean Scores on the Tourists' Experience in the Tourist Attractions in Cavite Amidst the COVID-19 Pandemic*

Indicators	Mean	SD	Interpret.
It was easy to find relevant information about the tourist attraction, such as restrictions, requirements, location, rates, and operating hours and days.	3.76	1.02	Satisfied
The information I gathered, such as protocols, restrictions, reviews, and feedback, are sufficient and have helped me decide to go to the tourist attraction.	3.89	1.03	Satisfied
The information I gathered before visiting made me excited to go to the destination.	3.88	1.05	Satisfied
It was easy to book a reservation or contact the tourist attraction for inquiries.	3.51	1.13	Satisfied

The tourist attraction implemented minimum health and safety protocols reducing perceived risk.	3.78	1.04	Satisfied
The facilities, amenities, and staff of the tourist attraction met my expectations.	3.79	0.94	Satisfied
The tourist attraction fulfilled my expectations.	3.84	0.95	Satisfied
I enjoyed my stay at the tourist attraction.	3.92	1.01	Satisfied
The rate or the entrance fee is reasonable and worth the experience.	3.77	0.99	Satisfied
I am satisfied by the memories I gathered through taking photos and videos, etc.	3.90	1.09	Satisfied
I plan to revisit the tourist attraction.	3.85	1.06	Satisfied
<b>OVER-ALL COMPOSITE MEAN</b>	<b>3.81</b>	<b>1.03</b>	<b>Satisfied</b>

Legend: *Very Satisfied*=4.51-5.00; *Satisfied*=3.51-4.50; *Neutral*=2.51-3.50; *Dissatisfied*=1.51-2.50; *Very Dissatisfied*=1.00-1.50

Based on Table 9, the respondents are satisfied with their stay at the tourist attractions in Cavite with a mean of 3.92. This finding implies that the performance of the tourist attractions in Cavite has met or exceeded the tourist expectations, thereby providing satisfaction as defined and supported by Sie et al. (2018). It infers how despite the restrictions and health protocols; the tourists were still satisfied with their experience. This finding implies that the performance of the tourist attractions in Cavite has met or exceeded the tourist expectations, thereby providing satisfaction, as defined and supported by Sie et al. (2018). According to Pai et al. (2020), Smart Tourism technologies considerably play a significant part in tourist satisfaction through a variety of factors such as setting expectation and seamless service process.

However, the respondents do not find it easy to book a reservation or contact the tourist attraction for inquiries with the lowest weighted mean of 3.51 although with an equivalent verbal interpretation of "Satisfied." This finding implies that the majority of the respondents are having a hard time booking reservations because of the country's current situation. It also infers the need to strengthen the online presence and technologies of the tourist attractions to provide better services to their tourists. This finding is supported by the survey entitled, "Insights on Filipino Travelers' Sentiments on the New Normal," conducted by the Department of Tourism et al. (2020), wherein it was found that travelers prefer online and digital channels for convenience and contact reduction. Generally, it signifies that most of the indicators have an overall mean of 3.81 with an equivalent verbal interpretation of "Satisfied," which means that tourists have a satisfying experience in the tourist attractions in Cavite amidst the COVID-19 pandemic. The overall positive tourist experience is further supported by travelers' willingness to travel domestically and closer to home and willingness to adhere to health and safety protocols (Department of Tourism et al., 2020).

**Table 10**

*Results for the Correlation Utilizing Pearson Product-Moment Correlation Coefficient (PPMCC) on the Tourists' Usage of Smart Tourism Technologies and the Demographic Profile of the Respondents*

	Smart Tourism Technologies	Demographic Profile
Smart Tourism Technologies		
Pearson Correlation	1	-0.03212
Sig. (2-tailed)		0.4025
N	205	205
Demographic Profile		
Pearson Correlation	-0.03212	1
Sig. (2-tailed)	0.4025	
N	205	205

Table 10 shows that the correlation coefficient ( $r$ ) equals -0.03212, it is a negative correlation; the relationship between variables is weak as the nearer the value to zero, the weaker the relationship. The researcher concludes that there is no evidence between the tourists' usage of Smart Tourism Technologies and the demographic profile of the respondents. A non-significant result was obtained ( $r=0.4025$   $p>.05$ ), indicating no statistical relationship between the two variables at the .05 level. The Pearson product-moment correlation coefficient results indicated that the variables among the demographic profile, none of the components significantly influenced the tourists' usage of Smart Tourism Technologies. This finding is in contrast with Neuhofer et al. (2018) since understanding the tourists' context is critical in delivering the best product or service. Since more evidence was needed to validate this contention, the results also underwent a T-test.

**Table 11**

*Results for the Correlation Utilizing Pearson Product-Moment Correlation Coefficient (PPMCC) on the Smart Tourism Technologies and the Tourists' Experience in the Tourist Attractions in Cavite*

	Smart Tourism Technologies	Tourist experience
Smart Tourism Technologies		
Pearson Correlation	1	0.4321
Sig. (2-tailed)		0.0000001
N	205	205
Tourist experience		
Pearson Correlation	0.4321	1
Sig. (2-tailed)	0.0000001	
N	205	205

Table 11 shows that the correlation coefficient (r) equals 0.4321, which is a positive correlation; however, the relationship between variables is moderately correlated as the results are somehow beyond the value to zero. Therefore, there is a relationship between the two variables. The researcher concluded that there is evidence between the Smart Tourism Technologies and Tourist Experience in the tourist attraction in Cavite. A significant result was obtained ( $r=0.0000001$ ,  $p<.05$ ), indicating a statistical relationship between the two variables at the .05 level. The Pearson product-moment correlation coefficient (PPMCC) results indicated that the variables among the tourist experience, approximately all the components, significantly influenced the SMART tourism technologies in Cavite. This finding is supported by several articles (Pai et al., 2020) on how the positive experience on the usage of smart tourism technologies has a link or a positive influence on travel experience based on the STT attributes investigated by the authors. It illustrates how STT could set the expectations of the tourists by providing relevant information fostering a seamless service process in the tourist attraction emphasized by the management's adherence to health protocols and commitment to satisfaction, thereby producing an elevated and satisfied tourist experience. This finding emphasized the theory of Neuhofer et al. (2018) on how the usage of smart tourism technologies strengthened the co-creation process in the tourist experience. Buhalis et al. (2019) argued that extensive implementation of technologies could also disrupt the essence of the tourist experience. To further validate this contention, the results also underwent a T-test.

**Table 12**

*Result of T-test on Mean Difference between Mean Scores Ratings of Tourist Usage of Smart Tourism Technologies and Demographic Profile*

Indicators	Level of Significant		Interpret.	Computed <i>t</i> (205)	<i>P</i> value
	Statistically Significant (SS)	Not Statistically Significant (NS)			
Smart Tourism Technologies					
Internet of Things	SS		Reject Ho	-27.0007	0.002
Mobile Devices & Applications	SS		Reject Ho	-2.62294	0.001
Ubiquitous Connection		NS	Reject Ha	0.181254	0.79147
Artificial Intelligence		NS	Reject Ha	0.971513	0.96288
Virtual Reality		NS	Reject Ha	0.457917	0.12454
Wearable Technology		NS	Reject Ha	0.667458	0.75789

*\*Legend: NS – statistically non-significant with  $p > 0.05$  – level of significance and SS – statistically significant with  $p < 0.05$  – level of significance*

Table 12 shows the summary of the descriptive statistics and analysis results which can be seen in the values computed  $P(T \leq t)$  two-tail. Four indicators of Smart Tourism Technologies such as Ubiquitous connection, Artificial Intelligence, Virtual Reality, and Wearable Technology were all greater than the level of significance  $\alpha$  equal to .05 and therefore the researcher rejects the alternative hypothesis (Ha), thus concluded that statistically non-significant difference between the Smart Tourism Technologies and the demographic profile hence, T-test was used to examine the difference in ratings. Moreover, the two indicators such as Internet of Things and Mobile Devices and Applications, were all less than the level of significance  $\alpha$  equal to .05. Therefore, the researcher rejects the null hypothesis (Ho), thus concluding a statistically significant difference between the Smart Tourism Technologies and the demographic profile.

The result signifies that rejecting the null hypothesis of a study question shows that the hypothesis is true.

Consequently, a statistically significant hypothesis means there is sufficient assurance of a certain degree of confidence in the results. Thus, although there is no significant relationship between the usage of Smart Tourism Technologies and the demographic profile using Pearson -correlation. It was found that among the six STT under study, the Internet of Things and Mobile Devices and Applications have a significant relationship to the demographic profile. The statistical significance findings signify that the hypothesis has a basis and is worth studying further. The two STTs were among the study's frequently used Smart Tourism Technologies, implicating their immense usability. According to Wang et al. (2011), smart devices and applications were some of the easiest technologies to use during travel while the widespread use of the technologies under the Internet of Things could have made a significant impact between the two variables, resulting in its significance to the demographic profile of the respondents. In fact, frequent exposure to specific technologies could lead to their frequent usage by tourists (Huang et al., 2017).

Table 13 shows the summary of the descriptive statistics and analysis results which can be seen in the values computed  $P(T \leq t)$  two-tail. All the indicators of Smart Tourism Technologies such as Internet of Things, Mobile Devices and Applications Ubiquitous connection, Artificial Intelligence, Virtual Reality, and Wearable Technology were all less than the level of significance  $\alpha$  equal to .05 and therefore the researcher rejects the null hypothesis ( $H_0$ ), thus concluded that statistically significant difference between the Smart Tourism Technologies and the tourist experience. Hence, T-test was used to examine the difference in ratings. Moreover, it is concluded that there is statistically significant difference between the Smart Tourism Technologies and the tourist experience in the tourist attractions in Cavite.

**Table 13**

*Significant Difference in the Ratings of Respondents on the Smart Tourism Technologies and the Tourists' Experience in the Tourist Attractions in Cavite*

Indicators	Level of Significant		Interpret	Computed $t$ (205)	$P$ value
	Statistically Significant (SS)	Not Statistically Significant (NS)			
Smart Tourism Technologies					
Internet of Things	SS		Reject $H_0$	2.306012	0.004
Mobile Devices & Applications	SS		Reject $H_0$	1.254631	0.002
Ubiquitous connection	SS		Reject $H_0$	3.541412	0.001
Artificial Intelligence	SS		Reject $H_0$	4.52732	0.0342
Virtual Reality	SS		Reject $H_0$	4.38710	0.0441
Wearable Technology	SS		Reject $H_0$	3.23335	0.04478

The result signifies that rejecting the null hypothesis of a study question shows that the hypothesis is true. Consequently, a statistically significant hypothesis means there is sufficient assurance of a certain degree of confidence in the results. The statistical significance findings signify that the hypothesis has a core and needs further study. Overall, all the Smart Tourism Technologies under study have a significant relationship to the tourist experience in Cavite tourist attractions, supported by the study of Pai et al. (2020) and Huang et al. (2017) on how the exploratory use of STT enriches tourist experience by enhancing information search, processing, and sharing. It also proves Neuhofer et al. (2018) theoretical framework on how the co-creation and usage of smart tourism technologies by tourists could improve a smart tourism experience.

**Table 14**

*Themes with Descriptions*

Themes	Description
Awareness of smart tourism technologies	The tourist is aware and familiar with smart tourism technologies.
I used Smart Tourism Technologies, but I did not know the correct term.	The tourist uses smart tourism technologies but is unaware of its correct term.
Accessible and Convenient	The smart tourism technologies provide easy and time-saving transactions.
Set expectations	It is the subjective idea of the facilities and services of one's tourist attractions based on the business's social media, photos, websites, and reviews.
Updated Information	It is real-time information about the tourist attraction, including operating hours, products and services, promotions, restrictions, and requirements posted by the business through smart tourism

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Contactless Technologies	technologies such as social media, websites, and applications. Wireless technologies allow one to conduct business without physical touch. This is possible through smart sensors and chips embedded through devices that use NFC. Several examples include a thermal scanner, smart sensors, and automatic flush. It also includes online payments through QR codes and scanners.
Safety	It is the condition of being able to manage hazards to have an acceptable level of risk. This term is utilized by tourists when their perceived risk of getting the COVID-19 virus is low due to the health and safety protocols implemented by the tourist attractions.
Communication	Exchange of information through smart tourism technologies such as mobile devices, smartphones, messenger, e-mail, social media posts, and comments.
GPS	Global Positioning System is a global navigation satellite system providing location, velocity, and time synchronization. Most participants refer to GPS as Waze and Google Maps, which are specific applications considered GPS.
Ubiquitous connection	Also known as wireless internet connectivity. Examples of this connection are Wi-Fi and Mobile Data.
No disadvantage	There are no disadvantage/s in using smart tourism technologies.
Minimal Disadvantage	There is only a small percentage of disadvantage in using smart tourism technologies. The advantages outweigh the disadvantages.
Technology-dependent	An intense reliance on devices and technologies that one will not be able to travel without using them.
Social Media Platforms	They are interactive technologies mostly used for the creation and sharing of information in virtual communities. The most dominant social media in the Philippines are Youtube, Facebook, Instagram, Twitter, TikTok, and Pinterest.
Smart Tourism Technologies influenced my visit to tourist attractions	Smart Tourism Technologies has influenced the participant's visit to tourist attractions.
QR Code	A type of bar code that stores information and stands for Quick Response. It is usually used for contactless transactions such as online submission of health declaration forms, online payments, and data collection.
Exciting & Encouragement	These are the feelings of tourists when they feel inclined and enthusiastic in their travel because of smart tourism technologies.
Check Reviews	It means reading and browsing several reviews written by previous visitors in the prospective tourist attraction using social media or travel-related applications before deciding on the visit.
Choosing travel destinations	This is defined by how smart tourism technologies could influence tourists where, how, and when to visit a particular tourist destination.
Mobile devices & Applications	It is considered as a portable handheld computer and all applications that could be installed within.
Potential for Malfunction/Unavailability	There is a possibility for a smart tourism technology to be unavailable or malfunction during the transaction because of loss of power, connection, system error, or physical failure.
Inability to Travel Without Smart Tourism Technologies	The participants would not be able to travel without using smart tourism technologies.
It is possible to travel without using Smart Tourism Technologies but it will be hard.	The participants could travel without using smart tourism technologies with difficulty.
I will be using STT in my future travels	The participants will be using smart tourism technologies in their future travels.
Yes, we have smart tourism technologies embedded in our business.	The participants or the tourist attractions have smart tourism technologies embedded in their business.
Google Applications	It includes all the applications Google hosts on their servers, including Google Maps, Google Search, Google Drive, Google Travel, and Google Play.
Convenience	It is the term used when a transaction is accessible, easy, and time-saving for tourists.
Smart Tourism Technologies Enhanced the Tourists' Experience	Smart Tourism Technologies enhanced the tourists' experience in the tourist attractions.
Plan on Future Transformation to a Smart Tourist Attraction	The tourist attractions plan to transform into a smart tourist attraction using smart tourism technologies in the future.
One common system or application	There is one common system or application wherein anything the tourist needs to go to the tourist attraction is already there. It includes information needed before, during, and after the actual travel. Examples would be a navigational app, map locator, list of tourism establishments where they could directly transact, reviews, updated information on the attractions and restrictions.
Attraction should be proactive in technological innovation.	Attraction should be proactive in looking and applying the best technological innovations suited to their tourist attraction and market.
LGU Support	LGU must support tourist attractions within their jurisdiction in applying certain technologies in their establishment. Support may include provisions on permits and requirements, assistance on its implementation, and others.
Comprehensive Study	There must be a comprehensive study before embarking on a smart tourism transformation. Needs, requirements, capabilities, and markets must be considered before applying a technological solution to maximize the best smart tourism technologies to enhance the tourist experience and the business competitiveness.

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Based on Table 15, the respondents are aware of STT and their application in travelling. Half of the participants is aware of smart tourism technologies, and the other half of participants uses them but they are unaware of the proper terminology.

**Table 15**  
*Awareness of Smart Tourism Technologies*

Code	Significant Statements	Theme
Awareness of Smart Tourism Technologies	<p>Tourist 2: Yes, even if I'm not techy.</p> <p>Tourist 4: Yes, because I am from the hospitality industry, my friends and I have always used smart technologies even before.</p> <p>Tourist 6: Yeah. I know some of the smart tourism technologies.</p> <p>Employee 1: From my understanding, STT is from as basic as using smartphones, the internet, and social media in communicating and sharing information with guests to as high tech as using holographic displays in presentations or displays, in our case exhibits. However, it's just now that I learned the proper term for it.</p> <p>Employee 2: Yes, I am aware</p>	Aware of Smart Tourism Technologies
	<p>Tourist 1: I'm familiar with the technology itself, but in regards to smart tourism, I haven't yet experienced that kind of application when it comes to tourism.</p> <p>Tourist 3: Actually, I don't really know that maps, Waze, WIFI are called smart tourism technology.</p> <p>Tourist 5: Actually, the general term, smart tourism technologies, I'm not really familiar with it. But if you're talking about the technology itself, like the application, yes, I am aware of that.</p> <p>Employee 3: Well, actually, we have an idea regarding Smart tourism technologies, but we don't really know the right term for it. We use these technologies in our business, but we are not familiar with the correct word for it</p> <p>Employee 4: Yes, I'm using the technologies, but I'm not aware that the right term is called smart tourism technologies.</p>	I use Smart Tourism Technologies, but I didn't know the correct term.

Although Filipinos have been using these technologies (Nanca et al., 2018), there is a need to introduce the concept of Smart Tourism technologies. Despite the increasing popularity of the smart tourism concept in the literature, this finding emphasized that its impact on the field lacks acknowledgment (Neuhofer et al., 2018).

**Table 16**  
*Themes on the Advantages of Smart Tourism Technologies in Tourist Attractions in the Tourist and Business' Perspective*

Code	Significant Statements	Theme
Advantages of Smart Tourism Technologies	<p>Tourist 3: It becomes easier to go to places. We usually use Waze even if we are also from Cavite because it makes the travel faster. It seems that information is more accessible because we have WIFI, data, 5g or 4G. If you're looking for tourist attractions or places where you can eat or stroll, it is easier because of mobile data. There are also applications that provide information about places to go in Cavite or one location.</p> <p>Tourist 4: This is based on my experience. It has many advantages. One example is the GPS using mobile data. Other examples are Waze and google maps, and it is easy to go to tourist sites. You won't get lost because it is very accessible since it is already on your mobile phone. All you need is to really go to the location. Next are restaurants that offer food deliveries or online restaurants. Those are very good examples of smart tourism technologies that we use.</p> <p>Tourist 5: First is the accessibility and convenience because it saves a lot of time, especially for the tourists. You can explore information about the destination anytime, anywhere in just one click of your device.</p> <p>Employee 2: First of all, [means of] communication is very important. As I've said earlier, if our manager is on leave, we can still contact them. Another is communication to our suppliers' using smartphones where we can order, and they can just deliver in our store. Very convenient.</p> <p>Employee 3: During pandemic, the two advantages that I noticed are that we can maximize the convenience and safety it provides, not only for our customers but also to our employees. It also provides convenience because the customers could access the technology anywhere, and some employees could also work from home.</p> <p>Employee 4: Through Smart Tourism Technologies, we were able to provide online platforms where tourists could book and pay in advance, reducing contact and waiting on site. Thus, it provides efficiency for both our customers and us.</p>	Accessible and Convenient
	<p>Tourist 1: You get to be updated and set an expectation before you go there. The attraction will match the expectation that you set. You become more updated and more aware of relevant information such as their operating hours, rates, and others.</p> <p>Tourist 2: I based on reviews. First, I check their website then Tripadvisor because you can see their photos not coming from the management. This way, you will be setting your expectations because sometimes, the reality is different when you go there.</p> <p>Tourist 5: Nowadays, establishments provide virtual tours for the tourists' perspective, so they know what to expect when they get there.</p>	Set expectations
	<p>Tourist 1: You get to be updated and set an expectation before you go there. The attraction will match the expectation that you set. You become more updated and more aware of relevant information such as their operating hours, rates, and others.</p> <p>Tourist 3: It seems that information is more accessible because we have WIFI, data, 5g or 4G. There are also apps that provide information about places to go in Cavite or one</p>	Updated Information

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<p>location.</p> <p><i>Tourist 5: You can explore information about the destination anytime, anywhere, with just one click of your device.</i></p> <p><i>Employee 1: Since technology is widely used by everyone, why not take advantage of it and use it for spreading information about a tourist attraction or business.</i></p> <p><i>Employee 4: There are many advantages of having STT in our tourist attraction. For one, we could deliver updated information to our potential clients instantly through the use of our social media pages. Promotional offers could also be posted immediately.</i></p>	
<p><i>Tourist 5: Lastly is the contactless transaction to avoid contracting the COVID-19 virus amidst the pandemic.</i></p> <p><i>Tourist 6: I think one of these is contactless transactions. For example, when we went to a restaurant, they just let me scan their QR code to see their menu and rates even if we were not yet inside the establishment or had not talked to their staff. We are still outside then, and the employees are still inside, but we already know what we should eat and how much it costs. One of the advantages is the contactless transactions with the establishments that have those smart tourism technologies.</i></p>	Contactless Transactions
<p><i>Employee 3: During pandemic, the two advantages that I noticed are that we can maximize the convenience and safety it provides, not only for our customers but also to our employees. Nowadays, the contactless transaction is very important for safety.</i></p> <p><i>Employee 4: Through Smart Tourism Technologies, we were able to provide online platforms where tourists could book and pay in advance, reducing contact and waiting on site. Thus, it provides efficiency for both our customers and us.</i></p>	Safety
<p><i>Employee 2: First of all, [means of] communication is very important. As I've said earlier, if our manager is on leave, we can still contact them.</i></p> <p><i>Employee 3: We can still contact them using smart tourism technologies</i></p>	Communication
<p><i>Tourist 2: I based on reviews. First, I check their website then Tripadvisor because you can see their photos not coming from the management</i></p> <p><i>Tourist 3: There are also applications that provide information about places to go in Cavite or one location.</i></p> <p><i>Tourist 4: Next are restaurants that offer food deliveries or online restaurants.</i></p>	Travel-related Applications
<p><i>Tourist 3: It becomes easier to go to places. We usually use Waze even if we are also from Cavite because it makes the travel faster.</i></p> <p><i>Tourist 4: This is based on my experience. It has many advantages. One example is the GPS using mobile data. Other examples are Waze and google maps, and it is easy to go to tourist sites. You won't get lost because it is very accessible since it is already on your mobile phone. All you need is to really go to the location.</i></p>	GPS (Waze and Google Maps)
<p><i>Tourist 3: It seems that information is more accessible because we have Wi-Fi, data, 5g or 4G. If you're looking for tourist attractions or places where you can eat or stroll, it is easier because of mobile data</i></p> <p><i>Tourist 4: This is based on my experience. It has many advantages. One example is the GPS using mobile data.</i></p>	Ubiquitous connection (Wi-Fi and Mobile Data)

Based on Table 16, there are nine significant themes on the advantages of using Smart Tourism Technologies in Tourist Attractions. It shows how using Smart Tourism Technologies provided advantages such as helping travelers set expectations, get updated information, and make their travel accessible and convenient while maintaining safety through contactless transactions. According to Gelbman (2021), expectations, along with performance, can significantly influence experiences and could play a valuable role in tourist satisfaction. Smart tourism is also centered on providing real-time information (Femenia-Serra et al., 2018) and making travel accessible, convenient and contactless, both of which are recognized as attributes of Smart Tourism Technologies (No et al., 2015; Huang et al., 2017). Pai et al. (2020) believed that when STTs provide relevant, sufficient, and accurate information, travel becomes convenient and safe, ultimately proving satisfaction to the tourists. Sampson et al. (2020) claimed that the COVID-19 pandemic heightened tourist awareness and safety, and smart tourism technologies could help alleviate these concerns, supported by the following statement.

*“During the pandemic, the two advantages that I noticed were we can maximize the convenience and safety it provides, not only for our customers but also to our employees.”*

Employees also regarded communication as one of the benefits of utilizing Smart Tourism Technologies, where businesses could continue interacting with customers and other employees even from afar. According to Huang et al. (2017), using STTs could facilitate immediate actions, real-time feedback, and active communication, promoting excellent customer service and transparent communication. All of these have become possible through smart tourism technologies mentioned by the participants, particularly travel-related applications (Douglas et al., 2018), GPS (Salgado et al., 2021), and ubiquitous connections (Pai et al., 2020).

Based on Table 17, the tourists believe there are no disadvantages to using Smart Tourism Technologies,

thereby implying its immense usability from the tourist perspective. These findings indicate the vital role of integrating and leveraging Smart Tourism technologies for tourists (Jeong et al.,2019). The participants even claimed the following statements.

*“I can’t think of one. All I can see are advantages.” (Tourist 1)*

*“The disadvantages are only for those who don’t know how to use it or are not familiar with the technology.” (Tourist 3)*

From the business perspective, using smart tourism technologies in their business has only minimal disadvantages that outweigh them. The next theme is centered around the tourists becoming technology-dependent that could distract them from creating an authentic travel experience as proven by the following statement.

**Table 17**  
*Themes on the Disadvantages of Smart Tourism Technologies in Tourist Attractions*

Code	Significant Statements	Theme
Disadvantages of Smart Tourism Technologies	<i>Tourist 2: I can’t think of one. All I can see are advantages.</i>	No disadvantage
	<i>Tourist 3: The disadvantages are only for those who don’t know how to use it or are not familiar with the technology.</i>	
	<i>Tourist 6: During this pandemic, I think, none because it really became a part or a necessity for travel means. During this pandemic, I think smart tourism technology is not really disadvantageous or not part of a negative aspect.</i>	
	<i>Employee 1: Using STT has a lot of advantages and very minimal disadvantages</i>	Minimal Disadvantage
	<i>Employee 3: Although there are disadvantages, the advantages it provides for the business outweigh them.</i>	
	<i>Tourist 4: For me, we are so focused on technology that we revolve around it, especially now. We use smart technologies for everything. Although it makes our life easier, we become so focused on it that sometimes we cannot enjoy the tourist attraction or destination we go to.</i>	Technology-dependent
	<i>Tourist 5: It could be a distraction for authentic travel experience for the tourist. Tourists have become dependent on technology for their convenience that the sense of being adventurous or risktaker is becoming lost, unlike before. Based on my experience, I can travel using paper maps before, and I can ask questions around strangers. These days, we actually tend to rely only on technology, apps, Google Maps, and reviews. We are somehow losing the personal human experience, which is the main product of tourism.</i>	
	<i>Employee 1: Regarding the internet and social media, not everything in it are facts; there are fake news that can damage one’s business.</i>	Social Media
	<i>Employee 4: Tourists could provide immediate negative feedback on our social media before we could even mitigate the issue.</i>	
	<i>Employee 2: One of the disadvantages is if there is no electricity, we won’t be able to use [smart tourism technologies] like WIFI.</i>	Potential for Malfunction/ Unavailability
	<i>Employee 4: The disadvantage in relying solely in Smart Tourism Technology, especially for reservations or payments, is its potential to malfunction, which causes frustration to the customers. One example, although it rarely happens, is when they’re trying to pay using Gcash or other payment apps and the payment was unsuccessful, but it deducted the amount from their account. Since it is a 3rd party application, we have no control over the situation.</i>	

*“We are somehow losing the personal human experience, which is the main product of tourism.”*

Neuhofer et al. (2015) recommended that these technologies must be used as a tool to strategically improve the human resource-led processes to enhance service and experience creation processes that will not substitute personal human experience. On the other hand, the real-time information on social media and smart tourism (Neuhofer et al.,2018) could also backfire as many of the advantages of social media, including immediate feedback, subjectivity, and lack of information regulation, are also potential liabilities (Henderson et al., 2017). Its unavailability or potential for the malfunction could also cripple the business system, which could hurt the business and tourist experience (Huang et al., 2017).

Based on Table 18, there are ten major themes identified in the thematic analysis of the influence of Smart Tourism Technologies on tourists’ experience in the tourist attractions. It shows that all the interviewees agree that Smart Tourism Technologies has influenced their visit to the tourist attractions, which is also for the first time. This finding is further supported by the study of Shen et al. (2020b), specifically on the influence of smart technologies in the customer journey. The interviewees justified their statements by enumerating the specific



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smart tourism technologies that heavily influenced their experience, which included GPS, travel-related applications, QR code, social media applications, and ubiquitous connection and relating how they use these Smart Tourism technologies to check reviews, choose travel destinations because it is accessible and convenient.

**Table 18**

*Themes on the Influence of Smart Tourism Technologies in the Tourist Experience on Tourist Attractions in Cavite during the COVID-19 Pandemic*

Code	Significant Statements	Themes
Influence of Smart Tourism Technologies	<i>Tourist 1: When it comes to smart tourism technology, it is one of the things that influence me.</i> <i>Tourist 2: Definitely.</i> <i>Tourist 3: Yes.</i> <i>Tourist 4: Yes,</i> <i>Tourist 6: Yeah.</i> <i>Tourist 5: Yes, indeed. It influences my visit to different tourist attractions in Cavite in different ways. Overall, it gives me comfortability, convenience, and accessibility for everything.</i>	Smart Tourism Technologies influenced my visit to tourist attractions
	<i>Tourist 3: [Using] google maps and Waze is easier to go to tourist attractions because they give you information on how to go there and what route to take.</i> <i>Tourist 4: The most helpful are the maps, Waze, and google to quickly go to places or tourist attractions in Cavite.</i> <i>Tourist 5: Aside from that, using Google Maps or Waze for accessibility of the destination without any hassle. Waze could determine if there is traffic or an ongoing construction and lead you to a better route.</i>	GPS and Waze
	<i>Tourist 1: Booking applications usually recommend places to visit and things to do.</i> <i>Tourist 5: One example is the travel apps. Depending on their reviews or feedbacks, it influences my decisions, especially if they have reviews.</i> <i>Tourist 5: There are also times that you are already at the destination and you feel hungry, and you could try to use your apps to order instead of [driving and looking] where to eat.</i>	Travel-related Applications
	<i>Tourist 3: When we have that, it becomes more accessible and touchless whenever we use QR codes.</i> <i>Tourist 5: For example, when you enter an establishment and have to fill out the health declaration form, I tend to use the QR code for my safety instead of writing my information on paper.</i>	QR Code
	<i>Tourist 1: When it comes to smart tourism technology, it is one of the things that influence [me] especially social media and other applications.</i> <i>Tourist 4: Yes, especially social media and websites such as Instagram and Facebook. There are a lot of tourist sites shown on social media, making us curious and excited to explore because they showcase their beauty.</i>	Social Media Applications
	<i>Tourist 3: It also includes technology like Wi-Fi and thermal scanner, where you can feel safe because they can have to do contact tracing during the pandemic since we do not have those before.</i> <i>Tourist 6: It influenced me in terms of it encourage me [to travel] because I have a gadget and good connection on the internet using the mobile data so I could search any information that I need as such as restrictions.</i>	Ubiquitous connection (Wi-Fi & Mobile Data)
	<i>Tourist 6: It influenced me in terms of encouraging me [to travel] because I have a gadget and good connection on the internet using the mobile data so I could search any information that I need, such as restrictions. So, the smart tourism technologies help me be more encouraged to travel even though there is a COVID-19 pandemic.</i> <i>Tourist 1: It becomes exciting to go to Tagaytay and Alfonso.</i> <i>Tourist 4: any tourist sites are shown on social media, making us curious and excited to explore because they showcase their beauty.</i>	Exciting & Encouragement
	<i>Tourist 2: I check them if the reviews are good or not.</i> <i>Tourist 1: One example is the travel apps. Depending on their reviews or feedbacks, it influences my decisions, especially if they have bad reviews.</i>	Check Reviews
	<i>Tourist 3: When we have that, it becomes more accessible and touchless whenever we use QR codes.</i> <i>Tourist 5: Overall, it gives me comfortability, convenience, and accessibility for everything.</i>	Accessible and Convenient
	<i>Tourist 5: It influences my visit to different tourist attractions in Cavite in different ways. First, of course, in choosing my travel destinations.</i> <i>Tourist 1: Overall, it helps me discover those places</i>	Choosing travel destinations

It made them feel excited and encouraged during and before they travel. One participant claimed specific applications such as the Global Positioning System or GPS made travel easier because of the information it provides along the way, which was supported by Salgado et al. (2021) as it allows users to take full advantage of the exploration of the attractions and information in real-time.

The specific smart tourism technologies and themes deemed influential by the participants are also strengthened by other academic studies, including travel-related applications (Douglas et al.,2018), QR codes (Khaddar et al.,2017; Pai et al.,2020), social media applications (Chung et al.,2015; Pai et al.,2020; Shen et al.,2020) and ubiquitous connections (Pai et al.,2020). Smart Tourism Technologies made travel accessible and convenient from the participants’ perspective, which was also one of the attributes of online tourism information sources in the study of No et al. (2015). Before traveling, participants usually check reviews (Shen et al.,2020a) of the attractions, which becomes a factor in their decision making and travel planning (Huang et al.,2017).

*“Depending on their reviews or feedbacks, it influences my decisions, especially if they have bad reviews.”*

These findings are consistent in the studies of Huang et al. (2017) and Gretzel et al. (2016), wherein information on the website or pages of the business is a critical part of the tourists’ decision-making that was discussed.

**Table 19**  
*Most Important Smart Tourism Technologies in Tourist’ Experience*

Code	Significant Statements	Theme
Most Important Smart Tourism Technologies	<i>Tourist 3: The maps, like Waze and google maps, because they provide the best routes we could take.</i>	GPS (Waze and Google Maps)
	<i>Tourist 4: The most useful for me is the location-based [apps] like GPS, Waze, or Google Maps.</i>	
	<i>Tourist 5: Next, I usually use Google Maps, especially if I am not familiar with the place. It also gives you the best route so you could reach [your destination] faster. It also saves a lot of time which you could allocate on your actual destination.</i>	
	<i>Tourist 6: I used gadgets and devices to go to those places, especially now, when we had time to travel even though we have this pandemic. I found them necessary to bring. It influenced me in terms of encouraging me [to travel] because I have a gadget and good connection on the internet using the mobile data so I could search any information that I need, such as restrictions.</i>	Mobile devices and Applications
	<i>Tourist 1: The most important probably is the smart devices and applications. All travelers probably use smart devices in creating transactions, finding the location, and information about the particular business. Travelers like me want to make sure that all information and feedbacks are in the smart devices I am using.</i>	
	<i>Tourist 6: Another is Gcash. It provided me accessibility in paying. I could just get their number, connect to the internet and verify if they received the payment without giving them physical money. This way, there is no contact between the guests and employees. Those are the two I could think of: Gcash and search engines that provide real-time information</i>	
	<i>Tourist 2: The travel sites because of the tourists’ point of view there. You can read their actual experience, which becomes a factor I become entice with the place. I need to read first a good experience, but not just one. I browse all of it.</i>	Travel-related Applications
	<i>Tourist 4: My third are travel-related applications because [they have] a lot of promos, and you can compare prices of hotels or restaurants. You may rely there based on your budget.</i>	
	<i>Tourist 5: Two things. One is the travel apps. It depends on the destination, but when I go to Cavite, I usually use Tripadvisor and Booking.com or Agoda.com. I browse there to read reviews, the available facilities, and how good their services are.</i>	
	<i>Tourist 3: The [mobile] data, of course. Everywhere you go, data is very important.</i>	Ubiquitous connection
	<i>Tourist 6: The real-time information it provides is important. For example, I could search if there is any establishment available or open in Tagaytay using mobile data or Wi-Fi connection and websites or search engines. You can see real-time information that even if you are not actually there, you’ll know where to go, there is name, location, operating hours, and even the products and services they offer.</i>	
	<i>Tourist 1: I think it is the facts or information and images that they need to input about their business. The most important probably are the smart devices and applications. All travelers probably use smart devices in creating transactions, finding the location, and information about the particular business. Travelers like me want to make sure that all information and feedbacks are in the smart devices I am using.</i>	Updated Information
	<i>Tourist 6: The real-time information it provides is important. For example, I could search if there is any establishment available or open in Tagaytay using mobile data or Wi-Fi connection and websites or search engines. You can see real-time information that even if you’re not actually there, you’ll know where to go, there’s name, location, operating hours, and even the products and services they offer. So, I think that is one.</i>	

Based on Table 19, the participants believed that the most important smart tourism technologies are GPS, travel-related applications, ubiquitous connection, and mobile devices and applications. They were found the most significant smart tourism technologies, and the participants reiterated that the main reason is the updated and real-time information they could provide while traveling. According to Wang et al. (2011), tourists have found smartphones helpful in helping them visit more places, have a richer experience, and enjoy higher

satisfaction with their trips overall, supporting the following transcript.

*“The most important probably is the smart devices and applications. All travelers probably use smart devices in creating transactions.”*

All the significant themes must be combined with smartphones to maximize their use fully. Salgado et al. (2021), using GPS in mobile phones combined with ubiquitous connection (Pai et al., 2020) and travel-related applications to check reviews or promos (Douglas et al., 2018), significantly improve the experience of the tourists due to its provision on omnipresent use of information, which gives way to one of the over-all concepts of smart tourism (Li et al., 2017).

**Table 20**  
*Themes on Tourist Perception on Capability of Travelling Without Using Smart Tourism Technologies*

Code	Significant Statements	Theme
Capability to Travel Without Smart Tourism Technologies	Tourist 1: No, probably. Tourist 2: No. Even if I am not techy, we always use Waze in looking for destinations. Tourist 3: For now, with the pandemic, and the QR code, Wi-Fi, and others, it will be hard, so no. Tourist 5: Nowadays, I need smart technology. I really rely on smart tourism technologies this pandemic because I want contactless [transactions], avoid face-to-face with people, and online payments. Tourist 6: If this pandemic end, I will still use [smart tourism technology] because it is already part of the chain.	Inability to Travel Without Smart Tourism Technologies
	Tourist 4: I think I can still travel, but I am already used to it so that it will be hard for me. Since I already experienced using them, like GPS, my life has become easier. Then if I won't use them, it is still possible, but it will be hard.	It is possible to travel without using Smart Tourism Technologies but it will be hard.

Based on Table 20, 83 percent of the participants would not be able to travel without using smart tourism technologies during the COVID-19 pandemic, while 17 percent of the participants claimed that “it is still possible, but it will be hard.” According to Nanca et al. (2018), Filipinos typically use Smart Tourism Technologies when traveling, implicating that their consistent usage made them accustomed to it that removing it from their usual usage will be difficult for them.

On Table 21, all the participants plan to use smart tourism technologies on their next visit to a tourist attraction in Cavite. It shows a significant positive effect and it is concurrent with the majority of the Filipino respondents who will plan their future travel using digital means based on the survey report entitled, “Philippine Travel Survey: Insights on Filipino Travel Behavior Post-COVID 19” (Department of Tourism, 2020).

**Table 21**  
*Themes on Utilization of Smart Tourism Technologies on Future Travels*

Code	Significant Statements	Theme
Utilization of Smart Tourism Technologies on Future Travels	Tourist 1: Yeah, probably. Tourist 2: Definitely. Tourist 3: Yes. Tourist 4: Yes, I am actually planning to book a hotel using Klook and Tripadvisor. Tourist 5: Yes, absolutely. Tourist 6: Yeah	I will be using STT in my future travels

The results of the thematic analysis for the interview with the tourist attraction employees are described as follows:

**Table 22**  
*Smart Tourism Technologies Embedded in Tourist Attractions*

Code	Significant Statements	Theme
Smart Tourism Technologies Embedded in Tourist Attractions	Employee 1: We use social media such as website, FB page, and Instagram for communication, announcements, and sharing information about the museum, artworks, and artists. Employee 2: Yes, actually, in our establishment we have a lot of smart technology. Employee 3: We use them in our business. Employee 4: Yes, we do.	Yes, we have smart tourism technologies embedded in our business.

Employee 1: QR codes are used for Health Declaration Form and payments. Employee 3: We utilize also QR codes to our customers for contactless transactions. Employee 4: We also have thermal scanners and QR code for contact tracing at the entrance of our attraction.	QR Codes
Employee 2: We also have Wi-Fi provided for our staff and also to our customers and clients. Employee 4: Around the area, we also have WIFI available to our customers, and we encourage them to tag us in their photos as well Employee 3: We have installed CCTV cameras in the vicinity and Wi-Fi is also available in the area	Ubiquitous connection
Employee 3: during this pandemic, the campaign for safety and contactless service became more intense. We utilize also QR codes to our customers for contactless transactions. And of course, just like what is being asked of our company, we also have thermal scanner and sensors in our restrooms to minimize contact between our customers, facilities, and employees. Employee 4: We tried to install several contactless devices around the perimeter of our business in order to assure safety from COVID 19 to our customers while reminding them of the minimum health and safety standards. We also have thermal scanners and QR code for contact tracing at the entrance of our attraction. Employee 1: QR codes are used for Health Declaration Form and payments.	Contactless Technologies
Employee 3: We also have a Google map so the customers can search us through the use of Google. Employee 1: Online google form is used in reservations.	Google Applications

Based on Table 22, all the participating tourist attractions have Smart Tourism Technologies embedded in their business, implicating the readiness and willingness of the businesses under study to adapt to the smart tourism concept gradually. It also proved Jeong et al. (2019) study on how the integration and leverage of Smart Tourism Technologies optimize business revenue and visitor experience. The participants then specified the Smart Tourism Technologies in their business, where six (6) distinct STTs emerged as themes. Standard Smart Tourism Technologies utilized by the tourist attractions are QR Codes, Ubiquitous Connections, Social Media Applications, Contactless Technology, and Google Applications. The three themes (QR Codes, Ubiquitous Connections, Social Media Applications) that emerged also aligned in the tourist perspective as the technologies that influenced their visit while they see contactless technologies as one of the advantages in using Smart Tourism Technologies. These technologies have the potential to contribute to asset management and business efficiency improvement, and value co-creation (Sotiriadis, 2017).

**Table 23**  
*Most Significant Smart Tourism Technologies in Business Competitiveness*

Code	Significant Statements	Theme
Most Significant Smart Tourism Technologies in Business Competitiveness	Employee 1: social media is a big help and, I think, the cheapest way of marketing a business. It also maintains the museum's visibility online even though it is temporarily closed because of the community quarantine restrictions. Employee 3: I believe, just like any other business, the most useful is social media. It provided us a lot of convenience. It is easier for us to navigate and for our customers to use so we can communicate. Through the social media pages, we can maintain our link or connection to our customers even during pandemic.	Social Media Applications
	Employee 1: Online forms used in Health Declarations and reservation forms are very helpful in collecting important details and information about the guests without direct contact with guests, which is useful in this time of pandemic. And it is paperless! Employee 4: I think the most important are the contactless technologies that we have because not only we reduce the safety concerns of our customers but also improve our compliance to the health & safety protocols and the efficiency of our services.	Contactless Technologies

Based on Table 23, the participants believe that the most significant smart tourism technologies in the business perspective are social media applications and contactless technology. The participants claimed that social media is also effective in marketing. In fact, 74% of marketers believe that social media are vitally important for their corporate and product strategy (Chung et al., 2015).

*“Through the social media pages, we can maintain our link or connection to our customers even during pandemic.”*

These findings are also concurrent with the tourists' perception of how smart tourism technologies influenced their experience. Another theme that emerged in the business perspective is contactless technologies which also emerged in the tourists' perspective as one of the significant advantages of using smart tourism technologies. Due to the COVID-19 pandemic, the most important consideration nowadays is health and safety

(Pappas et al.,2021), where contactless technologies could help reduce risk perception.

**Table 24**

*Future Transformation to a Smart Tourist Attraction*

Code	Significant Statements	Theme
Smart Tourist Attraction	<p><i>Employee 1: Definitely! We are thinking of putting big screens in the exhibit area to improve the display and storytelling. We are also exploring how to put content on social media that will fit people of all ages.</i></p> <p><i>Employee 2: Yes, of course. The owner really plans to expand or branch out. Once we branch out, the smart technologies that we would have would be better because communication is very important.</i></p> <p><i>Employee 3: Nowadays, yes. We have plans to transform it because our current situation or the new normal is not certain. I think [using] technology in everyday transactions will not disappear, especially in our business and our customers, because everyone is worried about the people they transact with. So, I think the best option for us, for all the businesses, most importantly in the tourism field, is to transform especially our transactions.</i></p> <p><i>Employee 4: Yes. Definitely. We always want to improve our competitiveness, and this includes being attuned to the current trends in the tourism industry, and I believe in the new normal, it is required to use smart technologies to be more efficient</i></p>	Plan on Future Transformation to a Smart Tourist Attraction

Based on Table 24, the participants plan to transform their business into a smart tourist attraction. It proves the resilience and adaptability of the tourist attractions and the commitment to competitiveness. Chung et al. (2015) suggested that tourists have been using and adopting smart tourism technologies. These require businesses' willingness to adapt rapidly as well (Neuhofer et al.,2018).

**Table 25**

*The Recommendation in Establishing a Smart Tourist Attraction in Cavite*

Code	Significant Statements	Theme
Recommendation in Establishing a Smart Tourist Attraction in Cavite	<p><i>Tourist 1: There must be updated information about the businesses depending on the current situation or quarantine status. Their pages must be updated accordingly and timely.</i></p> <p><i>Tourist 3: Maps should also be updated, especially with areas or locations that are open and close.</i></p> <p><i>Employee 1: Producing informative content, using QR codes for forms and payments, and video presentations can enhance the services that any establishments are providing.</i></p> <p><i>Employee 4: I think it should start with the easiest smart tourism technology to apply in the business, the social media pages, which must be updated at all times.</i></p>	Updated Information
	<p><i>Tourist 1: There must be an application wherein you (attraction) get to update the tourists' experience. It will show transparency on what the tourist attraction or Cavite could really offer.</i></p> <p><i>Tourist 2: They must have an Online Tourist Information Center wherein everything is already concentrated, not just hotel or Airbnb but also food, restaurants, and tour guides.</i></p> <p><i>Tourist 3: There should be a system that will be used by all smart tourist attractions in Cavite, just like with the Department of Health. I don't really know what they call it, but it is like a common app or QR code for contact tracing since they have different [apps].</i></p>	One common system or application
	<p><i>Tourist 5: [My] recommendation as a whole, in order for Cavite to establish more smart tourist attractions, establishment or the attraction itself should be proactive to embrace and invest with the smart technologies.</i></p> <p><i>Tourist 6: The management [of the tourist attraction] definitely has to strengthen or invest in providing equipment or consider it in their relevant process or policies. So, my recommendation is to strategize the management's policies, management's resources, additional resources, and procedures. Overall, know your target market's demands and then strategize on the management itself, policies, procedures, and also the resources because the client could have smart tourism devices and the capability to use them, but if the establishment does not have one, it will not matter.</i></p>	Attraction should be proactive in technological innovation.
	<p><i>Tourist 4: First, I think I really need to commend the effort of the Cavite government to establish public Wi-Fi in public areas. That is a good thing because if we're going to use smart technologies, we would need access to Wi-Fi or [mobile] data.</i></p> <p><i>Tourist 5: The LGUs should also support the different tourist attractions, either small or big businesses. They should have a harmonization process that all attractions need to embrace for the sake of convenience and accessibility of all the tourists that they want to invite to the province. Maybe in the future, Cavite could become the smart tourism capital of the Philippines.</i></p>	LGU Support
	<p><i>Tourist 6: I think you have to understand the demands of the customers first. The customers now are anxious if they will go to certain places. They are anxious if the place is safe for them or secure. Based on my experience, the smart tourism technology could help them feel or create an idea that they are safe in an attraction.</i></p>	Comprehensive study

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*Employee 3: I think we need experts to study comprehensively regarding Smart tourism technology. Although we are already utilizing them properly, there must be a proper study on how we could maximize its advantages and eventually transform the disadvantages to [advantages] in using smart tourism technology in our business.*

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Based on Table 25, there are five themes that emerged for the thematic analysis of the recommendation in establishing a smart tourist attraction in Cavite. Updated information is an essential characteristic of smart tourism technologies for the participants, and businesses must maximize this tool. This is supported by the study of Pai et al. (2020) on how informativeness stimulates tourists' rational judgment about the destination and helps them make efficient decisions. Neuhofer et al. (2018) conceptualization of the smart tourism experience focused on the holistic perspective where all the technologies will be interconnected in one smart ecosystem that must have real-time synchronization to facilitate a seamless experience (Neuhofer et al.,2015), supporting the findings on the participants' recommendation.

Consistent technological innovations and solutions have been emerging in the last decades, and to stay competitive, businesses must be proactive in adopting them with the support of the local government for a more cohesive system. To support these statements, the participants exclaimed the following statement.

*“[My] recommendation as a whole is that in order for Cavite to establish a smarter tourist attraction, the establishment or the attraction itself should be proactive to embrace and invest in smart technologies.”*

*“They should have a harmonization process that all attractions need to embrace for the sake of convenience and accessibility.”*

Department of Tourism (2020) also recognized the need to embrace the trend toward digitization in the Philippines' tourism industry, starting with launching a cohesive application, various training to stakeholders through webinars, and digitizing their transactions. Nevertheless, the participants also recommended that a comprehensive study must be applied to maximize its potential fully.

### ***Proposed Action Plan on Establishing a Smart Tourist Attraction***

*Proponent: Cavite Tourist Attractions*

*Author: Katherine Ann M. Magracia*

*Date: October 2021*

This report's main purpose is to create an action plan to establish or transform into a smart tourist attraction using smart tourism technologies in Cavite during and after the COVID-19 pandemic based on the findings of the study entitled, “Influence of Smart Tourism Technologies (STT) on the Tourist Attractions in Cavite: COVID-19 Pandemic Context. The researcher used the mixed-method of research to provide comprehensive results and findings. A quantitative approach using survey questionnaires to tourists and a qualitative approach using individual interviews with tourists and tourist attractions' employees were conducted. Statistical analysis using mean frequency, and Pearson correlation were utilized for quantitative results, while thematic analysis for qualitative findings was utilized. The embedded design was used to combine both approaches, wherein the qualitative findings were also used to strengthen the quantitative results. Technologies have massive potential in elevating experience (Neuhofer et al.,2015), but they also have the potential to blur the boundary between technology and the tourist experience (Buhalis et al., 2019.) Thus, this plan focuses on providing recommendations centered on authentic human experience elevated through smart tourism technologies without exhausting its use.

**Table 26**

***Action Plan in Establishing a Smart Tourist Attraction***

Strategies	Actions/Plan of Activities	Persons Responsible	Success Indicators
Integration of a Seamless	a. Stable Public WIFI in the vicinity	Local Government Unit	Number of uptime and connections and user

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Ubiquitous Connection	b. Stable Public WIFI in the vicinity	Tourist Attractions Management	satisfaction Number of uptime and connections and user satisfaction
	c. Strong Network Signal	Local Government Unit and Tourist Attractions Management	Number of uptime and connections and user satisfaction
Development, Utilization and Integration of Mobile Devices and Applications	2.1 Development of a user and mobile-friendly website	Local Government Unit and Tourist Attractions Management	Number of website traffic and conversion rate
	2.2 Development of Free Downloadable Application with a holistic system for the business and the tourists with services including: a. updated information on the products, services, restrictions, protocols, company information, location b. account creation, c. booking and reservation d. advanced payment e. advanced health declaration forms f. QR scanner <i>*Tourists would be issued a unique QR that will grant them access to establishment automatically after thermal scan and QR scan if they are already fully paid. They may also pay on site using cash or online payments using the QR codes. The issued QR code will allow seamless transactions while ensuring organized data collection for the business.</i>	Tourist Attractions Management	Number of usages, downloads, average response time and user satisfaction
	2.3. Download and utilized the tourist attraction application in transacting with the management	Tourists	Number of usages, downloads, average response time and user satisfaction
	2.4. Integration of the Business in other platforms and intensifying its presence in the following: a. social media	Tourist Attractions Management	Number of likes, reactions, interactions, tags, posts and positive reviews
	b. online presence using online marketing tools		Number of organic traffic, SERP visibility and click through rate
	c. Travel-related Applications		Number of purchases
	d. Google Applications		Number of engagement and analytics
Integration of Internet of Things	3.1. Creation of a common system for Contact Tracing System integrated in the Tourist Attraction Application	Collaboration between Department of Tourism, Cavite Government, LGU and Tourist Attractions	Number of user satisfaction (Apdex) and data collection
	3.2. Integrating Contactless Technologies at the crowd points of the tourist attractions a. Thermal Scanner	Tourist Attractions Management	Average rate of efficiency rate and user satisfaction
	b. QR scanner c. Smart sensors for including automatic sanitizers, sensor faucet, flush and lights		

The table shows the matrix for the action plan in establishing a smart tourist attraction based on the matrix used in the Tourism Guidebook for LGUs by the Department of Tourism. The action plan is divided into three strategies focused on the integration of the three most used smart tourism technologies, namely: Ubiquitous Connections, Mobile Devices and Applications, and the Internet of Things. Tourist attraction management could also choose which recommendation they would apply to their business. The first strategy is the Integration of a Seamless Ubiquitous Connection. Ubiquitous Connection has two smart tourism technologies: Wi-Fi and Mobile Data. Under the specific actions or plans of activities, both STT must be integrated into the vicinity implemented

by the local government unit and the tourist attraction management. The purpose of this strategy is to maximize the usage of smart tourism technologies installed by tourists and the attractions. Based on the results of the study, Wi-Fi is the most usable smart tourism technology among the ubiquitous connection. The mobile data signal, regardless of the network, must also be strong in the vicinity. Providing a holistic system of applications and smart solutions will not be usable and effective if there is no stable ubiquitous connection.

The second strategy is the development, utilization, and integration of mobile devices and applications. The first plan of action under this strategy is to create a user-and mobile-friendly website implemented separately by the local government and attractions. The local government must include the operating tourist attractions and tourism establishments within the area, complete with photos and information. On the other hand, the tourist attraction website must focus on providing information on its products and services. Websites have become an important asset for any organization to establish credibility and showcase one's brand while increasing leads (Kaplan, 2020), leading to income. In today's digital-savvy world, it has become the primary source of online information that Expedia Media Solutions found out that average consumers visit 38 sites before booking (Peterson, 2015). Another relevant strategy that must be launched along with the website is the development of a mobile application. It must be a free downloadable application that could provide a holistic system for the business and the tourists. Findings from the current study have significantly shown the importance of applications in the tourist perspective which was also supported by Trekksoft (2019) on how 90% of travelers now have to help them during their travel. This recommendation aims to suggest one application that will be used throughout their travel. The website and the application must provide the following services in the website and the application:

a) Updated Information including the products and service offerings complete with photos, videos, rates and reviews, products and services for different market segments, on-going promotions, marketing advertisements, attraction updates, food and beverage options in the attraction, LGU and business restrictions, health and safety protocols, social media pages and company information including exact location and contact numbers. One of the considerations, when tourists visit sites and applications, is to gather as much travel information as possible to make good decisions. Providing information about the tourism products and services on the website and application will benefit both customers and tourist attractions since it will help the business showcase its brand and provide customers with all the options available while setting their expectations. However, this also entails that the business must guarantee that all the information pages, website, and application will be updated regularly and concurrently.

b) Account Creation wherein they could create their own account and make advanced transactions without repeatedly inputting their information. Once their account is successfully created and verified, they would be issued a unique QR Code that will immensely help provide smart services while the tourist is in the actual tourist attraction. Once fully paid, the smart services include automatic entrance in the tourist attraction without answering health declaration forms or queuing at the cashier. They would just need to show the unique QR code provided to them to be scanned with a QR scanner at the entrance. This would ensure convenience to both parties since there will be no repeated filling in of information for the tourists as well as an organized information collection for the business. However, the business must ensure that the system and technologies required to accomplish this must be efficient and functional. Options to print the QR code that could be formed into a wristband are also recommended.

c) Booking and Reservation where tourists could make inquiries, make reservations for their preferred dates, submit advanced health declaration forms and choose payment options. Tourists would have the option of paying online or paying onsite using payment applications, especially Gcash, Paymaya, or other bank applications. They would still be issued their unique QR code where they could show the cashier to be scanned for their reservation or information in which they would have the option to pay in cash or any of the online payments available using QR codes. The tourists must be provided with the option of booking and inquiring without creating an account. However, they must also be provided an alternative to creating one even after reservations. It must be taken into



account that there are still clients who are apprehensive about providing personal information online and providing alternatives would ensure a reservation.

d) Advance Payment wherein tourists could pay prior to their arrival in the application or website using various payment channels such as Gcash, Paymaya, debit, credit card, or payment centers. This option aims to minimize contact with tourist attractions. However, based on the study of Nanca et al. (2018), although Filipinos prefer booking online, they prefer paying on site. Thus, paying on-site via cash and online channels must still be available.

e) Advanced Health Declaration Form or Contactless Tracing wherein tourists would have the option to answer prior to arriving at the tourist attraction. Once their unique QR code is scanned, the health declaration form and other relevant information will also be stored in the application for contact tracing monitoring, and data collecting of the management involved. This ensures the removal of the required process in the actual establishment but highlights the organized information collection. It will also create a seamless service for the tourists and management.

QR Scanner where tourists could use to scan QR codes in the tourist attraction. The tourist attraction will be using QR codes to collect various information such as payment, health declaration forms, Wifi connections, etcetera. Although there are free QR scanners downloadable via Playstore or Appstore, it would be better if the tourist attraction application had one to provide a holistic system to the tourists. This would ensure convenience to consumers wherein they will not need to download another application to scan QR codes.

The next strategy includes the download, installation, and utilization of the mobile application by the tourist to enable them to enjoy the seamless products and services it offers. Tourist attraction management could also offer incentives such as promos or lower entrance fees to encourage the patronization of the application. The next strategy is the integration of the business in other platforms and intensifying its presence in the following:

Intensify social media presence by regularly posting information, photos, and videos, providing a feedback platform for previous tourists to give reviews, and engaging users through posts and comments and quick inquiry responses. Based on quantitative findings, Facebook is the most used social media application by the respondents. Thus, creating a Facebook page is recommended and an Instagram page where users could also geotag the tourist attractions whenever they post their content. There are approximately 78.5 million social media users in the Philippines that the business could potentially tap as their market. The social media pages, along with their website and application, must work together to provide online information and customer engagement. However, photos and information must be curated carefully to avoid negative feedback, especially when responding to customers.

Strengthen online presence by using and maximizing various online marketing tools such as SEO or Search Engine Optimization in your website and social media, having a proactive review strategy, and paying for search and social media advertisements. Tourists browsed social media, sites, and blogs to gather travel information, which entails shifting from traditional advertising to online marketing. d) Integrate the business products and services in travel-related applications such as Klook, Travel advisor, or Traveloka to launch the business on various platforms. c) Aggregate the business information by utilizing various Google applications, such as creating Google My Business Profile, wherein it could be another business platform for your tourist attraction for free, Google Maps so tourists could find the location easily. Google applications are one of the significant applications in the current study. Establishing a profile in Google will also give the business another platform to showcase its products and services and its other tools.

To integrate the last smart tourism technology, the Internet of Things, a common system for contact tracing system must be created to integrate into the Tourist Attraction Application. The effective implementation of this system will enable a unified exchange of data from all attractions in Cavite. It will also ensure effective contact tracing and data aggregation to the businesses. The last activity is to integrate contactless technologies,

especially at the crowd points of the tourist attraction. Thermal scanners must be available at all the entrance points, along with QR Scanner for temperature check, contact tracing, and health declaration forms. A separate lane may be included for tourists who already have a reservation with their unique QR code and have paid in advance so that they may enter immediately after their thermal scan. According to the report conducted by the Department of Tourism (2020), health and safety are the top primary concerns of travelers, and addressing the risks through contactless technologies would be vital to encourage visitors. Contactless basic facilities must also be included in the vicinity. One requirement would be an automatic alcohol dispenser at the entrance and crowded areas of the tourist attractions. Basic facilities must be converted to sensors, such as automatic flush and sensor faucets in the restroom. If there are restaurants or establishments within the tourist attractions that would require additional health declaration forms and contact tracing, they must have a QR scanner to scan the QR code of the tourists. The menu in front of the store must be visible so tourists can easily decide their orders or a QR code for the menu to scan it using the scanner with the tourist attraction application. The reservation must also be available in the app. The tourists must also have the option of paying through cash, card, or their preferred online payment applications. The recommendations aim to provide a seamless form of service process using smart tourism technologies and enhance the tourists' experience without the exhaustive use of technologies. It intends to preserve the authentic touristic experience while accelerating the process of the services and protocols required during the travel. Thus, it provides potential tourists with the opportunity to enjoy the tourist attraction, eventually satisfying both parties.

#### **4. Conclusions and recommendations**

Smart tourism technologies have influenced the tourist experience in Cavite tourist attractions during the COVID-19 pandemic by providing excitement, encouragement, accessibility, and convenience while helping them choose travel destinations. Generally, the majority of the participants have already used smart tourism technologies during their travel to Cavite tourist attractions. Among the indicators, the most used Smart Tourism Technologies are the Ubiquitous Connection, Mobile Devices and Applications, and the Internet of Things. This finding is also supported by the qualitative data, implicating the need to utilize these top three smart tourism technologies together to create a seamless experience for the tourists in enhancing the tourist experience for ease while maintaining safety. The specific smart tourism technologies that garnered the highest mean and the verbal interpretation of "Always" are Wi-Fi, Smartphones, Facebook, and Smart Devices and Appliances. Based on the findings of the study, it was found that there is no significant relationship between the usage of Smart Tourism Technologies (STT) and the demographic profile of the respondents, therefore supporting HO. However, further examination showed that Internet of Things and Mobile Devices and Applications are statistically significant with the demographic profile, thus concluding a statistically significant difference between Smart Tourism Technologies and the demographic profile, proving the hypothesis true. On the other hand, there are findings that there is a significant relationship between the smart tourism technologies and the tourist experience, implicating that these two variables significantly affect each other, either positively or negatively, rejecting HO. Further examination per indicator also shows that all the smart tourism technologies under study are statistically significant with the tourist experience in Cavite tourist attractions, thus, rejecting the null hypothesis. Moreover, it is concluded that there is statistically significant difference between the Smart Tourism Technologies and the tourist experience in the tourist attractions in Cavite. The advantages of using smart tourism technologies in the tourist experience are setting expectations, providing updated information, communication, safety, convenience, and accessibility through contactless transactions, mobile devices and applications, travel-related applications, GPS, social media applications, and Ubiquitous Connections throughout their journey. On the other hand, the disadvantages include how technology-dependent the tourist could become and the potential for malfunction or unavailability of smart tourism technologies. Although the participants considered social media as one of the significant STT, many of its advantages could also become disadvantages. However, it was also found that the majority of the participants would not be able to travel without using smart tourism technologies and would use them in their future travel. Even during the pandemic and the ongoing restrictions, the tourists were still satisfied with their experience in the tourist attractions. It could be concluded that improving the integration of smart

tourism technologies in the tourist attraction in human-centered design could also significantly improve the tourist experience. By analyzing the usage, experience, and the relationship of the variables through the mixed method, this research was able to identify and understand the specific smart tourism technologies that were the most significant in the tourist perspective. It confirmed the conceptual model of Neuhofer et al. (2018) on smart tourism experience wherein through using smart tourism technologies, the tourist would be able to gain a smart tourism experience that is data-driven, real-time, context-aware, and co-created. Aside from its theoretical contribution to the smart tourism concept in the Philippines, its contribution to the smart tourism technologies centered as user-centric in the smart tourism concept as a whole will be invaluable, addressing the gap in the research area. The mixed-method approach utilized in the study also provided a holistic view of the problems and the probable solutions in mitigating the impacts of the COVID-19 pandemic in the tourist attraction industry in Cavite. The findings also have immense implications for the integration of STT in policy-making in the local government in Cavite and the business profitability and sustainability. While the study clearly illustrates the valuable contribution of smart tourism technologies in the tourists' travel, it also has limitations as with all research. Although the participants were chosen through rigorous criteria and the research instrument undergone strict validation and reliability, the study's conduct is still limited to online means due to the restrictions and safety issues during the COVID-19 pandemic. Another limitation of the study is its confinement to Filipino travelers and the operating tourist attractions in the research locale during the conduct of the study. Future studies could explore other towns in Cavite or expand to other tourist destinations. A comparative analysis could also be investigated between Cavite and other provinces as well with domestic and international tourists. Despite the limitations described, the study delivers a significant finding on smart tourism technologies to the tourist experience relevant in theory building, policy, and managerial implications. Implemented accordingly, it could deliver an innovative and smarter tourist experience, elevating the tourism industry towards a transformative and more sustainable tourism experience.

The study has contributed to determining the influence of smart tourism technologies on the tourist experience in Cavite tourist attractions during the COVID-19 pandemic. As the pandemic situation and restrictions in the country change and the technology advances, the following recommendations are made based on the outcomes of the study. An action plan in transitioning to a smart tourist attraction was created for the output of the study. It is a detailed plan with actions, activities, or strategies to achieve the specific goal of the smart tourist attraction transformation. The people responsible for the implementation and success indicators were also included to measure the performance outcomes of the specific actions. The persons responsible for each plan of activities include the Tourist Attractions' Management, Local Government Units specifically the department leading their tourism planning, Department of Tourism, Cavite Government and Tourists. The action plan was centered on the findings of the study in integrating the most used smart tourism technologies in creating a smart tourist attraction. This study is formulated according to the current pandemic situation in the Philippines, specifically in the locale in Cavite. Provinces and cities within the country have varying restrictions from General Community Quarantine (GCQ), Modified General Community Quarantine (MGCQ), Enhance Community Quarantine (ECQ), and Modified Enhance Community Quarantine (ECQ) with different alert levels, to date. All of these imposed different limitations on business operations, tourist and/or locals' movement, and requirements based on the COVID-19 cases, which must be considered in their technological integration. Thus, future studies on other cities and provinces are recommended, tailored to their current pandemic situation, quarantine classification, restrictions, and technological advancement, including arising considerations such as vaccines. A comprehensive study of the tourist attraction, target market, and the current situation before integrating smart tourism technologies is also recommended. Tourist attractions have many varieties and segments they cater to, so it would be best to analyze which specific smart tourism technologies would work in the existing tourist attraction, which would be easily applied by the existing market segment they cater to. It is also recommended to include emerging smart tourism technologies that were not included in the study on future researches. Developments in the technological and tourism field are continuous and abrupt, and it is imperative to take note of the emerging smart tourism technologies that could play a significant role in both industries. Future studies could also be done regarding the effectiveness of the implementation of health and safety

protocols and mandatory tests before entering the premises. Although technological advancement in the tourism industry and the COVID-19 pandemic situation changes rapidly, the researcher believed that this study would illuminate future research on the smart tourism concept, tourist experience, and how these two variables could help shape a better tourism industry towards its recovery and improvement.

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# Tax knowledge, bookkeeping practices, and financial performance of micro-enterprises: Basis for an enhanced tax compliance framework

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## ***Abstract***

The study determined the relationship between tax knowledge, bookkeeping practices and financial performance of micro-enterprises in the city of Calamba, Laguna. The study utilized the quantitative method of research and utilized the Shapiro-Wilk Test and Spearman rho using the SPSS version 28 to assess the objectives. The data were collected from three hundred ninety-nine (399) enterprises that could be sole proprietorship, partnership, corporation or cooperatives locally registered in the municipality of Calamba, Laguna with net assets not exceeding three million pesos (P3,000,000) and with employees not exceeding ten (10). The results showed a highly significant relationship between tax knowledge and financial performance, and bookkeeping practices and financial performance that implies a higher-level tax knowledge leads to a timely and accurate tax compliance preventing penalties and fines from being incurred. Moreover, a well-designed bookkeeping practices promotes an accurate and complete financial record enhancing the confidence in the financial statements and all have an effect to the overall financial performance. The framework developed for this study aimed to enhance the level of tax knowledge and bookkeeping practices of micro-enterprises to ensure better and timely tax compliance while providing accurate and complete financial records ready for any potential audit causing the prevention of incurring penalties and fines from incorrect and late filing, thereby, improving the overall enterprises' financial performance.

***Keywords:*** tax knowledge, bookkeeping practices, financial performance, tax laws and regulations, tax compliance

## **Tax knowledge, bookkeeping practices, and financial performance of micro-enterprises: Basis for an enhanced tax compliance framework**

### **1. Introduction**

Taxes are lifeblood of one's nation. Without it, a country would be paralyzed as it cannot sustain its functions and operation for the benefit of the nation. Taxes allow the government to fund social programs, public services, and infrastructure that enhance citizens' quality of life. They are in favor of the preservation of the nation's defensive capabilities, law and order, and general development. A nation can pay its debts and care for its citizens via tax money. In relation to this, the government must uphold its responsibility to collect the right amount of taxes to its citizen. It is, however, the responsibility of every taxpayer to comply with their taxes on an accurate and timely manner.

In a global context, collection of taxes is considered to be a challenge that are multifaceted that exist in both developed and developing countries. In actuality, micro companies in the UK are responsible for tax short fall of 40%, or unpaid taxes amounting to £14 billion. The primary causes of this include carelessness, mistakes, or disparate legal interpretations (White, 2019). In like manner, small business owners may underpay taxes as a result of their reliance on cash transactions, according to reports from the US Internal Revenue Service. Philippines has the Department of Finance (DOF), through the Bureau of Internal Revenue (BIR) is mandated by law to assess and collect all national internal revenue taxes, fees, and charges, as well as to carry out any associated forfeitures, penalties, and fines, including carrying out court-mandated execution of judgments. Moreover, after the Tax Reform for Acceleration and Inclusion (TRAIN) law was implemented, it was thought that a more straightforward tax system for micro and small businesses would encourage voluntary compliance and a higher number of registered individual taxpayers without enacting additional taxes. However, despite the efforts of the BIR to provide with a program to lessen the burden of complexity on compliance, as mentioned in Paco et al. (2022), micro to medium-sized taxpayers were recognized, profiled, and informed of their degree of tax compliance by the BIR due to their little tax understanding. In a more localized setting, the researcher, as a tax practitioner himself, observed in RDO 056 in the city of Calamba, there are a number of micro-enterprises who are not fully aware of the basic tax laws and regulations. It is one of the main reasons of unintentional non-compliance to tax laws and regulations. There is also an observation as to the incomplete bookkeeping documents leading to inaccurate tax computation. The business bottom-line is highly affected due to unnecessary incurrence of costs such as penalties and fines.

To support the study, it is anchored with regulations that can either have a good or negative effect on industry, according to the economic theory of regulations (Stigler, 1971); a regulation that benefits the industry is regarded as positive and vice-versa. To support this, proper compliance of MSMEs to the taxman (BIR) affects the financial performance of a company as it reduces the risks of a tax audit, thereby eliminating the chance to pay additional costs such as penalties in the form of surcharge, interest, and compromise penalties which are then affects the net income. It lowers the price of non-compliance for companies, allowing them to allocate and concentrate their money mainly on investment and operations. (Paco et al.,2022). Hence, a need for a proper bookkeeping management system. In addition, bookkeeping practices may offer companies with an improved process, reduced risks, accuracy in financial reporting and quicker retrieval. A good records management may also reduce the risks of litigation and potential penalties (imageAPI, 2024).

The challenges of micro-enterprise businesses in the limitation of tax knowledge and employing improper bookkeeping practices leading to possible tax non-compliance which incurs unnecessary costs for fines and penalties that ultimately affect financial performance are the main motivation of the study. Needless to say, inadequate bookkeeping can lead to inaccurate financial reporting, poor decision-making, and non-compliance with the tax regulations. Therefore, the study calls for more tax education to the micro-business enterprise

owners. The study is expected to provide with valuable insights into the level of tax knowledge and the bookkeeping practices of micro-businesses that affect business performance which will be the basis for an improved tax compliance framework that could be useful to the enterprise owners in tax-related compliances.

**Objectives of the Study** - This study aimed to assess the level of tax knowledge, bookkeeping practices and financial performance of micro-enterprises as basis for an enhanced tax compliance framework. Specifically, to assess the level of tax knowledge in terms of tax laws and regulations, tax liability, and tax compliance and penalties; to determine the bookkeeping practices in terms of accuracy and completeness, accessibility and verifiability, and audit readiness and risk reduction; to evaluate the financial performance in terms of cost management and profitability, cashflow management and investment and growth decision; to test the relationship of tax knowledge, bookkeeping practices and business performance and; to develop a framework to enhance tax compliance among micro-business enterprises.

**2. Methods**

**Research Design** - The present study utilized the descriptive-correlational research design to determine the relationship among tax knowledge, bookkeeping practices and financial performance in the city of Calamba, Laguna. Both descriptive and correlational designs were integrated in descriptive-correlational research. In descriptive research, information was gathered to test theories or provide answers on the participants' present employment situation. Descriptive study identified and documented the current state of affairs. Conversely, correlational research sought to ascertain whether and to what extent two or more quantitative variables were related. The degree of association (or relationship) between two or more variables or sets of scores was described and measured using this method.

**Participants of the Study** - The participants in the study were the 399 managers or owners of the micro-business enterprises. It was computed using Rao Software from a total population of 1,359 micro-enterprise businesses registered in the municipality of Calamba, Laguna as of January 2025 with a margin of error of 5% and 95% of confidence level. These micro-enterprises could be sole proprietorship, cooperatives, partnerships or corporation, the main business address is located in the City of Calamba, which are categorized based on the total assets, excluding land: micro (assets up to P3,000,000.00), with employees not greater than 9. Any business branches outside of the City of Calamba shall be excluded from the scope of the study. The study also focused on the business registration with the Bureau of Internal Revenue (BIR) and compliance with the applicable national taxation. Needless to say, local taxation and compliance will not be part of the scope.

**Data Gathering Instrument**

**Table 1**  
*Test of Reliability Result*

Variable	Cronbach's Alpha	Remarks
1. Tax Knowledge	0.924	Excellent
1A. Tax Laws and Regulations	0.907	Excellent
1B. Tax Compliance	0.939	Excellent
1C. Tax Liability	0.925	Excellent
1D. Penalties and Fines	0.953	Excellent
<b>2. Bookkeeping Practices</b>	<b>0.928</b>	<b>Excellent</b>
2A. Accuracy and Completeness	0.946	Excellent
2B. Accessibility and Verifiability	0.908	Excellent
2C. Audit Readiness and Risk Reduction	0.929	Excellent
<b>3. Financial Performance</b>	<b>0.890</b>	<b>Good</b>
3A. Cost Management and Profitability	0.847	Good
3B. Cashflow Management	0.824	Good
3C. Investment and Growth Decisions	1.000	Excellent
<b>Overall</b>	<b>0.914</b>	<b>Excellent</b>

*George and Malley (2003) provide the following rules of thumb >0.90 – Excellent, >0.80 – Good, >0.7 – Acceptable, >0.60 – Questionable, >0.50 – Poor, and <0.50 – Unacceptable*

The research instrument that was used in this study is a self-made survey questionnaire. The first part included questions about assessing the level of tax knowledge. It was interpreted using the 4-point Likert scale with a categorical response and verbal interpretation as: 3.50 – 4.00 = High; 2.50 – 3.49 = Moderate; 1.50 – 2.49 = Less; 1.00 - 1.49 = Not Knowledgeable. The second part of the questions assessed the level of bookkeeping practices and were interpreted as 3.50–4.00=Always; 2.50–3.49=Often; 1.50–2.49=Sometimes; 1.00-1.49=Not practiced. The third part of the questions were assessing the level of financial performance and were interpreted as Strongly Agree - Micro-business owners were able to fully identify applicable tax deductions, credits and incentives and uses taxation to operational advantage and potential growth; Agree-Micro-business owners were able to identify limited applicable tax deductions, credits and incentives and uses taxation to operational advantage and potential growth; Disagree-Micro-business owners were able identify few applicable tax deductions, credits and incentives thus affecting financial performance; and Strongly Disagree-Micro-business owners were not able identify applicable tax deductions, credits and incentives.

Table 1 displays the Cronbach's alpha reliability test results for the pilot testing of the survey questionnaire which was adopted from various sources and was modified and validated by experts to ensure the accuracy and reliability of the questionnaire.

**Data Gathering Procedures** - After the approval of the research proposal, a letter of request was given the municipality of Calamba to get the list of registered micro-enterprises, to conduct the study about the level of tax knowledge, bookkeeping practices and financial performance. After the aforementioned request was granted, a survey pertinent to the subject of the study was carried out. For the purpose of conducting and distributing the survey, the study used the Google Forms online tool. Although, the participants answered the survey at their own convenient time, there was a limitation identified during the conduct of survey: that there were participants who took an average of eight (8) days before they can able to submit response due to busy schedule but this was considered by the researcher. The researcher followed up for the responses depending on the commitment date of the participants within the relevant range. The research questionnaires were also collected, tallied, and evaluated for interpretation. For the processing and analysis of the data, a statistician was also consulted.

**Data Analysis** - To perform data analysis, the following statistical tools were used. Weighted mean and ranking were used to assess the level of tax knowledge in terms of tax laws and regulations, tax liability, and tax compliance and penalties; to determine the record-keeping practices in terms of accuracy and completeness, accessibility and verifiability, and audit readiness and risk reduction; to evaluate the business performance in terms of cost management and profitability, cashflow management and investment and growth decision. The result of Shapiro-Wilk Test revealed that p-values of the main variable were less than 0.05 which means that the data set is not normally distributed. Therefore, Spearman rho was used to test the significant relationship among the treated variables. The following Likert Scale was used in assessing the variables: 3.50- 4.00 = High, Always, Strongly Agree; 2.50-3.49 –Moderate, Often, Agree; 1.50 – 2.49 –Less, Sometimes, Disagree; and 1.00 – 1.49 – Not Knowledgeable, Never, Strongly Disagree. In addition, all data were treated using a statistical software known as PASW version 26 to further interpret the result of the study using an alpha level of 0.01.

**Ethical Considerations** - it is necessary to make sure the study would not ignore ethical concerns. Therefore, the actions listed below were implemented. First, the participants in the survey were properly informed about the study's goals and objectives. Second, there was no unpleasant language that could offend any group members in the surveys, including derogatory and discriminatory language. Finally, no personal or private questions were included in the questionnaires; they were created to gather data directly relevant to the research issues.

### 3. Results and discussion

Table 2 presents the summary of the tax knowledge of micro-enterprises in the city of Calamba, Laguna. It clearly shows that among the four (4) indicators assessing the level of tax knowledge, Compliance was noted to have gained the highest weighted mean of 3.27 interpreted as moderate while Penalties and Fines earned the

lowest in rank.

**Table 2**  
*Summary Table on Tax Knowledge*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Laws and Regulations	3.23	Moderate	2.5
Compliance	3.27	Moderate	1
Liability	3.23	Moderate	2.5
Penalties and Fines	3.13	Moderate	4
Composite Mean	3.22	Moderate	

*Legend: 3.50 – 4.00 = High; 2.50 – 3.49 = Moderate; 1.50 – 2.49 = Less; 1.00 - 1.49 = Not Knowledgeable*

The results can be deduced that a key element in encouraging tax compliance among micro-enterprises is tax knowledge. Building confidence between tax authorities and micro-enterprises, boosting tax education, and guaranteeing fair tax. Furthermore, Granfon, et al. (2023) conducted a study in Dipolog City, they claimed that tax knowledge is a critical component affecting MSEs' tax compliance. According to the study, compliance levels are increased when people are aware of tax rules, payment procedures, and applicable rates. Laws are therefore crucial tactics for raising compliance rates.

**Table 3**  
*Summary Table on Bookkeeping Practices*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Accuracy and Completeness	3.43	Often	1
Accessibility and Verifiability	3.40	Often	2
Audit Readiness and Risk Reduction	3.33	Often	3
Composite Mean	3.39	Often	

*Legend: 3.50 – 4.00 = Always; 2.50 – 3.49 = Often; 1.50 – 2.49 = Sometimes; 1.00 - 1.49 = Never*

Table 3 presents the summary of the bookkeeping of micro-enterprises in the city of Calamba, Laguna. It clearly shows that among the three (3) indicators assessing the level of bookkeeping practices, Accuracy was noted to have gained the highest weighted mean of 3.43 interpreted as Often while Audit Readiness and Risk Reduction earned the lowest in rank. Based on the results, bookkeeping practices have three (3) sub-variables: accuracy and completeness, accessibility and verifiability and audit readiness and risk reduction. The results show a composite mean of 3.39 verbally interpreted as often. This implies that accurate and complete bookkeeping is vital for micro-enterprises in the Philippines. In addition to guaranteeing adherence to legal and tax obligations, it also promotes efficient financial management, makes financing easier to get, and aids in well-informed strategic planning—all of which are essential for long-term company expansion. Businesses can use it to monitor their financial performance, make sure they are in line with the law, plan for expansion, and make well-informed decisions. Businesses can enhance cash flow management, position themselves for long-term success, and obtain important insights into their financial health by putting proper bookkeeping procedures into place and using bookkeeping software. Accurate bookkeeping is not only required by law, but it also gives firms a competitive edge that helps them successfully negotiate the market.

**Table 4**  
*Summary Table on Financial Performance*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Cost Management Profitability	3.37	Agree	2
Cash Flow and Management Reduction	3.31	Agree	3
Investment and Growth Decision	3.39	Agree	1
Composite Mean	3.36	Agree	

*Legend: 3.50 – 4.00 = Always; 2.50 – 3.49 = Often; 1.50 – 2.49 = Sometimes; 1.00 - 1.49 = Never*

Table 4 presents the summary of the financial performance of micro-enterprises in the city of Calamba, Laguna. It clearly shows that among the three (3) indicators assessing the level of financial performance, Investment and Growth Decision was noted to have gained the highest weighted mean of 3.39 interpreted as Agree while Audit Readiness and Risk Reduction earned the lowest in rank. Based on the results in table 14, financial performance got a composite mean of 3.36 verbally interpreted as agree. From among the sub-variables,

investment and growth decision got the highest weighted mean 3.36, verbally interpreted as 3.39. The results can be deduced that making wise investment choices is a crucial to micro-enterprises financial success. Through objective resource allocation and improved financial management procedures, microbusinesses can boost earnings, facilitate growth, and guarantee long-term viability.

In the same fashion, Capiña (2022) conducted a study on Marinduque's agribusiness companies emphasized how crucial financial management techniques—including investment choices—are to attaining the best possible business outcomes. Effective use and management of financial resources, particularly in times of financial crisis, improves profitability and firm survival, according to the study. Likewise, Alferos (2023) made a study on small and medium-sized businesses' (SMEs') financial management methods, including microbusinesses, was carried out in Zambales, Philippines. According to the study, these companies only minimally used capital structure and investment decision-making techniques, but they were very good at working capital management. As these practices are essential for business expansion and financial progress, the study suggested that SMEs improve their investment decision-making processes through capital budgeting and strategic resource allocation to long-term assets.

**Table 5**  
*Relationship Between Tax Knowledge and Financial Business Performance*

Laws and Regulations	rho-value	p-value	Interpretation
Cost Management Profitability	.551**	<.001	Highly Significant
Cash Flow and Management Reduction	.531**	<.001	Highly Significant
Investment and Growth Decision	.498**	<.001	Highly Significant
Compliance			
Cost Management Profitability	.453**	<.001	Highly Significant
Cash Flow and Management Reduction	.493**	<.001	Highly Significant
Investment and Growth Decision	.447**	<.001	Highly Significant
Liability			
Cost Management Profitability	.320**	<.001	Highly Significant
Cash Flow and Management Reduction	.407**	<.001	Highly Significant
Investment and Growth Decision	.414**	<.001	Highly Significant
Penalties and Fines			
Cost Management Profitability	.289**	<.001	Highly Significant
Cash Flow and Management Reduction	.301**	<.001	Highly Significant
Investment and Growth Decision	.359**	<.001	Highly Significant

Legend: Significant at  $p\text{-value} < 0.01$

Table 5 shows the association between tax knowledge and financial business performance. The computed r-values indicate a strong direct correlation and the resulted p-values were all less than the alpha level of 0.01. This means that there was significant relationship exists and implies that the more knowledgeable to tax, the better is the financial business performance.

Enhancing the financial performance of businesses, particularly micro, small, and medium-sized enterprises (MSMEs), requires a thorough understanding of taxes. Furthermore, there is a high significant relationship with tax compliance and financial business performance in terms of cost management and profitability, cash flow management and investment and growth decision. The results infer that financial performance of micro-businesses is significantly influenced by tax compliance. Even while following tax laws can be difficult, research shows that doing so can improve long-term sustainability, operational effectiveness, and financial results. It can be supported by the study made by Ssavuma (2024), who came to the conclusion that the income tax had a significant impact on the profitability of the small and medium-sized businesses in Nabuti Village Nsube Kauga Mukono. These require a lot of different resources, including time, money, effort, and attention, because of the high tax rates and the difficult-to-understand regulations. Because of the poor profit margin that resulted, these businesses found it challenging to expand and advance. The decrease of tax rates and the simplification of tax laws may be very beneficial to the financial and size-wise growth of these firms in this region.

Additionally, there is a high significant relationship with tax liability and financial business performance in

terms of cost management and profitability, cash flow management and investment and growth decision. This means that micro-enterprises in the city of Calamba can apply the knowledge with some level of confidence and achieve moderate results in terms of computing accurate tax liability. This is consistent with the study made by Paco et al. (2022), it was assessed the level of tax awareness and compliance among micro and small enterprises in Bacolod City. It found that higher educational attainment and greater tax awareness significantly predicted the extent of tax compliance, emphasizing the role of accurate tax computation in ensuring compliance. Additionally, tax literacy increases the accuracy of financial planning and budgeting, empowering entrepreneurs to make well-informed choices regarding pricing, investments, and resource allocation. This can be supported by Paco et al. (2022) who claimed that improved tax compliance was found to be substantially correlated with increased tax awareness, especially with reference to Bureau of Internal Revenue (BIR) standards. Tax compliance is crucial in order to avoid unnecessary expenditures such as tax penalties and fines which can enhance the overall financial performance.

Moreover, there is a high significant relationship with penalties and fines and financial business performance in terms of cost management and profitability, cash flow management and investment and growth decision. This implies that if micro-enterprises are knowledgeable enough, the incurrance of tax penalties and fines can be prevented which will enhance the financial business performance. According to a study made by Namusonge, et al. (2022), small and medium-sized businesses' (SMEs') tax compliance in Nairobi County, Kenya, is positively and significantly impacted by the imposition of tax fines and interest. According to the report, fines improve SMEs' financial performance by incentivizing them to adhere to tax laws. In summary, these studies collectively imply that tax compliance, which is impacted by elements like tax education and awareness, has a significant relationship on the financial performance of micro and small businesses. Enhancing tax understanding and guaranteeing compliance may help MSEs become more profitable and sustainable.

**Table 6**  
*Relationship Between Bookkeeping Practices and Financial Business Performance*

Accuracy and Completeness	rho-value	p-value	Interpretation
Cost Management Profitability	.560**	<.001	Highly Significant
Cash Flow and Management Reduction	.546**	<.001	Highly Significant
Investment and Growth Decision	.636**	<.001	Highly Significant
<b>Accessibility and Verifiability</b>			
Cost Management Profitability	.572**	<.001	Highly Significant
Cash Flow and Management Reduction	.659**	<.001	Highly Significant
Investment and Growth Decision	.708**	<.001	Highly Significant
<b>Audit Readiness and Risk Reduction</b>			
Cost Management Profitability	.637**	<.001	Highly Significant
Cash Flow and Management Reduction	.671**	<.001	Highly Significant
Investment and Growth Decision	.673**	<.001	Highly Significant

*Legend: Significant at p-value < 0.01*

Table 6 shows the association between bookkeeping practices and financial business performance. The computed r-values indicate a strong direct correlation and the resulted p-values were all less than the alpha level of 0.01. This means that there was significant relationship exists and implies that the better is the bookkeeping practices, the better is the financial business performance. Micro-enterprises can make well-informed decisions by efficiently managing cash flow, tracking spending, and monitoring income by keeping accurate and current financial records. Profitability may be raised by identifying areas where expenses can be cut, waste can be removed, and resources can be utilized thanks to this financial transparency. Furthermore, maintaining accurate records lowers the possibility of penalties and fines that could reduce earnings by guaranteeing adherence to tax laws. Businesses can increase their chances of making a profit by using precise financial data to inform strategic decisions about investment, expansion, and pricing. Essentially, sound bookkeeping forms the basis of financial stability, allowing companies to function more effectively and optimize their earnings.

Furthermore, the results show that accuracy and completeness have a high significant relationship with financial performance in terms of cost management and profitability, cash flow management and investment and

growth decision. This implies that when a micro-enterprises employ an accurate and complete bookkeeping practices, it allows them to effectively analyze business performance, objectively identify profitable areas and come up with an informed decision-making. It can be supported by the study made by Mbonga, et al. (2024), the study showed that almost 9% of the variances in financial statements can be accounted by proper bookkeeping. The study found that improved bookkeeping procedures help maintain financial stability, which allows companies to stay stable and maybe grow.

In the same fashion, the results revealed that accessibility and verifiability have a high significant relationship with financial performance in terms of cost management and profitability, cash flow management and investment and growth decision. This means that with accessible document practices into place, internal procedures can be streamlined, and the legal consequences of non-compliance can be reduced. As a result, expenses are reduced and resources are allocated more effectively. This will also increase the confidence of micro-enterprises to be ready in any potential audit from the BIR. Based on the study made by Lawton (2023), businesses should aim to have verified and conveniently accessible documentation in addition to accurate and thorough documentation. Being accessible is not just the right thing to do, but it's also a smart business decision. Businesses place a high importance on compliance. How easy it is for people of all abilities to access the internet, mobile devices, and web products is referred to as accessibility when discussing web information and documents. But accessible structures can also attract more potential customers to a business. Moreover, the results showed that audit readiness and risk reduction have a high significant relationship with financial performance in terms of cost management and profitability, cash flow management and investment and growth decision. This infers that the risk of financial misstatement can be reduced to an acceptable level and that internal controls can be strengthened.

With this in mind, Mohamed et al. (2024) claimed that SMEs that are required to conduct internal audits can increase their tax compliance in a number of ways, including by improving internal control, raising tax awareness, improving financial record accuracy, and gaining more credibility with tax authorities. Mandatory audits for SMEs could have disadvantages, though. For SMEs with low resources in particular, these audits can be expensive and time-consuming. They can also add to the administrative load on tax authorities, especially in jurisdictions with limited capacity and resources.

In order to provide the micro-enterprises with an enhanced tax knowledge for tax compliance, the researcher proposed the following improved tax compliance framework.

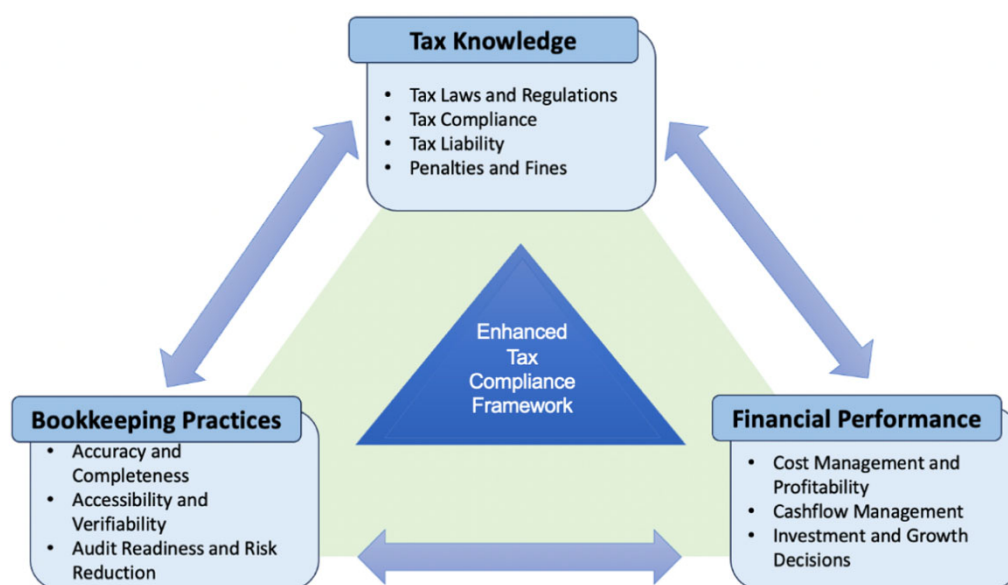


Fig 1. Enhanced Tax Compliance Framework



Enhanced tax compliance framework is vital to the long-term goals and prosperity of economies and enterprises. The framework shall provide with a clear-cut guideline, reduces complexity and ultimately ensures that the taxpayers understand their obligations. Moreover, this improved tax compliance framework focuses on increasing the tax knowledge among the taxpayers. It is essential to enhance the knowledge of people about taxes at the time of business registration in order to foster a culture of compliance, avoid expensive errors, and guarantee long-term success. With this, it promotes early compliance while avoiding potential penalties and fines. Also, this boosts confidence of the micro-enterprise owners as they gain clarity on tax systems for better planning. In addition to this, the framework also encourages proper bookkeeping practices among the micro-enterprises as tax education highlights the importance of accurate and complete bookkeeping practices and enhances the readiness for potential audit.

To sum up, enhanced tax knowledge promotes proper and timely compliance and prevents penalties and fines from being incurred. Accurate bookkeeping enhances the confidence of declaring the right amount of income and expenses preventing the over or under declaration of income and expenses and by extent over or under payment of taxes. Micro-enterprises can monitor their costs and profit based from an informed judgment. It also increases credibility of the micro-enterprises leading to more investment opportunities to investors, banks and partners. Needless to say, the framework may also be utilized by the government to ensure compliance among taxpayers causing a higher rate of tax collection. It increases confidence in the tax system, lowers tax evasion, and contributes to the development of a more just society where the tax burden is equitably divided.

#### **4. Conclusions and recommendations**

In light of the results of the study, the following conclusions were drawn: When micro-enterprises are equipped with tax knowledge in tax laws and regulations, they yield accurate computation of tax liabilities and promotes timely compliance to prevent tax penalties and fines. Micro-enterprises often apply bookkeeping practices accurately and completely ensuring documents are readily available for possible tax audits. When micro-enterprises comply to tax in a timely manner, it will have an effect to the overall profitability of the enterprise as costs can be minimized from preventing penalties and fines from incurring. That with the given results, tax knowledge and financial performance pose a highly significant relationship which implies that a thorough understanding to tax laws and regulations and a better bookkeeping practice, the better is the financial business performance. That as a result of the study, an improved tax compliance framework is proposed to undertake new capabilities to an existing tax framework which will enhance the tax compliance framework as this will increase the confidence of micro-enterprises in tax compliance which eventually will have an effect on the overall financial performance of the micro-enterprise.

Based on the afore-cited results and conclusions of the study, the following recommendations are proposed to improve the tax compliance framework among the micro-enterprises in the City of Calamba, Laguna. Micro-enterprise may be equipped with an improved tax knowledge through seminars and trainings prior the issuance of the certificate of registration. Micro-enterprise may maintain a well-designed bookkeeping practices with consideration to accuracy and completeness as this is vital in the preparation of a reliable financial statements and to readily available for possible tax audits. The overall financial performance of micro-enterprises may be improved through a thorough understanding to tax laws and regulations and by employing a well-design bookkeeping practice. That an improved tax compliance framework may be undertaken to enhance the current implementation as this may enhance the tax knowledge of micro-enterprises in terms of tax laws and regulations promoting timely tax compliance and preventing penalties and fines. Future researches may undertake to study to other revenue districts or nationwide locale. This research may serve as a guide or reference when they expand their study to additional revenue districts or on a national level, given that it focuses on enhancing tax understanding, bookkeeping methods, and their impact on financial performance.

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## Business continuity management and organizational resilience among small and medium enterprises

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### Abstract

Business operations can be disrupted by a wide range of unforeseen events and such disruptions can vary in scale and impact, ranging from minor inconveniences to severe crises that threaten the very existence of a business. This study assessed the Business Continuity Management (BCM) and the Organizational Resilience of Small and Medium Enterprises in Batangas City which examined the proactive risk management, continuity planning, and adaptive strategies that enable them to withstand and overcome challenges. The study also described the firmographic profile of SMEs in terms of the nature of business, size, and years of operation, assessed Business Continuity Management as to risk management, crisis management, and disaster recovery, evaluated Organizational Resilience in terms of Operational Resilience, Strategic Resilience and Cultural Resilience, tested the significant differences on the responses when grouped according to profile, tested the significant relationships between business continuity management and Organizational Resilience and proposed action plan that Small-Medium Enterprise owners can implement to ensure the continuity of business. The study utilized descriptive research design. The study revealed that respondents moderately agree with regards to preparedness of Business Continuity Management (BCM) in terms of risk management, crisis management, and disaster recovery. For Organizational Resilience the respondents demonstrated strong agreement as to Operational Resilience, Strategic Resilience and Cultural Resilience. There were significant differences in terms of Business Continuity Management on the responses when grouped according to profile; However, in terms of Organizational Resilience, most of the variable were significant but not with Operational and Cultural aspects of Industry and operational under the profile years of operation. There is significant relationship between business continuity management and organizational resilience and that more prepare the business continuity management is, the better their organizational resilience is. Finally, an action plan was developed for Small and Medium Enterprise owners that can be used to ensure the continuity of business.

**Keywords:** Business Continuity Management (BCM), organizational resilience, risk management, crisis management, disaster recovery, operational resilience, strategic resilience, cultural resilience

## **Business continuity management and organizational resilience among small and medium enterprises**

### **1. Introduction**

Unexpected events can disrupt business operations. Disruptions can vary in scale and impact, ranging from minor inconveniences to severe crises that threaten a business's very existence. Business Continuity Management (BCM) was created to prevent or lessen risks, lessen the effects of emergencies or disasters, and shorten the time it takes to return things to normal. A framework for enhancing organizational resilience is offered by business continuity management. It is a comprehensive approach that detects possible risks to a company and its operations (Anir et. al., 2019). BCM has been incorporated into various crisis-resolution ideas. It is related to ideas like catastrophe recovery, crisis management, and risk management. By addressing risks through actions and suitable measures, BCM is related to risk management. Through the incident management component, BCM and crisis management are very closely related. Crisis operation is allowed to reply to both palpable and impalpable events, like mishaps that damage a company's character or fiscal performance. also, disaster recovery is a subset of business durability operation since it's principally a plan with the structure to support it that's enforced in the event of a disaster (Supriadi, & Pheng, 2018).

The Philippines is ranked as the ninth most disaster-prone nation in the 2019 World Risk Report, which bases this ranking on the country's vulnerability to natural catastrophes, its ability to adapt to them, and its ability to cope with them. Additionally, according to the 2015 poll, the top three effects of catastrophes on businesses were damage to premises and equipment, the inability of the company to deliver to consumers, and the incapacity of staff to report to work. Without basic information on business continuity management, risks connected with disaster strikes are quite high, and owing to limited resources Small and Medium Enterprises (SMEs) might be particularly vulnerable to business disruptions.

Looking at the situation deeper, the researcher believed that organizational resilience is the adaptive capacity of an organization, to recover, and grow in the face of uncertainties, crises, or unexpected challenges. In the 21<sup>st</sup> century, where uncertainty and rapid change are the standard, resilience is no longer optional, instead, it is a critical capability for organizations to survive, thrive, and achieve their long-term goals. In addition to being able to endure shocks, resilience enables businesses to use crises as a chance for innovation and expansion. To elaborate, operational resilience refers to an organization's capacity to continue providing value and doing essential tasks even in times of disaster. It involves ensuring that day-to-day operations can continue smoothly, despite disruptions. Operational resilience requires organizations to have the ability to reallocate resources such as finance, technology, or personnel to address immediate challenges. It also requires proactive identification and mitigation of risks to minimize disruptions and having backup plans and systems ensure critical operations can push through during a crisis. On the other hand, the researcher also believed that the organizations here in the Philippines must have strategic resilience that is more on maintaining strategic consistency while being flexible to adapt to changing circumstances. For example, during economic downturns, strategic resilient organizations might pivot their business models, explore new markets, or invest in innovations to stay competitive. The researcher believed that business leaders can anticipate changes, make informed decisions, and guide the organization through uncertainty. There should be preparation for multiple future scenarios and having strategies in place to respond effectively and of course embracing change and using crises as opportunities to innovate and grow.

Furthermore, small and medium enterprises (SMEs) often lack the financial, technological, and human resources that larger organizations must recover from crises. Events like economic downturns, natural disasters, cyberattacks, or even pandemics can have devastating effects on SMEs, leading to business closures and job losses. Understanding how business continuity management and organizational resilience can help SMEs

navigate these challenges is crucial for their survival and growth. While business continuity management is well-documented in large companies in most cases, its application and effectiveness in SMEs remain under-researched. SMEs often face unique challenges in implementing BCM, such as limited budgets, lack of expertise, and competing priorities. This study sheds light and aims to address the gap by investigating the Business Continuity Management and Organizational resilience of Small and Medium Enterprises in Batangas City. Business owners will be able to assess their perceived organizational resilience and the preparation for any business disruption through Business Continuity Management.

**Objectives of the Study** - This study assessed Business Continuity Management (BCM) and the Organizational Resilience of Small and Medium Enterprises to examine proactive risk management, continuity planning, and adaptive strategies that enable them to withstand and overcome challenges. Specifically, it sought to describe the firmographic profile of SMEs in terms of the nature of business, size, and years of operation. Assess Business Continuity Management as to risk management, crisis management, and disaster recovery; evaluate Organizational Resilience in terms of Operational Resilience, Strategic Resilience, and Cultural Resilience; test the significant differences in the responses when grouped according to profile; test the significant relationships between business continuity management and Organizational Resilience; and propose an action plan that Small-Medium Enterprise owners can implement to guarantee the steadiness of business.

## 2. Methods

**Research Design** - To evaluate the organizational resilience and business continuity management of small and medium-sized businesses, the researchers employed a descriptive research approach. The goal of descriptive study design is to gather data methodically to characterize a population, circumstance, or phenomenon. More precisely, it aids in addressing the research problem's what, when, where, and how inquiries as opposed to its why. The researcher found it suitable to assess the relevance of Business Continuity Management (BCM) and Organizational Resilience for the continuity of business.

**Participants of the Study** - The respondents of this study are the owners or the top management of Small and Medium Enterprises in Batangas City. They are chosen as they are responsible for the decision-making process of the business. The total list of population was provided by the Business Permit and Licensing Office of Batangas City. The researcher used Raosoft Calculator to determine the total number of respondents.

**Data Gathering Instruments** - A survey questionnaire was used by the researcher in data gathering. Questions were adapted from "BCM Questionnaires 10: Crisis Management" Goh (2021) and other studies related to BCM and Organizational Resilience. It was validated by experts in the field and was subjected to preliminary testing. The questionnaire has three (3) parts. Part 1 describes the firmographic profile of the respondents of SMEs in terms of the nature of the business, size, and years of operation. Part 2 consists of (3) components of Business Continuity Management which are, Risk Management, Crisis Management, and Disaster Recovery. Part 3 consists of the Organizational Resilience of SMEs in terms of Capital Resilience, Strategic Resilience, and Cultural Resilience. The items in the questionnaire were given corresponding weights of 1 to 4. Equivalent verbal descriptions are also provided. The following scoring system was used. The scale of 4 with the range of 3.50 to 4.00 has a verbal interpretation of Strongly Agree. While a scale of 3 with a range of 2.50 to 3.49 has a verbal interpretation of Agree. And a scale of 2 with a range of 1.50 to 2.49 has a verbal interpretation of Disagree. And lastly, a scale of 1 with a range of 1.00 to 1.49 has a verbal interpretation of Strongly Disagree. The reliability test used the Cronbach Alpha with Acceptable results for all the domains. Risk Management has 0.704 with acceptable remarks, Crisis Management has 0.800 with good remarks, Disaster Recovery has 0.846 with good remarks, Robustness has 0.847 with good remarks, Agility with 0.854 with good remarks and Adaptability has 0.916 with excellent remarks.

**Data Gathering Procedure** - After submitting the proposal for feedback and receiving final approval from the thesis adviser, the researcher proceeded to adapt the questionnaire. The validation of the instrument was

carried out with the guidance of the research adviser and a university statistician. To identify potential respondents, the researcher obtained a list of registered SMEs from the City’s Business Permit and Licensing Office. Data collection was then conducted by distributing a Google Form through email and the Facebook pages of SME owners. In addition, printed versions of the questionnaire were given to SME owners and managers who lacked online access. The collected survey responses were then compiled and forwarded to the university statistician for statistical analysis.

**Data Analysis** - Simple descriptive statistics such as weighted mean, frequency, and percentage were utilized to describe if there is a significant difference in the research variables when grouped according to firmographic profile. Shapiro-Wilk test of normality was employed to identify whether a parametric test or non-parametric test would be used. If it is Parametric, Pearson r was used, and if it is not Spearman rho.

**Ethical Considerations** - The study followed ethical procedures by providing participants with a consent form as an indication of their agreement to take part in the research. To maintain the study’s validity, certain details about participant involvement were kept confidential until the research was completed. Participants were also informed that they could withdraw from the study at any time without explanation, penalty, or negative consequences. Data privacy was prioritized to ensure participants were fully aware of the research process, and all personal information collected from respondents was kept strictly confidential and not shared outside the research team. Furthermore, the researcher ensured that all measurement tools used in the study were publicly available, and, when necessary, permission from the original authors would be obtained. Lastly, proper citations were used throughout the study to avoid plagiarism.

### 3. Results and discussion

**Table 1**  
*Firmographic Profile of the Respondents*

	f	%
Industry		
Merchandising	162	45.9
Service	191	54.1
Size of the Business		
Small	182	51.6
Medium	171	48.4
Years of Operation		
0 – 30 years	187	53.0
31 – 40 years	43	12.2
41 years and above	123	34.8

Table 1 indicates the frequency and percentage of the respondents’ firmographic profiles. As to industry 162 are merchandising and 191 are service with 45.9 % and 54.1 % of the total sample respectively. As to the size of the business, 182 are small and 171 are medium with 51.6 % and 48.4 % of the total sample respectively. As to the years of operation 187 are in 0-30 years, 43 are 31 - 40 and 123 are 41 years and above with 53.0 %, 12.2 %, and 34.8% respectively. The service industry included in this research includes salons, restaurants, manpower services, agencies, etc. The service sector of SMEs has been identified as a driving force behind the shift towards smaller organizational structures, contributing to the increasing share of SMEs in total employment and income (Kamarudin, 2024). The merchandising industry included retail from small to medium enterprises. Merchandising, which involves the promotion and sale of products to consumers, is likely a critical function for SMEs, particularly those in the retail sector, as it can influence consumer demand and sales performance (Mulaudzi et. al., 2021). Small and medium-sized enterprises (SMEs) are essential to economic development, often constituting most businesses and serving as significant employment sources. SMEs are typically categorized based on the number of employees, with small enterprises having 10-49 employees and medium enterprises having 50-249 employees (Henschel & Heinze, 2018). Entrepreneurial ventures and startups, particularly those under 30 years of age, are critical for economic growth innovation. However, they face significant challenges, with high failure rates reported within the first few years of operation (Perry et. al., 2018).

Factors including management practices, family involvement, cultural values, and the ability to adapt to change are identified as critical for the longevity of businesses that have matured beyond 31 years. These findings underscore the complexity of business survival and the need for a holistic approach to understanding the determinants of long-term success (Riviezzo et. al., 2022).

**Table 2**

*Summary Table for Business Continuity Management*

	Mean	Interpretation	Rank
Risk Management	3.53	Strongly Agree	1
Crisis Management	3.52	Strongly Agree	2
Disaster Recovery	3.39	Agree	3
<b>Overall</b>	<b>3.48</b>	<b>Agree</b>	

Legend: 1.00 – 1.49 Strongly Disagree, 1.50 – 2.49 Disagree, 2.50 – 3.49 Agree, 3.50 – 4.00 Strongly Agree

Table 2 summarizes the assessment of Business Continuity Management of business owners and managers in terms of risk management, crisis management, and disaster recovery. Based on the result, the composite means of 3.48 presented that the business owners and managers have agreed to Business Continuity Management among the three indicators in general. In terms of the three indicators, respondents strongly agreed to risk management (3.53), crisis management (3.52), and disaster recovery (3.39). Risk Management ranks highest on the ranking as it is the proactive approach of Business Continuity Management. Risk management provides a structured approach to identifying, assessing, and mitigating risks that could disrupt business operations (Mošková & Buganová, 2023). Second, on the ranking is the Crisis Management which some of the respondents, especially those start-ups in the early years haven't experienced yet as there is no crisis yet. Crisis management involves the immediate response and management of a disruptive event to mitigate its impact on an organization's operations (Mishra et. al., 2018). Last on the ranking is the disaster recovery which involves the planning after the crisis and mostly about IT-related processes such as IT Disaster Recovery Planning (IT DRP) which focuses on the recovery and restoration of IT systems and infrastructure post-disruption (Kesa, 2023).

**Table 3**

*Summary Table for Organizational Resilience*

	Mean	Interpretation	Rank
Operational Resilience	3.64	Strongly Agree	1
Strategic Resilience	3.51	Strongly Agree	3
Cultural Resilience	3.53	Strongly Agree	2
<b>Overall</b>	<b>3.56</b>	<b>Strongly Agree</b>	

Legend: 1.00 – 1.49 Strongly Disagree, 1.50 – 2.49 Disagree, 2.50 – 3.49 Agree, 3.50 – 4.00 Strongly Agree

Table 3 summarizes the assessment of the organizational resilience of business owners and managers in terms of operational resilience, strategic resilience, and cultural resilience. Based on the result, the composite mean of 3.56 presented that the business owners and managers have strongly agreed on organizational resilience among the three indicators in general. In terms of the three indicators, respondents strongly agreed with operational resilience (3.64), strategic resilience (3.51), and cultural resilience (3.53) with a very small difference respectively. Operational resilience got the highest ranking as it has to do with the operation where the industries become profitable. By ensuring that the operation is robust, the industry may then focus on other factors such as strategic and cultural resilience. Hefner and Lawrence, (2022) differentiate that while operational resilience is crucial for immediate response to disruptions, strategic resilience is necessary for long-term adaptability. On the other hand, cultural resilience underpins both, providing the necessary mindset and behaviors for an organization to navigate through crises and evolve. Each form of resilience plays a distinct role, and together they contribute to an organization's overall resilience capacity. Therefore, it is not a matter of prioritizing one over the others but rather understanding how they interact and support each other (Deep, 2023).

**Table 4***Differences in Business Continuity Management When Compared According to Profile*

	t/F	p-value	Interpretation
<b>Industry</b>			
Risk Management	-3.722	.000	Significant
Crisis Management	-2.357	.019	Significant
Disaster Recovery	-2.247	.025	Significant
Overall BCM	-2.966	.003	Significant
<b>Size</b>			
Risk Management	-12.996	.000	Significant
Crisis Management	-13.288	.000	Significant
Disaster Recovery	-15.934	.000	Significant
Overall BCM	-15.857	.000	Significant
<b>Years of Operation</b>			
Risk Management	15.249	.000	Significant
Crisis Management	17.568	.000	Significant
Disaster Recovery	15.174	.000	Significant
Overall BCM	18.603	.000	Significant

Legend: Difference is significant at 0.05 alpha level

Table 4 compares business continuity management answers when they are classified by profile. The calculated p-values are all smaller than the alpha threshold, indicating that there was a significant difference when grouped according to industry, size, and years of operation.

The industry is significant with BCM (.003) and its domains, risk management (0.000), crisis management (0.019), and disaster recovery (0.025). Both industries of service and merchandising were susceptible to business disruptions which indicate the need to establish Business Continuity Management according to specific organizational needs. The impact of disruptions is not uniform across all service industries or types of disruptions. For instance, the study of Khlystova et. al., (2022) reveals that while some sectors within the creative industries suffered due to the COVID-19 pandemic, others, like IT and software, found positive implications. Moreover, the relationship between service disruptions and service quality in the airline industry is moderated by firm size and business strategy, indicating that not all service firms are equally affected. For the Merchandising industries, Wairimu et. al., (2022) highlight the vulnerability of the retail sector to disruptions, which can lead to insolvency and liquidation for some firms. The study also finds a significant relationship between supply chain (SC) agility capability and resilience in the retail sector, suggesting that dynamic SC agility practices can enhance a firm's ability to withstand disruptions.

Size is highly significant with BCM (.003) and its domains, risk management (0.000), crisis management (0.000), and disaster recovery (0.000). This result is supported by the study of Vanichchinchai (2022) which covers research on automotive parts manufacturers in Thailand and shows that industry-specific factors such as firm size, international level, and export level have significant positive impacts on overall BCM and its components. Interestingly, while BCM is traditionally associated with larger organizations, the dynamic nature of the global business environment and the reliance on information systems have made BCM equally relevant for start-ups. Start-ups, with their limited resources, may find implementing BCM challenging, yet the potential impact of disruptions on their operations and the increasing customer expectations for service availability underscore the necessity of BCM (Turulja & Bajgorić, 2022).

Years of operation are highly significant with BCM (.000) and its domains, risk management (0.000), crisis management (0.000), and disaster recovery (0.000). (Interpretation) This result is supported by the study of Păunescu & Argatu (2020) indicates that mature organizations often have established BCM strategies, which are essential for maintaining essential business operations during crises. Further explained by Anir et. al., (2019). These strategies are not only about having plans in place but also about embedding BCM into the organizational culture and structure, such as through enterprise architecture. Start-up businesses are increasingly recognizing the importance of Business Continuity Management (BCM) as a critical component for sustaining operations during and after disruptive events (Marisa & Oigo, 2018). BCM encompasses strategies and processes to ensure



that essential functions can continue throughout and after a crisis (Mishra et. al., 2018).

**Table 5**

*Differences in Organizational Resilience When Compared According to Profile*

	t/F	p-value	Interpretation
<b>Industry</b>			
Operational	-1.459	.145	Not Significant
Strategic	-2.950	.003	Significant
Cultural	-1.416	.158	Not Significant
Overall Organizational Resilience	-2.447	.015	Significant
<b>Size</b>			
Operational	-2.868	.004	Significant
Strategic	-8.386	.000	Significant
Cultural	-6.745	.000	Significant
Overall Organizational Resilience	-7.936	.000	Significant
<b>Years of Operation</b>			
Operational	2.254	.107	Not Significant
Strategic	9.412	.000	Significant
Cultural	7.708	.001	Significant
Overall Organizational Resilience	5.814	.003	Significant

Legend: Difference is significant at 0.05 alpha level

Table 5 compares organization resilience answers when they are classified by profile. The calculated p-values are all smaller than the alpha threshold, indicating that there was a significant difference when grouped according to industry, size, and years of operation. Industry is significant with OR (.015) and its domain, strategic (0.003). Merchandising and service industries of Small and Medium Enterprises influenced perceived organizational resilience in different ways. This result is supported by the study of Ahmić (2022) which mentioned that organizational resilience is a multifaceted concept that plays a crucial role in the service and merchandising industry, particularly in terms of strategic planning and management. The literature suggests that resilience in these industries involves anticipation, coping, and adaptation to disruptions, which are essential for maintaining competitive advantage and ensuring business continuity. Furthermore, the study of Rodonaia et. al., (2018) highlights the significant impact of intellectual capital on strategic agility and organizational excellence in the service sector, suggesting that strategic agility mediates the relationship between intellectual capital and organizational excellence. Similarly, Shukor et. al., (2020) identifies a positive impact of supply chain integrations on a firm's supply chain agility and organizational flexibility in the service industry. These findings imply that strategy with agility is an important component of organizational resilience, enabling firms to adapt and excel in dynamic service environments.

Size is highly significant with OR (0.000) and its domains, operational (0.000), strategic (0.000), and cultural (0.000). (Interpretation) This result is supported by the study of Ahmić (2022) which identifies that strategic sustainability orientation significantly influences organizational resilience and its sub-components, including agility, with the influence varying by firm size. Small firms showed a significantly different impact compared to large and medium-sized firms. Similarly, Koçyiğit & Akkaya (2020) found a positive impact of organizational structure flexibility on organizational agility across small, medium, and large enterprises, suggesting that flexibility contributes to agility irrespective of firm size.

Years of operation are significant with OR (.003) and its domains, strategic (0.000), and cultural (0.001). Perceived Organizational resilience is significantly influenced by how start-ups and mature businesses respond with agility to face challenges. The study of Sincorá et. al., (2023) states that both start-up and mature businesses contribute to organizational resilience, but they do so through different mechanisms.

Table 6 shows the relationship between BCM and OR. The estimated rho-values showed a strong direct connection, and the resulting p-values were lower than the alpha threshold of 0.01. This indicates a considerable relationship between BCM and OR, and that the more prepared the business continuity management is, the better their organizational resilience is.

**Table 6***Relationship of Business Continuity Management to Organizational Resilience*

	rx <sub>y</sub>	p-value	Interpretation
<b>Risk Management</b>			
Operational	.491**	.000	Significant
Strategic	.455**	.000	Significant
Cultural	.265**	.000	Significant
Overall Organizational Resilience	.497**	.000	Significant
<b>Crisis Management</b>			
Operational	.480**	.000	Significant
Strategic	.372**	.000	Significant
Cultural	.192**	.000	Significant
Overall Organizational Resilience	.423**	.000	Significant
<b>Disaster Recovery</b>			
Operational	.519**	.000	Significant
Strategic	.524**	.000	Significant
Cultural	.271**	.000	Significant
Overall Organizational Resilience	.539**	.000	Significant

Legend: Relationship is significant at 0.05 alpha level

Organizational resilience and business continuity management (BCM) have a complex and mutually beneficial interaction. BCM is a comprehensive framework that covers operational, financial, strategic, technological, supply chain, and human resources to guarantee that businesses continue to perform critical tasks in the face of disruptive events. This helps to increase organizational resilience. BCM plays a crucial role in boosting organizational resilience by offering an organized method for identifying potential threats and their effects, as well as by assisting an organization in responding to and recovering from disruptions. Effective leadership, communication, innovation, and continuous improvement are further factors that contribute to organizational resilience and are essential for maintaining resilience in turbulent times (Rouca & Figueiredo, 2024). The combination of BCM with Cyber Threat Intelligence further enhances this resilience, particularly in the context of cyber threats (Hytönen et. al., 2023). However, the implementation of BCM in SMEs remains a challenge, indicating an area for further development and support (Kaufhold et. al., 2018). Additionally, the relationship between organizational resilience and crisis management is highlighted, with resilience affecting the pre- and post-crisis periods and crisis management impacting adaptive resilience (Pekdemir & Küçükaltan, 2024).

#### 4. Conclusion and recommendations

Based on the findings of the study, the following conclusions were drawn:

- Majority of the firms belong to the service industry, small enterprises and operating for 30 years.
- The respondents agreed with regards Business Continuity Management as to risk management, crisis management, and disaster recovery. Although there is room to improve on documentation of plans such as BCP, CMP, and RTO for some of the Small and Medium Enterprises in Batangas City primarily in the service and merchandising industry.
- The respondents demonstrated strong agreement in Organizational Resilience in terms of Operational Resilience, Strategic Resilience, and Cultural Resilience.
- Significant differences were observed in Business Continuity Management responses when grouped by profile. However, regarding Organizational Resilience, most variables showed significant differences except for the Operational and Cultural aspects related to Industry, as well as the Operational aspect under the profile of years of operation.
- There is a significant correlation between business continuity management and organizational resilience, indicating that the greater the preparedness in business continuity management, the stronger

the organizational resilience becomes.

- An action plan was developed for Small-Medium Enterprise owners to implement and ensure the continuity of business.

The following recommendations are forwarded as an offshoot of the conclusions drawn.

- Service and Merchandising industries may review and validate the outlined action plan provided in the study for proper implementation.
- Businesses may enhance their understanding and implementation of Business Continuity Management (BCM) and organizational resilience through BCM training and profound education.
- Future researchers may compare resilience and BCM practices across different industries, organizational sizes, geographic regions, and cultural contexts. Identify similarities, differences, and contextual factors that influence resilience outcomes, allowing for more nuanced and contextually relevant recommendations.
- Future researchers may also delve deeper by focusing on specific segments such as risk assessment for specific lines of business, documentation of plans, updates, and implementation strategies.

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## Work engagement, stress, and coping strategies among police officers

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### **Abstract**

This study investigated the levels of work engagement, sources of stress, and coping strategies employed by Philippine National Police (PNP) officers and examined the relationships among these factors. To gain a deeper understanding of the experiences of police officers in the Philippines, this paper was designed to explore their levels of work engagement, sources of stress, and the coping strategies they employed. Only 363 signified their willingness to answer all the provided questionnaires where stratified random sampling technique was used to ensure that the sample reflects the diversity of the police population in terms of rank, unit, and location. Results revealed that Police officers in the Philippines are predominantly male, middle-aged, married workforce with high educational attainment and varying income levels. Respondents have low level of work engagement, high level of stress, and employ religion as their coping mechanism likely suggest a critical concern for enhancing their performance and well-being. Work engagement varies significantly among police officers when analyzed by age, rank, civil status, years of service in the Philippine National Police (PNP), and monthly income with significant differences in coping strategies based on age, rank, years in service, and monthly income in which these results illustrate the complex interplay between demographic factors and psychological outcomes among police officers. Based on the result, PNP officials may enhance its likelihood of success in improving work engagement and reducing stress among police officers where a thoughtful approach to program design proposed by the researcher will not only support officer well-being but also contribute to a healthier organizational culture within law enforcement agencies.

**Keywords:** work engagement, stress, coping strategies, police officers, psychological well-being

## Work engagement, stress, and coping strategies among police officers

### 1. Introduction

Police officers play a critical role in maintaining public safety and order. However, the nature of their work exposes them to a wide range of stressors, including exposure to violence and trauma, long and irregular work hours, and the constant threat of danger. These stressors can have a detrimental impact on officers' physical and mental health, leading to burnout, post-traumatic stress disorder (PTSD), and other stress-related disorders. Furthermore, stress can negatively affect work engagement, which is characterized by vigor, dedication, and absorption in one's work. Work engagement is essential for police officers, as it can enhance job performance, job satisfaction, and organizational commitment. Policing is a challenging profession that exposes officers to numerous stressors, which can have a significant impact on their work engagement, mental health, and overall well-being. Understanding the unique stressors police officers face, the consequences of stress, and their various coping strategies is crucial for developing effective interventions to enhance their well-being and job performance. As such, it is in this context that the researcher who is a Police officer was motivated to conduct this study. Her motivation to study work engagement, police stress, and coping strategies stems from a deep understanding of their inter-connectedness and potential impact on both individual well-being and overall law enforcement effectiveness.

Work engagement is a positive, fulfilling work-related state of mind characterized by a high level of energy or vigor, dedication, and absorption in one's work. This can help officers cope with the demanding nature of their profession. It is crucial for police officers as it can enhance their job performance, job satisfaction, and organizational commitment. Recent studies have highlighted the importance of understanding work engagement among police officers, as it is a crucial factor in maintaining their well-being and job performance. Violanti et al. (2019) examined the impact of organizational and operational stress on the work engagement of police officers. The study found that officers who successfully handled organizational and operational stress experienced greater work engagement, emphasizing the value of building coping strategies to support their well-being and job effectiveness.

Recent studies have highlighted a concerning rise in work stress and anxiety among law enforcement officers, leading to inadequate psychological wellness, non-adaptive coping techniques, and self-destructive behaviors. This surge in occupational stress research within the police force underscores the critical need to address the mental and physical well-being of officers to ensure optimal performance and overall health. Studies conducted by Violanti et al. (2019) and Wasserman et al. (2019) have delved into the sources of distress experienced by law enforcement officers and the detrimental effects on their work efficiency and health. These investigations emphasize the pressing nature of understanding and mitigating work-related stress among police officers to prevent psychological strain, fatigue, and diminished performance. Ermasova et al. (2020) explored the relationship between distress and emotional well-being in law enforcement officers, shedding light on the profound impact of occupational stress on their mental health. In the context of modern-day policing, where officers face challenges like political pressure, physical violence, and resource constraints, the need for effective coping strategies and support mechanisms is paramount. Recognizing stress indicators and using effective coping strategies are essential for preserving police officers' psychological resilience and commitment to their work. By addressing these issues, police departments can enhance the well-being of their personnel and improve overall job performance in the face of demanding and stressful work environments.

Studying the work engagement, stress, and coping strategies of police officers is vital for understanding their unique challenges and improving their overall well-being. This research has significant implications for enhancing job performance, retention rates, community relations, leadership practices, and public safety. The researcher as she pursues her Master's degree in Psychology, focusing on these areas will not only contribute to

her academic growth but also have a meaningful impact on the law enforcement community. As such, this study is important for the PNP Police Officers to enhance their well-being by identifying specific stressors they face, leading to the development of targeted programs to improve work engagement and reduce stress to promote police officers' overall mental and physical health. The study can contribute to the field of psychology, specifically industrial-organizational psychology, by providing valuable insights into the unique challenges faced by law enforcement personnel. Also, this scholarly work can open doors for collaboration with the PNP, other research institutions, or government agencies, leading to further research funding and opportunities.

**Objectives of the Study** - This study investigated the levels of work engagement, sources of stress, and coping strategies employed by Philippine National Police (PNP) officers and examined the relationships among these factors. Specifically, it described the profile of the respondents in terms of their sex, age, position, civil status, number of years being a PNP officer, educational attainment, and monthly income; determined the respondents' work engagement, sources of stress, and coping strategies employed by them; tested the differences of the variables when grouped based on their profile variables; established possible relationship among the three variables and proposed a psychological intervention program that can lead to enhanced work engagement and reduce stress of police officers for their mental health and overall well-being.

## 2. Methods

**Research Design** - To gain a deeper understanding of the experiences of police officers in the Philippines, this paper was designed to explore their levels of work engagement, sources of stress, and the coping strategies they employed. The descriptive survey method was chosen as the most appropriate approach for this investigation. The descriptive survey method was selected due to its ability to collect quantitative data from a large sample of police officers efficiently and cost-effectively. This method allowed for the use of standardized and validated instruments, ensuring the reliability and comparability of the data. To capture the multifaceted nature of the officers' experiences, three main gathering tools were employed. The Utrecht Work Engagement Scale (UWES-17) was used to measure the levels of vigor, dedication, and absorption that characterize work engagement. The Police Stress Questionnaire was administered to identify the specific stressors that officers face, both in their professional and personal lives. Lastly, the Brief COPE inventory was utilized to assess the diverse coping strategies employed by the officers to manage stress, ranging from problem-focused and emotion-focused approaches to avoidance-oriented tactics.

Surveys containing the UWES-17, Police Stress Questionnaire, and Brief COPE were then administered to the selected officers. To encourage honest and open responses, the surveys were designed to maintain the anonymity and confidentiality of the participants. The data collected through these surveys provided a rich source of information for analysis. Rigorous statistical analysis was then conducted to uncover patterns, trends, and relationships within the data. These analyses sought to answer key research questions such as the levels of work engagement among officers, the primary sources of stress they encounter, and the most frequently utilized coping strategies. Furthermore, the relationships between these variables were examined to determine if higher levels of work engagement were associated with lower stress levels or if specific coping strategies were more effective than others in managing stress. The findings of this descriptive-survey study provide valuable insights into the work lives of police officers. By shedding light on their levels of engagement, stressors, and coping mechanisms, this research can inform the development of targeted interventions and support systems to enhance their well-being, job satisfaction, and overall performance. Ultimately, this knowledge can contribute to creating a healthier and more resilient police force that is better equipped to serve and protect the community.

**Participants of the Study** - The respondents in this study are PNP Police officers from Region 1 with a minimum age of 21 years old and a maximum age of 56 years old. Using the Raosoft sample size calculator with an estimated population of 10,000 police officers, a 95% confidence level, a 5% margin of error, and a 50% response distribution, the recommended sample size is 370, unfortunately, only 363 signified their willingness to answer all the provided questionnaires. A representative sample of police officers was carefully selected,

considering their diverse ranks and units to ensure the findings would be generalizable to the broader police population. From this, a stratified random sampling technique will be used to ensure that the sample reflects the diversity of the police population in terms of rank, unit, and location, and the findings can be confidently generalized to the broader police population due to the representative nature of the sample. By utilizing stratified random sampling, the study can obtain a representative sample of Philippine National Police officers in Region 1, making the findings more robust and applicable to the wider police force.

### *Measures*

**Utrecht Work Engagement Scale (UWES-17).** This is the tool to be used in measuring police officers' work engagement. In the heart of the Netherlands, a team of researchers led by Schaufeli et al. (2003) embarked on a quest to understand a phenomenon they called "work engagement." They observed that some employees seemed to thrive in their jobs, brimming with energy and enthusiasm, while others felt drained and disengaged. To measure this elusive concept, they developed the Utrecht Work Engagement Scale (UWES-17), a questionnaire that would become a cornerstone of work engagement research and a widely used, validated instrument designed to assess work engagement across various occupations, including law enforcement. It measures three key dimensions of work engagement: vigor, dedication, and absorption. The UWES-17, with its 17 carefully crafted questions, aimed to capture the essence of work engagement, a positive and fulfilling state of mind characterized by vigor, dedication, and absorption. Vigor, the first dimension, measures an individual's energy levels and resilience at work. Dedication, the second dimension, assessed their sense of meaning and pride in their work. Absorption, the final dimension, gauged the level of immersion in their work.

Today, the UWES-17 continues to be a cornerstone of work engagement research. It has helped researchers and practitioners to better understand the factors that promote or hinder work engagement, leading to the development of interventions and strategies to enhance employee well-being and performance. The questionnaire has also sparked a global conversation about the importance of creating fulfilling and meaningful work environments where employees can thrive and flourish. A study published in the "International Journal of Environmental Research and Public Health" by Kohan et al. (2023) examined work engagement and its association with mental health among Iranian police officers using the Utrecht Work Engagement Scale (UWES-17). The study revealed that police officers generally exhibited moderate levels of work engagement, with dedication being the most prominent dimension. Notably, higher levels of work engagement were significantly associated with lower levels of depression, anxiety, and stress, highlighting the crucial role of fostering work engagement in promoting the psychological well-being of police personnel. The UWES-17 typically demonstrates high internal consistency, with Cronbach's alpha values ranging from 0.80 to 0.95 for the total scale and its subscales (vigor, dedication, and absorption).

**Police Stress Questionnaire (PSQ-Op).** This is the standardized test to be used in determining Police Officers' stress. It is a valuable tool designed to assess stress among police officers. The test was developed by the Police Stress Questionnaire (PSQ-Op), developed by McCreary et al. (2013) which is a 20-item questionnaire that aims to measure stress and the most common stressors experienced by police officers. It evaluates various stressors associated with policing duties, such as shift work, working alone at night, overtime demands, risk of injury, traumatic events, managing social life, paperwork, and maintaining physical health, among others. Respondents are asked to rate the level of stress caused by each item over the past 6 months on a 7-point scale ranging from "No Stress at All" to "A Lot of Stress". The questionnaire is divided into sections that cover different aspects of stress experienced by police officers in their work environment. It provides a structured approach to assessing the impact of operational stressors on officers' well-being and job performance. The PSQ-Op is a reliable and valid measure of stressors in policing, with good internal consistency, reliability, and positive correlations with other general stress measures. The PSQ-Op is a valuable tool for researchers and organizations seeking to understand and address the stress experienced by police officers. It can help identify specific stressors that may impact officers' mental health and job satisfaction, leading to the development of targeted interventions and support programs to promote the well-being of law enforcement personnel.



A recent study published in the journal "Frontiers in Psychology" by Clemente et al. (2020) examined burnout and stress in Portuguese police officers using the Operational Police Stress Questionnaire (PSQ-Op). The study found that Portuguese police officers reported high levels of operational stress, with specific stressors like exposure to traumatic events and lack of organizational support being particularly prominent. Moreover, the study identified a significant association between operational stress and burnout, emphasizing the need for targeted interventions to mitigate stress and prevent burnout among police personnel. As to its psychometric soundness, the PSQ-Op has Cronbach's alpha values **above .90**, indicating excellent internal consistency.

**Brief COPE.** This is the standardized test that will be used to determine coping mechanisms employed by Police officers. Carver (1997) developed the Brief COPE, a concise and insightful tool designed to measure how individuals cope with stress and challenges. Carver (1997), a renowned psychologist with a deep understanding of human resilience, sought to create a tool that would capture the multifaceted nature of coping. He believed that understanding how people dealt with adversity was crucial for promoting well-being and resilience. The Brief COPE, with its 28 simple yet profound questions, delves into 14 different coping strategies. It explores both problem-focused coping, such as active coping and planning, and emotion-focused coping, such as seeking emotional support or turning to religion. It also delves into less adaptive coping mechanisms, such as denial or substance use.

A recent study conducted by Smith et al. (2021) published in the journal "Policing: An International Journal" examined the coping strategies of police officers in the United States using Carver's Brief COPE. The study found that police officers predominantly relied on problem-focused coping strategies, such as planning and active coping, while emotion-focused coping strategies like venting and positive re-framing were also utilized. Notably, the use of avoidant coping strategies, such as denial and behavioral disengagement, was associated with higher levels of psychological distress and burnout. These findings underscore the importance of promoting adaptive coping mechanisms among police officers to enhance their well-being and resilience in the face of demanding and stressful work environments. In general, the Brief COPE subscales tend to have moderate to good internal consistency, with Cronbach's alpha values typically ranging from 0.50 to 0.80.

**Data Gathering Procedure** - The research process began with a comprehensive review of existing literature on work engagement, stress, and coping mechanisms among police officers. This review helped refine the research questions and hypotheses, ensuring the study's relevance and contribution to the existing body of knowledge. In doing this study, the following was observed. First, the researcher meticulously crafted the research questions, seeking to understand the levels of work engagement, the specific stressors that weighed heavily on officers, and the effectiveness of their coping strategies. The researcher delved into the existing literature, both international and local, to gain a solid foundation for her study. Next, she chose a descriptive survey approach that allowed the researcher to gather numerical data using standardized scales to measure work engagement, stress, and coping strategies among police officers. To ensure that the study was representative of the diverse PNP workforce, she carefully selected a sample of officers from various ranks, genders, and regions. She sought ethical approval to protect the officers' confidentiality and well-being, recognizing the sensitive nature of her inquiry. Data collection was a multi-faceted endeavor. After obtaining the necessary permission to conduct the study, she distributed the surveys both online and in person, ensuring participant anonymity to encourage honest answers. Once all responses were collected, she began the data analysis process by tallying and calculating frequency counts in Microsoft Excel. The compiled data was then forwarded to her designated statistician, who performed computations and analyzed the survey results, including respondent profiles, levels of work engagement and stress, comparisons across different profiles, and correlations between the variables.

**Data Analysis** - This study employed both descriptive and inferential statistics in statistically treating the quantitative data obtained by the respondents. Descriptive statistics are used to summarize and describe the main features of a data set. They provide a snapshot of the data, allowing them to understand its central tendencies, variability, and distribution while inferential statistics are used to make inferences or draw conclusions about a population based on a sample of data. In describing the profile of the respondents, frequency, and percentage

were used, and weighted mean in determining the work engagement, stress, and coping mechanisms employed by the respondents. In testing the differences of the three variables when compared based on their profile, analysis of variance (ANOVA) was employed and Pearson-r for the correlation of the three variables.

***Ethical Consideration*** - In the pursuit of understanding the complex interplay of work engagement, stress, and coping mechanisms among police officers, the researcher recognized that ethical considerations were not merely a formality, but a moral compass guiding every step of the research journey. The researcher approached this research with a deep sense of responsibility, acknowledging the sensitive nature of the topic and the potential vulnerability of the participants. She understood that police officers often face unique stressors and challenges in their line of work, and they wanted to ensure that her research not only contributed to knowledge but also upheld the highest ethical standards. The researcher's priority was obtaining informed consent. She explained the purpose, procedures, and potential risks of the study to each officer in clear and understandable language. She emphasized that participation was entirely voluntary and that they could withdraw at any time without consequence. The researcher also highlighted the potential benefits of the research, such as contributing to a better understanding of police well-being and informing policies and practices aimed at supporting officers. Confidentiality was another cornerstone of the ethical approach. She ensured that all data collected would be anonymized and that individual responses would never be linked back to specific officers. She utilized secure data storage methods and implemented strict protocols to protect participant identities.

The researcher was mindful of the potential that her research will trigger emotional distress to her respondents for she knows that police work can involve exposure to traumatic events. Along with it, she provided resources for mental health support and ensured that officers knew they could access help if needed. The researcher also grappled with the issue of power dynamics and created a safe and non-judgmental space for officers to share their experiences honestly, assuring them that their voices mattered. Throughout the research process, she engaged in ongoing dialogue with police organizations and stakeholders. She sought their input on the research design, data collection methods, and interpretation of findings. This collaborative approach ensured that her research was relevant, respectful, and responsive to the needs of the police community. In disseminate the findings, she would be careful to avoid sensationalizing or stigmatizing police officers. She may present the results with nuance and sensitivity, emphasizing the complexities of police work and the importance of supporting officer well-being. Ultimately, the ethical considerations were not just a checklist of requirements but a reflection of her respect for the dignity and well-being of police officers. The researcher believed that conducting research ethically is not only a moral imperative but also a prerequisite for producing meaningful and impactful findings.

### **3. Results and discussion**

Table 1 presents the demographic profile of police officers in the Philippines. Based on a survey of 363 respondents, results reveal that in terms of sex distribution, there are 259 (71.3%) males and 104 (28.7%) females. Hence, a related study that supports the demographic profile of police officers in the Philippines is the study conducted by Cabila et al. (2023) which highlighted the challenges and experiences of female police officers within a predominantly male environment. The study emphasized that despite the increasing awareness of gender equality issues, women still represent a small fraction of the police workforce, comprising less than 10% of all police personnel in many regions, which aligns with the findings from the demographic profile indicating a significant male majority among police officers (Cabila et al. 2023).

The age distribution reveals that most officers are between 31 and 50 years old, with 150 respondents (41.3%) aged 31-40 and 160 (44.1%) aged 41-50, while only 45 officers (12.4%) aged 21-30 and a mere 8 (2.2%) are 51 years or older. A study conducted by Magtaan et al. (2024) in terms of the demographic and socio-cultural profiles of the Philippine National Police Members, findings showed that the age distribution of police officers and found that a significant number of respondents were aged 26 to 30 years (44.54%). This aligns with the findings that most officers fall within the age range of 31 to 50 years, indicating a trend towards a more

experienced workforce.

**Table 1**  
*Respondents Demographic Profile (n = 363)*

Profile	f	%
Sex		
Male	259	71.3
Female	104	28.7
Age		
21 – 30	45	12.4
31 - 40	150	41.3
41 - 50	160	44.1
51 and above	8	2.2
Rank		
Pat.	54	14.9
PCpl.	26	7.2
PSSg.	43	11.8
PMSg.	102	28.1
PSMS	15	4.1
PCMS	22	6.1
PEMS	10	2.8
PLT	7	1.9
PCPT	79	21.8
PMAJ	2	.6
PLTCOL	2	.6
PCOL	1	.3
Civil Status		
Single	76	20.9
Married	280	77.1
Widow/er	6	1.7
Separated	1	.3
Years in PNP		
1 – 5 years	48	13.2
6 – 10 years	39	10.7
11 – 15 years	157	43.3
16 – 20 years	78	21.5
21 – 30 years	38	10.5
30 +	3	.8
Educational Attainment		
College	314	86.5
Masteral Degree	47	12.9
Doctoral Degree	2	.6
Monthly Income		
20k – 30k	80	22.0
30k – 40k	115	31.7
40k – 50k	77	21.2
50k – 60k	48	13.2
60k-70k	17	4.7
70k – 80k	13	3.6
80k-90k	9	2.5
90 – 100k	2	.6
100k+	2	.6

Regarding rank distribution, most respondents hold ranks such as Patrolman (14.9%), Police Captain (21.8%), and Police Master Sergeant (28.1%). This result is similar to the community survey on the performance of the Philippine National Police done by Deri et al., (2020) which discusses rank distribution among police officers, noting that a majority hold lower ranks such as Patrolman and Police Corporal, similar to the findings that many respondents are Patrolmen and Police Captains. The civil status of the officers indicates that a substantial majority are married, with 280 officers (77.1%) reporting this status, while only 76 (20.9%) are single. In the study on the program implementation of community-oriented policing, it was found that a significant majority of police officers were married, mirroring the demographic profile where 77.1% of respondents reported being married (Cawaling et al., 2020).

In terms of years in service, most officers have considerable experience, with 157 respondents (43.3%) having served between 11 and 15 years, followed by those serving between 16 and 20 years (21.5%). This finding is similar to the study conducted by Magtaan et al. (2024) regarding to demographic profiles of Police Officers, it was highlighted that many police officers have served between 5 to 10 years, which complements the finding that a considerable number have served between 11 and 15 years. The educational attainment of the officers is notably high; a significant majority, 314 respondents (86.5%), hold a college degree, while 47 (12.9%) have obtained a master's degree. This finding is again similar to the result of the paper conducted by Magtaan et al. (2024) which indicated that a high percentage of police officers are college graduates, supporting the finding that a significant majority hold at least a college degree.

Finally, the survey also assessed monthly income, revealing that many officers earn between PHP 30,000 and PHP 40,000, with 115 respondents (31.7%) falling within this range. Again, similar to other profiles of the police officers, in a study that examined police personnel's demographics and their correlation with administrative offenses, it was found that most officers earn below PHP 50,000 monthly, which aligns with the finding that many officers earn between PHP 30,000 and PHP 40,000 (Magtaan et al. 2024). Overall, this demographic profile illustrates a well-educated, experienced police force that is predominantly male and married, reflecting a stable workforce within the Philippine National Police.

**Table 2**  
*Respondents Work Engagement (n = 363)*

Subscales	Mean	Std.dev.	Rank/ Interpretation
Vigor	17.97	4.80	2
Dedication	19.89	5.21	1
Absorption	14.61	4.45	3
Work Engagement	52.47 (md = 55.00)	13.35	Below Median

Legend: higher scores indicate a higher tendency

Table 2 presents the work engagement levels of police officers in the Philippines, based on a survey of 363 respondents. The table includes three key components of work engagement: **vigor**, **dedication**, and **absorption**, along with their respective mean scores, standard deviations, and overall interpretation. The mean score for **vigor** is **17.97** with a standard deviation of **4.80**, ranking it second among the three components. Vigor reflects the level of energy and mental resilience that officers feel towards their work; however, the score being below the median (55.00) indicates that while officers exhibit a reasonable level of energy, there is still room for improvement in their enthusiasm and stamina at work. In contrast, **dedication** has the highest mean score of **19.89** and a standard deviation of **5.21**, ranking it first. This component measures the sense of significance, pride, and inspiration that officers derive from their roles, suggesting that they feel a strong commitment to their duties as law enforcers and find meaning in their work. The results of this study are similar to the research conducted by Caw-it et al. (2022) that examined dedication in terms of work engagement among police officers. The study found that police officers exhibited high levels of work engagement, with dedication scoring the highest average at 4.21, indicating a very high level of commitment and pride in their roles. Lastly, **absorption**, with a mean score of **14.61** and a standard deviation of **4.45**, ranks third. This dimension assesses how deeply engaged officers are in their tasks, indicating their ability to focus fully and become engrossed in their activities. Similar to vigor, this score also falls below the median, suggesting that while officers can concentrate on their tasks, there may be distractions or challenges that prevent them from achieving full immersion in their work.

Similar to the results presented, a study by Caw-it et al. (2022) found that dedication was the strongest predictor of work engagement among police officers in Zamboanga del Sur, with a mean score of 4.21 for dedication compared to lower scores for vigor (4.07) and absorption (4.09). This aligns with the findings in Table 2, where dedication also received the highest mean score. The overall work engagement score is **52.47**, which is below the median score of **55.00**, indicating that while police officers show dedication to their roles, there are aspects of vigor and absorption that could be enhanced for better overall work engagement.

**Table 3***Respondent's Stress (n = 363)*

Variable	mean	Md	Std.dev	Interpretation
Police Stress	49.41	46.00	22.58	Above Median

Legend: higher scores indicate a higher tendency

Table 3 displays findings related to the stress levels experienced by a sample of 363 respondents, likely police officers or individuals in similar high-stress occupations. The data includes a mean stress score of 49.41, a median score of 46.00, and a standard deviation of 22.58, with an interpretation indicating that the overall stress levels are "Above Median." This analysis provides critical insights into the occupational stress faced by police officers, which is supported by various studies highlighting the prevalence and impact of stress in law enforcement. The mean stress score of 49.41 suggests that, on average, respondents experience a moderate to high level of stress. This score is significant as it reflects the central tendency of stress levels among the sample. Although a mean score above 50 would typically indicate higher stress levels, the interpretation as "above median" indicates that while not excessively high, these stress levels are notable and warrant attention. The median score of 46.00 reveals that half of the respondents report stress levels below this value and half report above it. The fact that the mean exceeds the median suggests a right-skewed distribution, indicating that some respondents experience significantly higher stress levels than others. This variability is further emphasized by the standard deviation of 22.58, which indicates considerable dispersion in stress scores among respondents. Such variability may reflect differences in individual coping mechanisms, personal circumstances, or work environments.

The finding that respondents experience above-median stress levels has several implications for mental health and occupational well-being within law enforcement. High occupational stress among police officers is associated with various mental health issues, including anxiety, depression, and burnout (Violanti et al., 2019). A study conducted on Portuguese police officers found that 85% reported high operational stress levels, with significant implications for their mental health (Cumming et al., 2020). This underscores the necessity for regular assessments of stress and burnout levels within police forces. Research shows that high stress levels negatively affect police officers' job performance. About 80% of the differences in how well officers perform their jobs are due to job stress, meaning it's very important to manage these stressors to improve their effectiveness (Van Hasselt et al., 2019). The variability in stress scores suggests a need for effective coping strategies tailored to the unique challenges faced by police officers. Studies have shown that officers who employ adaptive coping strategies tend to experience lower levels of occupational stress (Liu et al., 2019). Therefore, implementing training programs focused on resilience and coping mechanisms could help mitigate the adverse effects of stress.

From all the perspectives presented, by the researcher who is also a Police Officer, the finding that police officers experience stress levels above the median is significant and reflects a complex interplay of factors that contribute to their occupational stress. Analyzing this phenomenon reveals several key insights into the nature of police work, the psychological impact on officers, and the broader implications for law enforcement agencies. Police work inherently involves exposure to dangerous and unpredictable situations, which can lead to chronic stress. Officers frequently encounter violent incidents, domestic disputes, and traumatic events, such as witnessing death or injury (Cummings et al., 2021). According to a review published in *Frontiers in Psychology*, 85% of surveyed officers reported high operational stress levels, with 28% experiencing significant distress (Frontiers in Psychology, 2020). This indicates that a substantial portion of officers is operating under considerable psychological strain.

In summary, Table 3 highlights concerning levels of stress among police officers, with an average score indicating moderate to high-stress levels. Given the significant implications for mental health, job performance, coping strategies, organizational support, and community relations, law enforcement agencies must prioritize interventions aimed at reducing stress and enhancing officer well-being. Regular assessments and tailored support systems can help address these challenges effectively.

**Table 4***Coping Strategies Employed by the Respondents (n = 363)*

Subclass	mean	Std.dev.	Rank/ Interpretation
Active Coping	3.46	0.81	4
Planning	3.42	0.79	5
Positive Reframing	3.55	0.70	2.5
Acceptance	3.55	0.73	2.5
Humor	3.06	0.89	8
Religion	3.67	0.65	1
Emotional Support	3.32	0.79	6
Instrumental Support	3.21	0.83	7
Self Distraction	2.89	0.88	9
Denial	2.24	1.01	11
Venting	2.45	0.95	10
Substance Use	1.71	1.03	14
Behavioral Disengagement	1.87	1.05	13
Self Blame	2.03	1.05	12
Overall Coping	2.89 (md:2.86)	0.53	Above Median

Legend: A higher score indicates a higher tendency

Table 4 outlines the coping strategies employed by a sample of 363 respondents, presumably police officers, indicating their mean scores, standard deviations, and rankings for various coping sub scales. Understanding these coping strategies is crucial for assessing how police officers manage stress and challenges inherent in their roles. Below is a thorough discussion of the findings in relation to existing literature on coping strategies among police officers. Coping strategies are essential mechanisms that individuals use to manage stress and adversity. In the context of police work, which is often associated with high levels of stress, trauma, and emotional challenges, effective coping strategies can significantly impact officers' mental health and job performance. The highest-ranking coping strategy among respondents is religion with a mean of 3.67. This finding aligns with previous studies indicating that spirituality and religious beliefs can provide significant emotional support and resilience for police officers (Miller et al., 2019). Engaging in religious practices may help officers find meaning in their work and cope with the stresses associated with law enforcement. This suggests that police officers often turn to religion as a coping strategy probably for emotional support, resilience, meaning-making, and coping with trauma reflecting the unique stressors associated with their profession.

Religion provides a significant source of emotional support for police officers facing the daily stresses of their jobs. Engaging in religious practices such as prayer, attending services, or seeking guidance from spiritual leaders can help officers manage feelings of isolation and anxiety. According to research, officers who utilize religious coping mechanisms report lower levels of occupational stress and better mental health outcomes (Beehr et al., 1995; Robinson, 2019). Similarly, the nature of police work often involves exposure to traumatic events, which can lead to feelings of helplessness and despair. Religion offers a framework for meaning-making, allowing officers to interpret their experiences in a way that promotes psychological healing. This is particularly relevant for police officers who encounter critical incidents that challenge their worldview. Furthermore, religious coping strategies have been shown to mitigate the effects of trauma among police officers. Practices such as prayer or meditation can serve as forms of emotional regulation, helping officers to process their experiences and reduce symptoms of post-traumatic stress disorder (PTSD).

Ranks 2.5 are positive re-framing (mean: 3.55) and acceptance (mean: 3.55). Both positive re-framing and acceptance are adaptive coping strategies that allow officers to view stressful situations in a more positive light or to accept circumstances that cannot be changed. Research suggests that these strategies can enhance psychological well-being and reduce burnout among law enforcement personnel (Sonntag et al., 2015). Since police officers are frequently exposed to high levels of stress due to the nature of their work, which involves responding to emergencies, managing conflicts, and encountering traumatic events, many officers employ various coping strategies, among which positive re-framing allows officers to reinterpret stressful situations in a more constructive light, thereby enhancing their resilience and overall mental health.

Positive re-framing is a cognitive coping strategy that involves changing one's perspective on a stressful situation to view it in a more positive or manageable way. This technique not only helps in reducing the immediate emotional impact of stressors but also fosters long-term psychological resilience. Hence, positive reframing serves as an essential coping strategy for police officers facing significant occupational stressors. Recent studies underscore its effectiveness in promoting resilience, reducing anxiety, and improving mental health outcomes among law enforcement personnel. By prioritizing training programs that encourage the use of positive reframing and other adaptive coping strategies, police departments can foster a healthier work environment that ultimately benefits both officers and the communities they serve.

In addition to this, it resulted in this academic undertaking that acceptance is also used by police officers as one of their coping strategies. Acceptance is a vital coping strategy employed by police officers to manage the high levels of stress associated with their profession. This strategy involves acknowledging the reality of stressful situations without attempting to change them, allowing officers to regulate their emotional responses and maintain psychological well-being. In the context of law enforcement, where officers frequently encounter traumatic events and high-pressure scenarios, acceptance can serve as an effective tool for coping with occupational stress. Relative to this, acceptance helps police officers manage their emotional responses to stressors by accepting the circumstances they face, officers can reduce the emotional turmoil that often accompanies high-stress situations. A study by Cummings et al. (2021) found that acceptance was associated with lower levels of emotional distress among police officers, enabling them to respond more effectively during critical incidents. Similarly, acceptance contributes to resilience, a crucial trait for police officers facing traumatic incidents.

In terms of the lowest-ranking strategies, it was found that self-blame (mean:2.03), behavioral disengagement (mean:1.87), and substance use (mean:1.71) are not common coping mechanisms among the respondents. This finding is encouraging, as reliance on substances can lead to further complications such as addiction or deteriorating mental health (Violanti et al., 2019). This suggests that these maladaptive coping mechanisms are not prevalent among the respondents, which can have positive implications for their mental health and overall well-being. The low mean score for self-blame reflects a negative coping style that can exacerbate feelings of inadequacy or guilt among officers facing challenging situations. The low utilization of self-blame as a coping strategy among police officers can be attributed to its negative impact on mental health, the emphasis on problem-solving approaches, cultural stigma within law enforcement, supportive structures available to officers, and resilience training programs. These factors collectively contribute to a more adaptive coping framework that prioritizes mental well-being and effective stress management. As to substance use, this indicates that police officers in this study are less likely to rely on alcohol or drugs as a coping mechanism for stress. This is particularly noteworthy given the documented prevalence of substance abuse within law enforcement, where high levels of occupational stress can lead to maladaptive coping strategies (Dietrich et al., 1986; Chopko et al., 2024). The reduced reliance on substances may reflect a growing awareness among officers about the long-term consequences of such behaviors, including addiction and deteriorating mental health (Violanti et al., 2019).

In terms of behavioral disengagement, this involves withdrawing from stressors rather than actively coping with them. The low ranking suggests that officers may be more inclined to engage in their challenges rather than avoid them. This proactive approach is vital in high-stress environments like policing, where confronting issues directly can lead to better outcomes both personally and professionally (Gershon et al., 2009). As such, the overall mean score for coping strategies is reported at 2.89, which is above the median score of 2.86. This suggests that respondents generally employ a range of coping strategies effectively but may benefit from additional training or resources focused on enhancing adaptive coping mechanisms. The findings from this study highlight the diverse range of coping strategies employed by police officers, with an emphasis on adaptive methods such as religion, positive re-framing, acceptance, active coping, and planning being most prevalent. These strategies contribute positively to their ability to manage occupational stressors effectively.

**Table 5***Differences in the Respondent's Work Engagement when Compared According to the Profile (n = 363)*

Profile	u/H	p-value	Interpretation
Age			
Vigor	8.598	.035	Significant
Dedication	10.487	.015	Significant
Absorption	7.844	.049	Significant
Rank			
Vigor	20.160	.043	Significant
Dedication	25.272	.008	Significant
Civil Stat			
Vigor	8.387	.039	Significant
Years in PNP			
Dedication	13.619	.018	Significant
Monthly Income			
Dedication	16.667	.034	Significant

Legend: Difference is significant at 0.05 alpha level. NOTE: Only those profiles of the respondents with significant differences in work engagement are presented.

Table 5 depicts the difference in work engagement when compared based on respondents' profiles. The findings reveal that age, rank, and civil status have significant differences in work engagement among police officers. Specifically, the significant p-values for vigor (p-value of .035), dedication (p-value of .015), and absorption (p-value of .049) across different age groups suggest that younger officers may exhibit different levels of engagement compared to their older counterparts. This aligns with research by Bakker et al. (2019), which indicates that younger employees often have higher energy levels and a greater propensity for engagement due to their career stage and enthusiasm for their roles. The significance of age as a factor in work engagement suggests that different age groups experience and respond to work-related challenges differently. Research indicates that younger officers often exhibit higher levels of vigor and dedication compared to their older counterparts. For instance, Sheikh et al. (2024) found that younger police officers reported greater job satisfaction and lower levels of exhaustion, likely due to their enthusiasm and adaptability in early career stages. In contrast, older officers may face different life circumstances, such as increased family responsibilities or nearing retirement, which can influence their engagement levels.

Rank also plays a significant role in determining work engagement levels among police officers. Higher-ranking officers typically report greater dedication and vigor compared to lower-ranking personnel. This can be attributed to the increased responsibilities and decision-making authority associated with higher ranks, which often lead to a greater sense of purpose and fulfillment in their roles (Sonnetag et al., 2015). A study by Bakker et al. (2019) supports this notion, indicating that officers in leadership positions tend to have higher job satisfaction and engagement due to their involvement in shaping departmental policies and mentoring junior officers. Conversely, lower-ranking officers may experience feelings of stagnation or frustration due to limited opportunities for advancement, which can negatively impact their engagement levels.

On the other hand, civil status is another significant factor influencing work engagement among police officers. The data suggests that married officers may exhibit different engagement dynamics compared to single officers. Research indicates that married individuals often have more stable support systems, which can enhance their resilience against occupational stressors (Brough et al., 2004 as cited by Okan et al. (2024). A study conducted by Cummings et al. (2021) found that married police officers reported higher levels of job satisfaction and lower burnout rates, likely due to the emotional support they receive from their spouses. In contrast, single officers may face unique challenges related to work-life balance and social isolation, which can affect their overall engagement with their work.

Similarly, rank appears to influence engagement levels, with higher-ranking officers reporting greater vigor (p-value of 0.43) and dedication P-value of .0048). This may be attributed to increased responsibility and a sense of purpose associated with leadership roles (Sonnetag et al., 2015 as cited by Duran et al. (2024). Notably, civil



status also plays a role; married officers may experience different engagement dynamics compared to single officers due to varying support systems and responsibilities outside of work (Brough et al., 2004 as cited by Okan et al., 2024). Conversely, factors such as sex, years in service, educational attainment, and monthly income did not show significant differences in work engagement levels. The non-significant results regarding sex suggest that both male and female officers experience similar levels of engagement despite the challenges faced in a predominantly male-dominated field (Miller et al., 2019). Additionally, the lack of significant findings related to years of service may indicate that while experience is valuable, it does not necessarily correlate with higher engagement; rather, it may be the nature of the work environment or support systems that play a more critical role in sustaining officer engagement over time.

Overall, these findings highlight the complex interplay between demographic factors and work engagement within police forces. Understanding these dynamics is essential for developing targeted interventions aimed at enhancing officer engagement and well-being. By addressing the unique needs of different groups within the police force particularly younger officers and those in leadership positions, law enforcement agencies can foster a more engaged workforce that is better equipped to handle the demands of the police.

**Table 6**

*Differences in the Respondent's Stress when grouped according to Profile (n = 363)*

Profile	u/H	p-value	Interpretation
Sex	13165.500	.738	Not Significant
Age	2.580	.461	Not Significant
Rank	11.677	.388	Not Significant
Civil Status	1.517	.678	Not Significant
Years in PNP	6.438	.266	Not Significant
Educational Attainment	2.066	.356	Not Significant
Monthly Income	6.223	.622	Not Significant

Legend: Difference is significant at 0.05 alpha level

Table 6 illustrates the differences in stress levels among police officers when grouped according to various demographic and professional profiles, including sex, age, rank, civil status, years in the Philippine National Police (PNP), educational attainment, and monthly income. The results indicate that none of these factors showed statistically significant differences in stress levels, as reflected by the p-values obtained for each category.

For sex, the Wilcoxon rank-sum test statistic was 13165.500 with a p-value of 0.738, indicating no significant difference in stress levels between male and female officers. This finding aligns with previous studies suggesting that while there may be perceived differences in stress experiences based on gender, actual reported stress levels do not significantly differ (Violanti et al., 2019 as cited by McCarty et al., 2024). As to the age group, analysis yielded a test statistic of 2.580 and a p-value of 0.461 also indicating no significant differences in stress levels across different age groups. This result is consistent with findings from a systematic review by Kumasey et al. (2020), which suggested that age does not significantly influence perceived stress levels among police officers. The results from this analysis indicate that age may not be a determining factor in the stress experienced by police officers. The non-significant p-value of 0.461 suggests that regardless of whether officers are younger or older, their reported stress levels remain relatively consistent. This is an important finding as it challenges common assumptions that older officers, due to their experience, might handle stress differently than their younger counterparts.

In relation to rank, the result produced a test statistic of 11.677 and a p-value of 0.388, showing no significant differences in stress based on rank within the police force. This suggests that regardless of rank, officers experience similar levels of stress, which may be attributed to systemic organizational stressors that affect all ranks similarly (Shane, 2010 as cited by Khamis et al., 2023). The non-significant indicates that rank does not play a critical role in determining stress levels among police officers. This is an important observation, as it challenges the assumption that higher-ranking officers might experience less stress due to their perceived

authority and decision-making power. Instead, it suggests that all officers, regardless of their rank, are subjected to similar organizational pressures and stressors inherent in policing.

For civil status with a test statistic of 1.517 and a p-value of 0.678, it did not significantly impact stress levels among officers. This finding is noteworthy as it suggests that the support systems typically associated with marital status may not sufficiently buffer against occupational stressors faced by police personnel. The non-significant p-value obtained implies that whether an officer is married, single, or in another civil status category does not lead to meaningful differences in their reported stress levels. This challenges the common assumption that marital status inherently provides a protective factor against the stresses associated with police work. While it is often believed that being married offers emotional support and stability, the findings suggest that this support may not be adequate to mitigate the unique and intense stressors encountered in law enforcement. Research has shown that police work is characterized by high levels of occupational stress due to factors such as exposure to violence, long hours, and the emotional toll of dealing with traumatic incidents (Violanti et al., 2019).

As regards the analysis for years of service, findings yielded a test statistic of 6.438 and a p-value of 0.266, indicating no significant differences in stress levels based on tenure within the PNP. This suggests that longer service does not necessarily correlate with lower stress levels, which is supported by research indicating that chronic exposure to stressful situations can accumulate over time without leading to improved coping (McCanlies et al., 2014). Likewise, this implies that the duration of service in the police force does not lead to meaningful variations in stress levels experienced by officers. This finding challenges the assumption that increased experience and tenure would naturally result in better-coping mechanisms or reduced stress. Instead, it suggests that chronic exposure to stressful situations may accumulate over time without leading to improved resilience or coping strategies. Moreover, findings from other studies indicate that stress levels often peak during specific career stages rather than declining with experience. For instance, research has shown that police officers typically experience heightened stress during their early years as they adjust to the realities of the job, followed by a potential increase in stress again as they face burnout or disillusionment later in their careers (Violanti et al., 2019). This cyclical pattern suggests that while some officers may become more adept at managing stress over time, others may find themselves overwhelmed by cumulative experiences.

When it comes to educational attainment, the results showed a test statistic of 2.066 and a p-value of 0.356, indicating no significant differences in stress levels based on education level. This finding suggests that educational background does not play a critical role in how police officers perceive or manage their stress. This finding highlights the complexity of occupational stress in law enforcement and suggests that systemic factors play a more crucial role than individual characteristics such as education. To effectively address officer stress, law enforcement agencies should implement targeted interventions focusing on organizational support and coping strategies rather than relying solely on educational qualifications.

Finally, the monthly income analysis produced a test statistic of 6.223 and a p-value of 0.622, showing no significant differences in stress levels related to income brackets among officers. This finding emphasizes the importance of focusing on systemic organizational factors that contribute to occupational stress rather than relying solely on financial compensation to improve officer well-being. By addressing these systemic issues through targeted interventions and support systems, law enforcement agencies can create a healthier work environment for all personnel. This finding suggests that law enforcement agencies should focus on improving organizational support and addressing systemic issues rather than relying solely on financial compensation to mitigate occupational stress. By doing so, they can foster a healthier work environment for officers and enhance their overall well-being.

The overall lack of significant differences in stress levels across various profiles highlights the pervasive nature of occupational stress within law enforcement, suggesting that systemic factors may overshadow individual demographic characteristics when it comes to experiencing work-related stressors. As Bailey (2021),

organizational factors such as negative relationships with superiors and inadequate support systems are primary contributors to occupational stress among police officers, regardless of personal characteristics.

**Table 7**

*Differences in the Respondent's Coping Strategies when Compared According to the Profile (n = 363)*

Profile	u/H	p-value	Interpretation
Age			
Behavioral Disengagement	8.508	.037	Significant
Self-Blame	10.848	.013	Significant
Rank			
Active Coping	36.620	.000	Significant
Positive Reframing	28.363	.003	Significant
Acceptance	23.892	.013	Significant
Emotional Support	23.113	.017	Significant
Self-Distracton	25.523	.008	Significant
Denial	22.583	.020	Significant
Venting	25.205	.009	Significant
Substance Use	23.955	.013	Significant
Behavioral Disengagement	31.020	.001	Significant
Self-Blame	33.732	.000	Significant
Years in PNP			
Venting	11.964	.035	Significant
Substance Use	15.622	.008	Significant
Behavioral Disengagement	13.858	.017	Significant
Self-Blame	17.139	.004	Significant
Monthly Income			
Behavioral Disengagement	23.481	.003	Significant
Self-Blame	19.507	.012	Significant

Legend: Difference is significant at 0.05 alpha level. NOTE: Only those profiles with significant differences are presented in the Table.

The results from Table 7 indicate significant differences in the coping strategies employed by police officers based on various demographic profiles, including age, rank, years of service in the Philippine National Police (PNP), and monthly income. The findings highlight various coping strategies that are adaptive or maladaptive, reflecting how officers manage the stressors associated with their profession. The analysis of coping strategies among police officers, as detailed in Table 7, reveals significant differences based on demographic factors such as age, rank, years of service in the Philippine National Police (PNP), and monthly income. These findings highlight the varied ways in which officers cope with the stressors inherent in their profession and underscore the importance of understanding these dynamics to improve their officers' well-being.

The result shows that younger officers exhibited significant tendencies towards behavioral disengagement ( $u/H = 8.508$ ,  $p = .037$ ) and self-blame ( $u/H = 10.848$ ,  $p = .013$ ). Behavioral disengagement indicates a tendency to withdraw from stressful situations rather than actively confronting them. This withdrawal can lead to avoidance of necessary coping mechanisms and may exacerbate stress over time. Additionally, self-blame as a coping strategy suggests that younger officers may internalize stressors, attributing personal failure to external pressures, which can result in negative psychological outcomes. Research by Silva et al., (2020) supports this notion, indicating that younger officers often prefer emotion-focused strategies like avoidance and self-blame rather than problem-solving approaches.

From the table, the data reveal that higher-ranking officers employ more effective coping strategies compared to their lower-ranking counterparts. For instance, active coping ( $u/H = 36.620$ ,  $p = .000$ ) indicates a proactive approach to managing stress, while positive re-framing ( $u/H = 28.363$ ,  $p = .003$ ) reflects their ability to reinterpret stressful situations positively. Additionally, strategies such as acceptance ( $u/H = 23.892$ ,  $p = .013$ ) and seeking emotional support ( $u/H = 23.113$ ,  $p = .017$ ) were significantly associated with higher ranks. This suggests that those in leadership positions not only have more resources at their disposal but also possess better skills for managing stress effectively. The findings align with research indicating that higher-ranking officers are more likely to utilize adaptive coping mechanisms that enhance resilience (Haugen et al., 2019).

In terms of rank-related coping strategies, as officers accumulate years of service, certain maladaptive coping strategies become more pronounced. Significant results for venting ( $u/H = 11.964$ ,  $p = .035$ ), substance use ( $u/H = 15.622$ ,  $p = .008$ ), behavioral disengagement ( $u/H = 13.858$ ,  $p = .017$ ), and self-blame ( $u/H = 17.139$ ,  $p = .004$ ) suggest that longer service may lead to increased reliance on these less effective coping mechanisms. This trend may stem from prolonged exposure to occupational stressors without adequate support or coping resources, leading to burnout and diminished mental health over time.

As regards to monthly income, the analysis also revealed significant findings related to monthly income, particularly for behavioral disengagement ( $u/H = 23.481$ ,  $p = .003$ ) and self-blame ( $u/H = 19.507$ ,  $p = .012$ ). Officers with lower incomes may be more prone to disengaging from stressors and blaming themselves for their circumstances, reflecting the financial pressures that can exacerbate occupational stress. This aligns with findings from previous studies indicating that financial instability can significantly impact mental health and coping strategies among police personnel (Soomro et al., 2018).

In summary, the results indicate that demographic factors such as age, rank, years of service, and monthly income significantly influence the coping strategies employed by police officers. Younger officers tend to engage in maladaptive strategies like behavioral disengagement and self-blame while higher-ranking officers are more likely to utilize adaptive approaches such as active coping and emotional support seeking. As officers gain experience within the PNP, there is a noticeable shift towards maladaptive coping mechanisms like venting and substance use. These findings underscore the need for law enforcement agencies to implement targeted interventions that promote effective coping strategies tailored to the specific needs of officers based on their demographic profiles. By fostering a supportive organizational culture and providing resources for mental health and resilience training, agencies can better equip officers to manage the unique stresses associated with policing.

**Table 8**

*Relationship among the Variables of the Study (n = 363)*

	Work Engagement			Coping			Police Stress		
	rho	p-value	Int.	rho	p-value	Int.	rho	p-value	Int.
W.Engagement	-	-	-	.346	.000	HS	-.030	.564	NS
Coping	.346	.000	HS	-	-	-	.015	.779	NS
Police Stress	-.030	.564	NS	.015	.779	NS	-	-	-

The results presented in Table 8 illustrate the relationships among work engagement, coping strategies, and police stress among officers. The findings reveal significant correlations between work engagement and coping strategies, while the relationship between stress and both work engagement and coping strategies appears to be non-significant.

As to the relationship between work engagement and coping strategies, the analysis indicates a strong positive correlation between work engagement and coping strategies ( $\rho = 0.346$ ,  $p = 0.000$ ), suggesting that higher levels of work engagement are associated with more effective coping mechanisms among police officers. This finding aligns with previous research that emphasizes the importance of work engagement in enhancing an officer's ability to manage stress effectively. For instance, a study by Lan et al. (2020) found that organizational support significantly boosts police officers' work engagement, which in turn improves their active participation in coping with job-related stressors. This positive relationship implies that engaged officers are likely to employ adaptive coping strategies, such as seeking social support or actively addressing problems rather than resorting to avoidance or maladaptive methods.

Conversely, the relationship between police stress and both work engagement ( $\rho = -0.030$ ,  $p = 0.564$ ) and coping strategies ( $\rho = 0.015$ ,  $p = 0.779$ ) is non-significant. This suggests that variations in police stress do not significantly influence the officers' levels of work engagement or their choice of coping strategies. The lack of significant correlation may indicate that police officers experience stress as a constant element of their job, which does not necessarily translate into changes in how they engage with their work or cope with challenges.

Furthermore, findings from a study conducted by Huang et al. (2019) suggest that while stress is prevalent in policing, its impact on individual performance may vary widely based on personal resilience and support systems rather than directly affecting coping mechanisms.

These results underscore the importance of fostering work engagement through organizational support and training programs aimed at enhancing adaptive coping strategies among police officers. Given the strong correlation between work engagement and effective coping, law enforcement agencies should prioritize initiatives that promote officer's well-being and resilience. For example, implementing resilience training programs could equip officers with skills to better manage stress while enhancing their overall engagement with their roles. Additionally, creating a supportive organizational culture where officers feel valued and connected can further bolster both work engagement and effective coping mechanisms.

In summary, the analysis reveals a significant positive relationship between work engagement and coping strategies among police officers, while the relationships between police stress and both work engagement and coping strategies are non-significant. These findings highlight the need for law enforcement agencies to focus on enhancing work engagement through supportive practices and training initiatives that promote adaptive coping strategies. By addressing these areas, agencies can help mitigate the effects of occupational stress on their personnel.

Table 9 presents the proposed psychological intervention program intended for Police officers. As gleaned from the table for respondents' low work engagement, a proposed Psychological Skills Training program is a targeted intervention designed to address the critical issue of low work engagement within law enforcement agencies. This program aims to enhance officer engagement and motivation through a structured series of activities that focus on developing psychological resilience and fostering a supportive work environment. The program is built around three main activities: conducting workshops on resilience training and mindfulness, implementing team-building exercises, and facilitating regular feedback sessions to assess engagement levels.

The first activity, workshops on resilience training and mindfulness is designed to equip officers with essential psychological skills that can help them manage the stressors associated with their roles. These workshops will cover techniques such as cognitive restructuring, stress management strategies, and mindfulness practices, which have been shown to significantly improve mental health outcomes for police personnel. Research indicates that such training programs can reduce symptoms of depression and anxiety while enhancing resilience, thereby mitigating the risks associated with the demanding nature of police work. By providing officers with tools to cope with stress effectively, these workshops aim to foster a greater sense of control and well-being among participants.

**Table 9**

*Proposed Psychological Intervention Program for Police Officers*

Key Result Areas	Objectives	Program	Activities	Responsible Persons	Success Indicators
Low Work Engagement	Enhance officer engagement and motivation	Psychological Skills Training This aims to enhance officer engagement and motivation by addressing low work engagement through a structured series of activities.	- Conduct workshops on resilience training and mindfulness - Implement team-building exercises - Facilitate regular feedback sessions to assess engagement levels	Training Coordinator	- Increased officer participation in activities - Improvement in self-reported engagement scores

<b>Above Median Stress</b>	Enhance mental resilience and coping skills.	ARMOR Program (Acquired Resilience for Mastering Operational Response)	- Workshops on self-awareness and mental skills - Training in biofeedback techniques - Group discussions on resilience strategies	Mental Health Professionals Trainers	Increased self-reported resilience scores in follow-up surveys.
	Promote physical health to mitigate stress effects.	Wellness and Fitness Program	Regular fitness classes (yoga, cardio) - Nutrition workshops - Healthy meal planning sessions	Fitness Trainers, Nutritionists	Improved health metrics (BMI, fitness levels) among participants.
	Establish strong peer support networks among officers.	Peer Support Program	- Training for peer supporters - Regular peer support meetings - Anonymous feedback sessions	Peer Support Coordinators	Increased participation in peer support activities.
	Encourage a healthy work-life balance to reduce burnout.	Work-Life Balance Initiatives	- Workshops on time management - Family involvement activities - Flexible scheduling options	Human Resources, Supervisors	Higher job satisfaction ratings in employee surveys
	Provide continuous education on stress management techniques.	Annual Stress Management Training	- Mandatory annual training sessions on stress management - Access to online resources and workshops	Training Department	Completion rates of training programs and positive feedback scores.

The second activity involves team-building exercises, which are crucial for enhancing communication, collaboration, and trust among officers. These exercises will be integrated into regular training sessions or organized retreats, focusing on activities that promote teamwork and problem-solving skills. Evidence suggests that team-building initiatives can lead to improved job satisfaction and stronger interpersonal relationships within the department. By fostering a sense of camaraderie and support among officers, these exercises can contribute to a more engaged workforce that feels connected to their colleagues and mission.

The third component of the program is the facilitation of regular feedback sessions. These sessions will provide a structured opportunity for officers to share their experiences, discuss challenges related to engagement, and provide feedback on the effectiveness of the training activities. By holding these sessions bi-monthly, the program ensures ongoing assessment and adaptation to meet the evolving needs of the officers. This feedback mechanism is essential for creating an environment of open communication, which has been linked to improved morale and job satisfaction within law enforcement agencies.

The Training Coordinator will oversee the implementation of this program, coordinating with mental health professionals who specialize in resilience training and facilitating team-building exercises. Supervisors will play a key role in encouraging participation among their teams and supporting the overall objectives of the program.

Success indicators for this intervention will include increased officer participation in activities targeting at least 75% attendance at workshops and team-building events and measurable improvements in self-reported engagement scores. Pre- and post-training surveys using validated scales will be utilized to assess changes in engagement levels, aiming for a minimum 20% increase following program implementation. In conclusion, the Psychological Skills Training program represents a proactive approach to enhancing officer engagement and motivation by addressing low work engagement through evidence-based practices. By focusing on resilience training, team-building exercises, and regular feedback mechanisms, this intervention seeks not only to improve individual officer well-being but also to foster a supportive organizational culture that enhances overall

departmental effectiveness.

The anticipated outcomes include improved mental health, increased job satisfaction, and stronger team dynamics within law enforcement agencies, ultimately leading to better service delivery in communities. The program focuses on developing mental resilience through workshops that enhance self-awareness and teach officers how to manage their mental states effectively. Activities include biofeedback training and group discussions that help officers share experiences and strategies.

For stress regulation, this provides practical tools for officers to regulate their stress responses. Activities such as mindfulness meditation and breathing exercises aim to equip officers with immediate techniques they can use during high-stress situations. In terms of physical wellness, acknowledging connection between physical health and stress management, Wellness and Fitness Program incorporates regular fitness classes and nutrition workshops designed to improve overall health, which can help mitigate the effects of occupational stress.

In terms of peer support systems, establishing a robust peer support program encourages officers to lean on each other for emotional support. Training peer supporters will ensure that officers have access to someone who understands the unique challenges they face. Lastly is work-life balance. To combat stress, initiatives promoting work-life balance will be implemented. Workshops on time management and family involvement activities will help officers maintain a healthy separation between work and personal life.

#### **4. Conclusions and recommendations**

Police officers in the Philippines are predominantly male, middle-aged, married workforce with high educational attainment and varying income levels which reveals critical areas for potential improvement in gender representation, work-life balance, community relations, and economic support structures within the police force. Respondents' level of work engagement ranks first on dedication, second on vigor and third on absorption. Furthermore, level of stress was notably high and employ religion as their coping mechanism likely suggest a critical concern for enhancing their performance and well-being. Work engagement varies significantly among police officers when analyzed by age, rank, civil status, years of service in the Philippine National Police (PNP), and monthly income with significant differences in coping strategies based on age, rank, years in service, and monthly income in which these results illustrate the complex interplay between demographic factors and psychological outcomes among police officers. The data indicates a significant positive correlation between work engagement and coping strategies suggesting that officers who exhibit higher levels of engagement in their work are also more likely to employ effective coping mechanisms. The proposed Psychological Intervention program intended for police officers experiencing low work engagement and high stress is to address the unique challenges faced by police officers, who often encounter high-stress situations and traumatic events that can lead to significant psychological distress.

Police officers may enhance their resilience, improve their engagement levels, and better manage the stresses associated with their demanding roles by prioritizing self-care practices such as regular exercise, adequate sleep, and a balanced diet, as these are foundational for managing stress and enhancing overall well-being. Families of police officers may help their loved ones cope with the challenges of low work engagement and high stress by strengthening familial bonds not only enhances the well-being of officers but also contributing to healthier family dynamics, ultimately fostering a more resilient law enforcement community. The Moral and Welfare Division (PNP) may design a more supportive environment that enhances work engagement while effectively managing stress levels among police officers in the PNP. Prioritizing mental health and well-being not only benefits individual officers but also contributes to improved service performance and community trust in law enforcement agencies. PNP Health Service specifically in the Department of Psychiatry may augment the mental health needs of officers facing low work engagement and high stress. Such initiatives not only improve individual well-being but also enhance overall departmental effectiveness by fostering a more engaged and resilient workforce. PNP officials may enhance police officers' work engagement while effectively

managing stress levels among police officers by prioritizing mental health and well-being not only benefits individual officers but also contributes to improved service performance and community trust in law enforcement agencies.

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## Caring behavior, organizational commitment and resilience among psychiatric nurses

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### **Abstract**

This study aimed to describe and explore the relationship among caring behavior, organizational commitment, and resilience of mental health nurses, as well as their lived experiences. Specifically, it investigated the respondents' profiles in terms of sex, age, marital status, length of mental health work experience, and type of patients handled; assessed the levels of caring behavior, organizational commitment, and resilience; examined differences across profile variables; analyzed interrelationships among the three variables; and identified their effects on professional functioning. Utilizing a descriptive-correlational design and qualitative inquiry, data were collected from 101 mental health nurses in a government psychiatric facility through convenience sampling. Findings indicated that most of the respondents were female, aged 26–35, either married or single and had more than 11 years of experience in mental health nursing. The levels of caring behavior, organizational commitment and resilience were both medium to high. Most profile variables did not demonstrate any significant difference across the three constructs, but marital status did, under a subscale “respect” in caring behavior and two subscales of resilience, “having an anchor” and “response to novelty”. Organizational commitment was only meaningfully affected by length of experience under the normative subscale. In general, high rates of caring behavior, commitment, and resilience were perceived to have a positive effect on nurses' motivation, actions and decision-making and their competence and reliability in the mental health field. These results functioned as a basis for suggesting a Psychological Health Module to be used to support and to improve the well-being and the professional behavior of mental health nurses.

**Keywords:** caring behavior, organizational commitment, resilience, psychiatric nurses

## **Caring behavior, organizational commitment and resilience among psychiatric nurses**

### **1. Introduction**

Psychiatric nurses play a crucial role in supporting patients with mental health disorders through a combination of clinical expertise, emotional understanding, and compassionate care. Their ability to maintain empathy and resilience under stress allows them to deliver high-quality service despite the emotionally taxing nature of their roles (Happell et al., 2019). These nurses are responsible for identifying patient needs, implementing therapeutic interventions, and administering medications while developing emotional resilience through collaboration with healthcare teams. Caring behavior is central to patient healing, helping reduce stigma and building trust (Pereira et al., 2021). Studies show that caring actions—like empathy, active listening, and advocacy—not only improve patient outcomes but also reinforce professional standards in mental health nursing.

Research further highlights the impact of various factors such as technical competence, patient privacy, and ethical practice on how nurses demonstrate care (Alikari et al., 2022; Afrasiabifar et al., 2021). These caring behaviors are supported and enhanced by strong organizational commitment, where nurses align with institutional values and goals (Boamah et al., 2022). Resilience, as noted by Kim et al. (2020), enables nurses to manage the emotional strain of mental health care without losing their capacity for compassion. When supported by a positive workplace culture and professional development opportunities, resilient nurses demonstrate stronger commitment to their organizations and are less likely to suffer burnout (Bui et al., 2023). The synergy among caring behavior, resilience, and commitment creates a foundation for sustained, high-quality nursing care in mental health settings.

Despite growing awareness, many studies still examine these elements separately, missing their interconnected influence on nursing outcomes. With increasing demands in mental health services, understanding the interplay between these factors is essential. High stress levels, extended work hours, and exposure to difficult patient behaviors—such as psychosis or suicidality—can reduce nurse effectiveness and job satisfaction. Addressing these challenges requires targeted strategies that enhance physical, mental, and emotional capacities among nurses (Delgado et al., 2022; Hasan et al., 2024). As the Philippines works to normalize discussions around mental health through policies like the Mental Health Act (Hontiveros, 2018), the role of psychiatric nurses becomes even more vital. They must be well-prepared to lead in this advocacy, and research into their resilience, commitment, and caring behavior can shape better support systems to ensure their continued effectiveness and well-being (Labrague et al., 2021; Othman et al., 2022).

This study aims to investigate the interconnections between caring behavior, organizational commitment, and resilience among mental health nurses, recognizing their critical role in delivering compassionate and effective care. Given the emotional and psychological challenges unique to mental health nursing, the research stems from a deep appreciation for nurses' dedication and seeks to find ways to support their well-being and professional growth. The researcher is particularly interested in how these nurses maintain their caring attitude despite the intense pressures of their role and how improvements in their work environment can foster better nurse wellness and patient outcomes.

By examining the relationship among caring behaviors, commitment to the organization, and resilience, the study underscores the importance of supportive workplaces in sustaining both nurse satisfaction and quality healthcare delivery. The findings emphasize that enhancing these three areas can lead to higher job satisfaction, lower nurse turnover, and improved patient care. The research further suggests that mental health institutions can benefit from developing targeted interventions, such as mental wellness programs and workplace culture improvements, to reinforce these factors. It also illustrates how personal stories of mental health nurses enrich the statistical data, offering deeper insight into their challenges and the support systems they rely on.

The study will be conducted in a mental health institution within the Greater Manila Area, involving nurses assigned to psychiatric wards and facilities. These professionals face additional responsibilities in caring for patients with diverse mental health needs. The research aims not only to gather data but also to use the findings to develop a specialized Psychological Health module tailored for mental health nurses. This module will be designed to enhance their coping mechanisms by addressing the specific challenges they encounter in their roles, ultimately aiming to support both their mental well-being and sustained delivery of high-quality mental health services.

**Objectives of the Study** - The aim of the study is to describe and explore relationship among caring behavior, organizational commitment and resilience of psychiatric nurses as well as their lived experiences towards the development of a Psychological Health module intended for the respondents. Specifically, it seeks to describe the respondents profile in terms of their sex, age, marital status, length of mental health work experience, and number of patients handled; determine the level of caring behavior, organizational commitment and resilience of the respondents, compare if the profile of the respondents have significant difference in terms of their profile; test if there is significant relationship among the three variables of the study; identify the effects of caring behavior, organizational commitment and resilience of the respondents; and propose a psychological health module that addresses the results of the study.

## 2. Methodology

**Research Design** - The research design used in this study was based on explanatory-sequential mixed-methods design was utilized to examine mental health nurses' behaviors of care and their organization commitment and resilience rates. The research design contains two separate steps: first it calculates numerical data statistics then it conducts qualitative studies to delve into statistical findings by gathering participant perspectives. The sampling strategies for both phases contain the following components to match the research goals and the design's sequential order.

**Phase 1: Quantitative Sampling.** The researcher applied purposive sampling which included elements based on stratification. A community of registered mental health nurses practicing in a psychiatric hospital from Greater Manila Area forms the research population. The study recruited 101 mental health nurses based on power analysis findings for correlational or regression analysis that focuses on power level 0.80 and alpha 0.05 with medium effect size. This design provides enough statistical strength to identify relationships that exist between caring behavior and organizational commitment and resilience.

**Inclusion Criteria:** Full-time healthcare nurses who directly provide patient care. The participants demonstrate readiness to interact with standardized questionnaires for self-reporting purposes. The research sample will be stratified based on key demographic groups which include age, sex, marital status, work experience durations and actual patients handled. The research tools comprise of three standardized instruments: Caring Behaviors Inventory(CBI), Organizational Commitment Scale(OCS), and Resilience Scale for Nurses for variable assessment.

**Phase 2: Qualitative Sampling.** A purposive sampling technique selected the participants from the Phase 1 group. The study focused on a small group of participants from the quantitative phase who showed specific measurement results, allowing for a deeper dive into the quantitative findings. Data collection will wrap up once saturation was reached, which is expected to happen with 15 to 20 mental health nurses taking part in the interviews. In qualitative research, it's common to work with fewer participants to ensure a more in-depth exploration. The researcher selected participants through purposive methods using Phase 1 results to ensure participation from nurses across various experience levels. The study includes mental health nurse participants at all levels of caring behavior, organizational commitment, and resilience measurement. The researcher chose outlier observations and unexpected results to study environmental circumstances surrounding blending high personal resilience with weak organizational commitment. The research includes participants from diverse

workplace environments and with different levels of work experience because it seeks multiple perspectives.

**Inclusion Criteria:** The participants from Phase 1 who agreed to continued interaction in the study. The participants show willingness for a 45-60 minute interview operated using semi-structured methodology. The research tools for data collection consist of semi-structured interviews following an interview protocol that emerges from Phase 1 results. The researcher guided interviews through two specific questions about organizational influences on caring actions and individual perceptions regarding their ability to balance work dedication with resilience levels.

**Integration of Sampling Across Phases.** The quantitative analysis establishes general connections between caring practices and organizational involvement and work-related resilience yet the qualitative assessment intentionally selects subjects for comprehensive explanations about these relationships and their related environmental aspects (e.g., workload, organizational support). The sampling process integrates at phase 2 through the connection of qualitative participants to their matching phase 1 information which allows quantitative and qualitative analysis to develop from each other.

**Participants of the Study -** The participants in this study were 101 nurses working in mental health setting in one government psychiatric facility in the country since it has an authorized bed capacity of 4,200 inpatients and served an average of 56,000 outpatients per year and obviously needs most numbers of nurses. Respondents of the study was chosen using the convenience sampling technique based on the availability and accessibility of the respondents to the researcher.

### *Measures*

**Caring Behavior Inventory (CBI).** This will be the test to be used in measuring the caring behaviour of the respondents. It was developed by Zane Wolf based on Jean Watson's theory and literature. Wu et al (2006) researches on Caring Behavior Inventory, a reduction of the 42-item inventory was employed from which only 24 items were considered. The standardized measure has 4 sub-groups and is evaluated on a 6-point Likert type scale from 1 to 5 with verbal descriptions of never, almost never, sometimes, usually, often and always. CBI four sub-scales of caring are: (a) assurance of human presence, which deals with patients' needs and security (b) knowledge and skills, related to nurses skills and educated persons (c) respectfulness deference to the other, dealing with how nurses show interest for the patients (d) positive connectedness, corresponding to the need for nurses to be ready to help the patients. The convergent validity and good test-retest reliability of CBI-24 is 0.82 for nurses (Wu et al.,2006). There is high internal consistency as indicated in previous researches with Cronbach alpha of 0.93 and 0.94.

**Organizational Commitment Scale (OCS).** This will be the tool to be used in determining respondents' organizational commitment. It was developed by Meyer et al. (1991) consisting of 18 items. It measures three types of commitment which are affective, continuance and normative. The items were measured using five point Likert scale as strongly agree, undecided, disagree and strongly disagree respectively. The three forms of organizational commitment (affective, continuance, and normative), Meyer et al. (1990) addressed the question of interest of nurses commitment in an organization. There is high internal consistency with cronbach's  $\alpha$  coefficient of 0.917 of the total organizational commitment scale (Cao et. al, 2019).

**Resilience Scale for Nurses.** This is the scale that will be employed in obtaining data from the respondents as to their resilience. Resilience Scale for Nurses was originated in Japan. Ihara et. al. (2010) who made a research study regarding Development and Psychometric Validation of the Resilience Scale for Nurses and constructed a 32 item questionnaire. The study mentioned that all of the four factors solution namely: 'Positivity in nursing', 'Interpersonal skill', 'Having an anchor in personal life',and 'Response to novelty', are reflected characteristics of resilience and had already been indicated by previous studies: personal competence and acceptance of self and life; optimism; future orientation; and 'belief in others; novelty seeking; and positive future orientation supporting the construct validity of the RSN. The 32 Item Resilience Scale for Nurses used the

five point Likert Scale from agree, somewhat agree, neither agree nor disagree, somewhat disagree and disagree. The estimated predicted reliability is .77 using the Spearman-Brown prediction formula and the levels of Cronbach's alpha for the overall RSN presents good internal consistency of .84 (Ihara et.al., 2010).

For the qualitative part, an interview guide will be the main tool used in this research in obtaining responses from the respondents who work in mental healthcare setting involving topics on their caring behavior, organizational commitment and resilience. The said questions underwent a validity check from their Research Professor which were then approved for her Proposal Defense. Also, the said questions were also content validated by the chief nursing service of the mental institution where the study will be conducted.

**Data Gathering Procedure** - The research strategy known as explanatory-sequential design applies quantitative analysis in its first phase before moving on to qualitative examination. The research design starts with a quantitative data-driven phase that collects numerically-based information. The further investigation of quantitative outcomes happens in the following qualitative research phase. Through this combination researchers gain deeper insights about their research issue. The quantitative phase of research would include data collection for assessing variables regarding caring behavior and organizational commitment and resilience of mental health nurses. After conducting quantitative analysis the researcher would execute qualitative data collection by performing interviews and holding focus groups or conducting observations. This research effort strives to reveal essential reasons from numerical data while investigating environmental elements that shape the situation. The qualitative discussions will elaborate how nurses benefit from their resilience capabilities to maintain compassionate care delivery regardless of mental health burnout in healthcare. The quantitative data serves as a guide for the following qualitative analysis to take place. Tests show that nurses with heavy patient loads who score low in resilience would be studied further within the qualitative phase.

**Phase 1: Quantitative Phase.** In this initial phase, researchers gather numerical data through standardized scales to measure: Caring Behavior (independent variable), Organizational Commitment (mediator), and Resilience (outcome variable). The researcher then apply statistical analyses, like regression and mediation analysis, to spot significant patterns, relationships, or outliers—think nurses who show high caring behaviors but struggle with resilience. These insights lay the groundwork for further exploration. Transition to Phase 2. The findings from Phase 1 guide the sampling and focus for the qualitative phase. For example, researchers might pinpoint groups of nurses with surprising variable combinations (like high caring but low resilience) and choose them for interviews or focus groups to dig deeper into why these trends occur.

**Phase 2: Qualitative Phase.** In this phase, researchers conduct interviews or focus groups to collect rich, narrative data that reveals: Personal experiences of care, Perceived organizational support or the lack of it, Factors that lead to burnout or resilience, and the significance of purpose and meaning in their work. These stories help clarify the mechanisms behind the quantitative findings and add valuable context. Integration: Mixed-Methods Insights. Finally, the data from both phases come together to create a comprehensive understanding: Quantitative data highlights general patterns and measurable relationships; Qualitative data sheds light on the "why" and "how" behind those patterns, enriching the overall narrative. By merging these two types of data, researchers can develop a fuller, more actionable understanding of how caring behaviors, organizational elements, and resilience interact in the day-to-day realities of nursing practice.

In conducting this research study, the researcher began by reading various literature and studies on psychology, particularly those related to the caring behavior, commitment, and resilience of nurses. From this academic endeavor, she decided to develop this paper and subsequently presented it to her research adviser for approval. Upon the approval of the proposed manuscript, she will also seek permission from her adviser and panel to use the adopted instruments for obtaining the necessary data on caring behavior, commitment, and resilience of the participants. The researcher will discuss and request approval from the healthcare facility's chief nurse to conduct the study and involve the institution's nursing staff.

Once permission is granted, the paper will be presented to a panel of examiners for their comments,

suggestions, and validation of the tools to be used. During the data collection phase, the researcher will distribute the questionnaires to the participants, ensuring confidentiality and protection of their information through the use of informed consent forms. When participants are identified, data collection will begin, and they will be reassured that their responses will be treated with the utmost privacy, with accurate results intended to benefit their facility or institution. An in-depth interview with five participants will also be conducted using a convenience sampling technique for the qualitative portion of the study.

To ensure the rigor of the data gathered, the researcher will conduct collateral interviews if needed, followed by interpretation and analysis. Validity checking will be done during the interpretation of the protocols and transcripts, which will be reviewed by two registered psychologists. The results from both the quantitative and qualitative data will be compared and correlated to arrive at the study's findings. First phase of this mixed-method research involves the quantitative method, where the primary tools used were adopted from previous validated studies. The researcher will carefully consider the selection of instruments to ensure they appropriately address the categories of caring behavior, commitment, and resilience of nurses in healthcare settings.

**Data Analysis** - Data obtained in this study will be treated statistically through different statistical tools as suggested by the assigned statistician. Frequency will be utilized in describing the profile of the respondents as to sex, age, length of mental health work experience, and type of patients handled while mean will be utilized in identifying the personality, and work values of the respondents as well in determining their caring behavior, organizational commitment and resilience. In testing significant differences among the three variables of the study with the profile of the respondents, analysis of variance(ANOVA)will be used. Lastly, Pearson r will be used as statistical tool in testing correlations among caring behavior, organizational commitment and resilience. Lastly for the qualitative analysis, the Interpretative Phenomenological Analysis (IPA) will be used. With this, the researcher will be able to understand the life experiences of the respondents and how these affect them in their everyday life. Data will be gathered through in-depth-interview with the use of simple questions with the 5 selected respondents. After answering the questionnaires. The qualitative data were also organized into conceptual categories called codes. These codes serve as a label for the compiled descriptive information which are the words or phrases from the interview with the respondents by transcribing the significant responses of the respondents per variable which will then be translated as to emerging concepts, sub-categories, categories and last to the formulation of themes.

**Ethical Considerations** - Ethics is an essential part of every research study. In this study, the researchers took into consideration the General Ethical Standards and Procedures-Standard III.J of the 2017 Code of Ethics by the Psychological Association of the Philippines states. Stipulated in the said ethical code that respondent should have read and understood the consent form and accepted the terms of the study before participating. Confidentiality of the participants' personal information and their answers to the questionnaire and interview were given utmost importance. Researchers did not force any of the participants to answer questions they do not want to. Ethical consideration was also applied in the related literature gathered in this study by citing their appropriate sources.

### 3. Results and discussions

Table 1 presents the profiles of the respondents consisting of age, sex, marital status, mental health experience and number of patients handled. The age distribution among mental health nurses respondents shows that age group 20-25 years old, which is the youngest group, has the least number of respondents with only a total of 7(5.9%).The age group 26-30 years old has a total of 33(33.7%)of the total respondents. The 31-35 age group has a total of 30 (29.7%).The 36-40 years old group has 12 or (11.9%) of the nurses in this study. The 41 and above age group is registered 19 (18.8%) of the total respondents. The majority of nurses fall under the age 26-35 years old.



**Table 1**  
*Profiles of Respondents*

Age	20-25 years old	26-30 years old	31-35 years old	36-40 years old	41 years old and above	Total		
Frequency	7	33	30	12	19	101		
Percentage	5.9	33.7	29.7	11.9	18.8	100%		
Sex	Male		Female			Total		
Frequency	35		66			101		
Percentage	34.7		65.3			100%		
Marital Status	Single	Married	Separated	Widowed		Total		
Frequency	52	48	1	0		101		
Percentage	51.5	47.5	1	0		100%		
Mental Health Experience(Years)	Less than a year	1-2 years	3-4 years	5-6 years	7-10 years	11 years above	Total	
Frequency	10	15	20	18	16	22	101	
Percentage	9	14.9	19.8	17.8	15.8	21.8	100%	
No of Patients Handle	1-5	6-10	11-20	21-30	31-50	51-70	71-100	Total
Frequency	0	13	17	15	15	20	14	101
Percentage	0	12.9	16.8	14.9	14.9	19.8	13.9	100%

The result is almost identical with the findings of Aydin et al.,(2019) whereas the age of participants was between 18-65 years. The majority (50%) were in the age between 26 and 35 years old. Abrigo et al.,(2019) also noted that the average age of nurses in the Philippines is 29 years old. In 1990,the median age of professional nurses were 31-years. By 2015, these have gone down to 28-years, as a direct result of the increasing number of new board passers, who are generally younger, in these fields. This is despite the increasing trend in the number of new-hire temporary Filipino health care migrant workers, particularly among professional nurses. Table 1 describes the sex distribution of the respondents. Male respondents are numbered at 35 which is 34.7%of the total number of nurse respondents while female nurses totaled 66 or 65.3%of the total nurse respondents. The results coincide with the notion that nursing profession in the Philippines has a long-standing reputation for being predominantly female. According to the Philippine Statistics Authority, data on education and workforce demographics indicate that most health workers, including nurses, are women.

In the Philippines, a qualitative study by Cortiguiera et al. (2024) focused on mental health nurses at the National Psychiatric Referral Hospital (NPRH).Out of the nine participants, five were women, making up 55.6% of the group. This shows a slight female majority, even within such a small sample size. The predominance of women in nursing in the Philippines, particularly in mental health, can be linked to various cultural and historical influences. Nursing is often seen as a “caring profession, “which fits neatly into the traditional gender roles prevalent in Filipino culture. A comprehensive review by Rubio (2020) explored how the Filipino perspective on mental illness and the attitudes of nurses reflect these gender dynamics, revealing that societal expectations have historically nudged women toward nursing as a natural extension of their caregiving responsibilities at home. This cultural viewpoint likely plays a significant role in the gender distribution within mental health nursing as well. The table above also illustrates the marital status of the respondents. The total number of married respondents is 48 (7.5%),while single respondents is 52 (51.5%).There are no widows in this group while there is only one accounted with separated status. The number of *married* and *single* respondents indicates that there is an equal distribution of married and single nurses among mental institutions in greater Manila area.

This table also highlights the distribution of respondents according to their years of service as mental health nurses. Data collected show 10 respondents with less than a year of experience,15 who have been in the field for 1 to 2 years, and 20 with 3 to 4 years of mental health experience. Additionally, 18 respondents have 5 to 6 years of experience, while 16 fall into the 7 to 10 years category. The biggest group, with 16 respondents, includes those boasting 11 years or more of experience, representing the most experienced professionals in the sample. The numbers indicate that the respondents number in terms of years of service are almost equally distributed. This implies that mental health nurses chose to continue their service even after some years working at the mental institution.

The years of service distribution for mental health nurses in Table 1 aligns with trends found in broader workforce analyses. This is consistent with the current findings, where 16 respondents reported 11 or more years, making it the largest group alongside those with 7 to 10 years. This indicates a strong dedication to the profession, which is in line with the present observation that mental health nurses tend to remain in their roles for a longer period of time. Evidently, in this study, there is a considerable sense of job satisfaction for mental health nurses as shown by the bigger number of experienced nurses in this field. The table above also presents the results for the number of patients handled by the respondents. There were no respondent credited for the number of patients 5 or less. Those who handled 6-10 patients were 13 (12.9%). Respondents who took care of 11-20 patients totaled 17(16.8%). Nurses who handled 21-30 patients had a total of 15 (14.9%) as well as those who handled 31-50 patients. Those who handled 71-100 patients were 14 (13.9%) and those respondents who handled 101 and above were totaled 7 (6.9%).

**Table 2**  
*Psychiatric Nurses' Level of Caring Behavior*

Sub-scales	N	Minimum	Maximum	Mean	Standard Deviation
Assurance	101	4.38	6.00	5.5121	0.43398
Knowledge	101	4.20	6.00	5.6000	0.45255
Respect	101	4.00	6.00	5.5571	0.47869
General Mean:5.5564			Average SD:0.4551		

Table 2 presents the level of mental health nurses caring behavior indicated by three sub-scales: assurance, knowledge and respect. The factor of assurance in caring manifests through actions which promote confidence and comfort and dependable behavior towards others. The survey data showed that study participants strongly rated assurance as part of caring behavior with their mean score at 5.51 and low standard deviation at 0.43. Data shows that mental health nurses report a high level of certainty in the way they act towards patients, as expressed by a mean score of 5.51 and a low standard deviation of 0.43. Hence, nurses always take actions that bring about confidence, comfort and dependability, all of which play a key role in trusting and therapeutic relationships in mental health care. Because the responses are similar, this shows that the finding is reliable and repeated among most of the subjects. Confidence in their abilities is a main strength of mental health nurses, most likely leading to good experiences and outcomes for patients.

Alikari et al. (2022).documented patient and nurse perceptions of caring behaviors. Caring Behaviors Inventory (CBI) incorporated the Assurance sub-scale that consists of actions which create confidence and comfort through empathy and active listening. Survey data from 310 participants indicated that nurses gave more favorable evaluations than patients did in measuring assurance behaviors which strongly impacts patient perception of care. This research corroborates with the current findings even though the specific mean scores and standard deviations differed slightly (5.51 with 0.43 SD).The low variability in patient and nurse responses shows the importance of assurance as a caring factor. Similarly, Wang et al.(2022) analyzed data from 748 respondents using Caring Behaviors Scale for Healthcare Students and Providers (CBS-HSP). The research scale contained a factor “Gratifying Needs and Responsiveness” which matched assurance principles of dependable and comforting action (such as responding when someone needs it). The validity of this factor was supported by both research methods as the factor analysis results showed excellent internal consistency (Cronbach’s alpha>0.8)and mean scores exceeding 5 points on a 9-point Likert-type response scale for associated items. The standard deviation value of 0.43 in the current study matched the past research that shows a tight clustering of responses at high mean levels which indicates participants strongly support assurance as a caring behavior.

The rating indicates that knowledge appears to be essential for caring behavior possibly through competent and understanding actions of caregivers. Among the three components of caring behavior “knowledge” resulted in the highest mean score of 5.60 which indicates a significant role of knowledge in caring practices while maintaining moderate stability between researchers (SD=0.45). Tsegay et al. (2024) conducted a research project to evaluate what knowledge and abilities family caregivers need to provide good home care for elderly people in Ethiopia. Caregivers who acquired better knowledge about healthcare functions showed improved competence

alongside better understanding of their responsibilities. The study reported no specific mean scores but declared knowledge as essential for practical care giving activities and this validation supports the significance of knowledge as shown in the current data (mean=5.60). The moderate SD value of 0.45 in the present study findings matches the research observations that show caregivers possess varying levels of knowledge because they have different educational pathways. Empowered caregivers relied on knowledge across disease information and care practices and resource details to deliver competent nursing actions. The caregivers who actively sought knowledge displayed higher confidence in dealing with complicated care duties which corresponds to the current observation of a high mean score (5.60) regarding knowledge in caring behavior. The data indicates that care providers acquire power to deliver effective compassionate treatment through their knowledge acquisition.

“Respect” in nursing care as it means both dignifying patients through respect and respecting their autonomy. The rating score of 5.56 shows respect in caring behavior receives similar acknowledgment from patients but the wider SD value (0.48) indicates patients view this aspect differently. Fuseini et al. (2022) studied patient accounts regarding dignity experiences and dignified healthcare services in acute hospital settings. Patient dignity maintenance depends heavily on healthcare providers’ respect which includes the care given by nurses while autonomy functions as a major related factor. Patients consistently appreciated respectful healthcare experiences but revealed dynamic service quality because hospitals limited their choices and privacy access. Variable patient perspectives reveal different personal viewpoints according to the standard deviation measurement of 0.48. Vasiloglou et al. (2022) evaluated patients alongside nurses caring behaviors through Caring Behaviors Inventory (CBI-16). Study participants showed strong positive views about respect-related interactions by giving scores above 5 on a 6-point rating scale that matched the current 5.56 figure. Patients in the study showed different priorities from nurses because they valued technical expertise and protection above all else but nurses made dignity and privacy their main concerns.

Data indicators demonstrate a strong and steady perception of caring behavior through these three dimensions which exceeds 5.5 on a 6-point rating scale. The observed ratings seem to indicate a caring environment and talented people displaying these characteristics. Statistics evaluate the caring behavior by measuring three essential elements which define assurance and knowledge together with respect. These qualities exist consistently and reliably in an environment where caring demands are essential based on both high average scores and low score variations.

Table 3 shows the emergence of the theme expressions of love. Based on the interviews conducted, it is quite clear that the respondents are well aware about their duties and responsibilities as mental health nurses and on how they should deliver the caring services that mental health patients need. The respondents’ level of caring behavior is high and notably surpassed the level of caring behavior that other mental health nurses possess. Basic nurse functions such as giving of medications, monitoring of patients’ activities and assessing the physical and emotional state of the patients are mentioned by respondents as being an important part of their duty. However, respondents agreed to the idea that mental patients need a strong support system in order to survive and recover. The respondents fairly believed that most of their patients were neglected by their own families thus it is very important for the mental health nurses to provide at least the basic care services they could give and let them feel that someone cares. These basic care includes training the mentally challenged patients to care for themselves and help them to become highly functional individuals.

Compassion, love and care for those individuals suffering from mental disorders emerged as one of the guiding principles for the respondents caring behavior. The nurse respondents feel there must have an element of love and compassion in providing care for the patients because the patients positively respond to this emotion and fully cooperate with the nurses in the process of their recovery. Consequently, the patients acknowledge the kind of love and care that the nurses give and somehow create a bond between the nurse and the patient. Recent studies highlight the crucial role mental health nurses play in providing both clinical and emotional support to their patients. For instance, Coffey et al. (2019) point out that nurses in these environments prioritize

person-centered care. This involves not just administering medications and monitoring patient activities, but also assessing both physical and emotional well-being—key responsibilities you mentioned. The research underscores that while nurses see these tasks as essential, they also acknowledge the importance of collaborative, recovery-oriented approaches that empower patients and support their journey to recovery.

**Table 3**  
*Emergence of the Theme: Expression of Love*

Respondent ID	Significant Statements	Emerging Concepts	Level	Category	Theme
R1	“Kung maipakita mo sa kanila na may love,tapos may care,susunod sila”	Compassion	High	Caring Behavior	Expression of Love
R2	“Ang pinaka-basic ay tender loving care..kasi neglected sila by their family”	Compassion	High	Caring Behavior	Expression of Love
R3	“Different approaches dapat ang i-aplay kasi iba iba ang kaso ng mga patients e”	Caring Creativity	High	Caring Behavior	Expression of Love
R4	“Once na 232aming232 ang pagbibigay mo ng care sa kanila,wala silang masabi sa’yo at tatandaan pa nila ang pangalan mo”	Sincerity	High	Caring Behavior	Expression of Love
R5	“Most important yung basic selfcare nila...kailangan lang na i-train sila hanggang maging independent sila”.	Empowerment	High	Caring Behavior	Expression of Love

In a similar vein, a study by Hartley et al.(2020) delves into the importance of the therapeutic alliance in nursing. It highlights that nurses demonstrate a high level of caring behavior when they establish trust and actively involve patients in their treatment plans, which aligns with your observation about respondents exceeding typical levels of care. The study emphasizes that behaviors like listening, empathizing, and providing support are vital for patients who may feel overlooked, reinforcing the notion that nurses often step in to bridge the gaps left by absent family support. Another aspect of caring behavior that the respondents never fail to observe especially in psychological wards is familiarity with the patients. This part of caring behavior thwarts numerous upcoming problems that may arise inside the wards. The ability to recognize each patient’s individuality, that includes their moments of mood swings, misbehavior, manipulative tendencies and other behavior related to their psychological conditions, aid the nurses in keeping each ward in order. Recent studies underscore just how crucial familiarity is in building strong therapeutic relationships and boosting patient outcomes in psychiatric care.

There were numerous challenges in the aspect of caring behavior that were discussed by the respondents during this qualitative inquiry. One of the respondents said that it was very challenging to deal with patients because they have different attitudes and each has different needs. However, everyone agreed that nurse to patient ratio seemed to be the biggest challenge for mental health nurses. This problem arises from the lack of community knowledge and mental health stigma and of course the lack of facility and manpower for mental institutions. Shortage for mental health doctors and mental health nurses is a perennial problem in the Philippines which is worsen by the growing numbers of mental health disorders that many Filipinos are suffering today. In reality, the respondents estimated that for every one mental health nurse, he/she has to take care at least one hundred patients. Surprisingly, the respondents accepted such gigantic task positively and still believe that they can do their job as caregivers effectively.

The study of Alibudbud (2023) demonstrates that Philippine healthcare facilities experience a critical shortage of nurses which affects both general and mental health care settings. The article explains how long-term understaffing which combines with poor pay and heavy schedules drives nurse burnout. Although the research study does not indicate specific nurse-to-patient ratios for mental health care staff it shows that general ward nurse staffing surpasses Department of Health established 1:20 guideline rates reaching 1:50 during COVID-19 pandemic high-demand periods. The severe conditions of understaffed mental health facilities support the validity of under-staffed nurses’ estimates. This research supports policy changes through more staff retention measures and better workplace conditions as effective solutions for the mentioned difficulties.

Likewise, Cortiguiera, et al. (2024) conducts qualitative research with mental health nurses in 2024. The increased nurse-to-patient ratio stands as the main obstacle against compassionate care delivery because staff members state they cannot adequately address patient intelligence because their workload consumes their time. The nurses displayed both resilience and dedicated service toward comprehensive patient care which mirrors what your participant respondents noticed in their positive encounters. The research findings confirm that both empathy and autonomy in nursing care practices continue to guide nursing practice throughout challenging circumstances. The respondents also believe that in order to deliver caring services effectively, it is very important that a nurse is prepared physically, mentally emotionally, and spiritually. Years of experience and training taught the respondents the best caring service they could give especially therapeutic approach.

The integration of research findings by Delgado et al.(2020) assessed emotional labor practices in mental health nursing contexts. Research proved that nurses with proper mental preparation through training and experience demonstrated better therapeutic communication skills regardless of stressful situations. Participation in preparation methods decreased burnout while improving patient care standards indicating the participants ‘focus on complete readiness models for delivering care services. According to Thompson et al. (2021) organizational methods that support nurse welfare in physical and mental together with emotional and spiritual domains deliver better healthcare outcomes following COVID-19. Research showed that nurses receiving structured support frameworks which integrate spiritual care education become more resilient while delivering better therapy outcomes. The respondents validate their position that experienced-based preparation linking all dimensions remains essential for delivering optimal care services.

The Information In Table 3 is consistent with the numbers in Table 2. Both analyses demonstrate that mental health nurses demonstrate a high degree of care for their patients. The qualitative data’s emphasis on Compassion, Creativity, Sincerity, and Skills Development Support, unified by the theme Expression of Love, aligns with the quantitative data’s high scores in Assurance, Knowledge, and Respect. The qualitative descriptions enrich the quantitative findings by providing nuanced insights into how caring behavior is expressed, while the quantitative data confirms the prevalence and consistency of these behaviors across a larger sample. This means both data sets enhance each other and are in agreement, without any evidence of conflict.

**Table 4**  
*Mental Health Nurses’ Level of Organizational Commitment*

Variables	N	Minimum	Maximum	Mean	Standard Deviation
Affective	101	2.00	4.33	3.1538	.447762
Continuance	101	1.33	4.67	3.2495	.68288
Normative	101	2.17	4.50	3.3715	.56233
General Mean:3.2583			Average SD: <b>0.5643</b>		

Table 4 shows the level of mental health nurses organizational commitment in various sub-scales. The emotional attachment level lies moderately high at 3.1538 according to the scale midpoint. Mental health nurses exhibit moderate bond feelings toward the organization but not with deep intensity. Workers build affective commitment when they emotionally tie themselves to their organization mainly through the organizational values match and personal job satisfaction and organizational connection. None of the participants rated their workplace commitment at the highest or lowest scores on the scale(1 or 5)implying moderate distribution of ratings throughout the range (2.00 to 4.33). The 0.44762 standard deviation indicates uniformity in employee responses since participants have comparable levels of emotional organization connection with minimal extreme variation.

Recent research into nurses’ emotional commitment sheds light on current findings. For example, a 2023 study by Shen and colleagues looked into how benevolent leadership relates to affective commitment and work engagement among nurses in China. They found a moderate level of affective commitment, with a mean score of 3.42 and a standard deviation of 0.81 on a 5-point scale. This is quite similar to your mean of 3.1538, suggesting that both studies reflect a comparable emotional connection. While their standard deviation shows a bit more variation than your 0.44762, it still points to a fairly consistent response among participants. The study also

highlighted that affective commitment is linked to leadership support and work engagement, which resonates with your observations about how organizational values and job satisfaction can foster emotional connections.

Employees often stick with an organization out of continuance commitment, feeling they have no choice due to high costs associated with leaving, such as losing benefits, facing financial instability, or having limited job options. Interestingly, it seems that employees have slightly stronger practical reasons for staying compared to emotional ones, as reflected in an average score of 3.2495. However, perceptions of continuance commitment can vary widely, ranging from 1.33 to 4.67 on the scale, indicating different levels of attachment to the organization based on necessity or the absence of pressure to stay. The measurement deviation of 0.68288 suggests a broad spectrum of feelings of being “stuck” compared to other types of employee commitment. This significant internal variation indicates that many workers remain in their jobs primarily out of necessity rather than personal desire, while the levels of group maintenance can differ greatly. Organizations should keep an eye on high levels of continuance commitment, as strong attachment could lead to retention issues when appealing alternatives arise outside the organization.

A review by McGowan et al (2020) examined the practices of mental health nurses in historical contexts (1800–1960), providing a solid foundation for understanding how the profession has evolved. However, we can also draw parallels to current workforce dynamics. The review points out ongoing staffing challenges, a theme that continues to appear in modern research, suggesting that the lack of employment options—a major factor in continuance commitment—remains a pressing issue for mental health nurses today. The notion of compliance through normative commitment leads employees to remain in a role because it is proper for them to stay based on feelings of loyalty and their moral responsibilities alongside social expectations (such as maintaining relationships with colleagues or fulfilling organizational investments).

The current participants demonstrate the strongest commitment driver through duty as exhibited by their mean score of 3.3715. These scores span the middle area (2.17 to 4.50) which means that employees do not experience complete freedom of leaving the organization (2) and also avoid feeling absolute obligation (5). Dependent on the SD of 0.56233, employee duty perception shows moderate uniformity although not as pronounced as continuance commitment perception. Nurses demonstrate a fairly strong commitment to staying at the organization that potentially results from employee loyalty initiatives as well as internal team bonding and organizational cultural norms. The commitment of employees towards organizational retention might strengthen retention because it is focused more on internal values than external limitations.

Table 5 shows the emergence of the theme positive work engagement. There were various indicators of organizational commitment reflected in the interview with the respondents. Obviously, their level of organizational commitment is high. Firstly, when the respondents were asked if they were happy with their profession, they responded positively. Most of the respondents interviewed were working in the mental facility for more than 10 years. This span of years of experience are indicative of their willingness to stay in the organization for good which the nurses confirmed during the interviews. The respondents asserted that it is their sense of duty to others that they thought as the most significant reason to stay.

**Table 5**  
*Emergence of the Theme: Positive Work Engagement*

Respondent	Significant Statements	Emerging Concepts	Level	Category	Theme
R1	“Masaya kami kasi every day is learning”	Growth mindset	High	Organizational Commitment	Positive Work Engagement
R2	“Kahit kulang yung sahod mo ok lang kasi mahal mo ang trabaho mo”	Contentment	High	Organizational Commitment	Positive Work Engagement
R3	“Every day is a learning experience dito sa wards kaya we treasure each day and learn from	Lifelong learning	High	Organizational Commitment	Positive Work Engagement

R4	it“ “Proud kami sa ginagawa 235aming kasi alam naming na nakakatulong kami”	Pride in Someone’s Work	High	Organizational Commitment	Positive Work Engagement
R5	“Dito na kami hanggang magretire kami,I don’t see myself having another career”	Loyalty	High	Organizational Commitment	Positive Work Engagement

Study results from Cao et al. (2019) showed nurses who experienced positive feelings towards their work field demonstrated better emotional commitment to their organizations due to intrinsic motivations stemming from a sense of calling. The positive feedback regarding their profession shows that personal professional contentment strengthens their dedication to their work. The majority of the respondents when asked if they would leave the organization had been given a chance to move to greener pasture, many of the respondents negate the idea and expressed their willingness to stay in the country and serve fellow Filipinos. Though the salary of mental health nurses in the Philippines is only a fraction of what mental health nurses received in developed countries, the respondents expressed that devotion to close family relationships made them refuse opportunities abroad. In the same vein, good relationship with friends and colleagues strengthened the nurses commitment to their mental health organization. In fact, many of the nurses expressed their commitment to the profession until the time of retirement.

Rubio (2021) conducted a study investigating how Filipino nurses viewed their mental patient care responsibilities while demonstrating their dedication to assisting Filipino individuals despite better job prospects in industrialized nations. Professional Filipino healthcare providers base their work commitment on elements that exceed financial rewards. This strong commitment exists because culture teaches Filipinos about “bayanihan” which means community spirit and people want to care for healthcare needs especially among under-served mental health patients. The study conducted by Lorenzo et al.(2019) revealed Filipino healthcare workers have dual motives to work within or outside their homeland because economic factors lead many abroad but nurses often choose to stay due to their desire to serve their nation. Mental health nurses need to work in the Philippines because the national scarcity of mental health resources emphasizes the importance of their specialized skills. The findings demonstrate that your respondents chose to remain in the Philippines instead of selecting “greener pastures” for the purpose of assisting Filipino people directly.

Regarding satisfaction with the compensation and benefits that they receive, the respondents agreed that they are receiving barely enough. However, some nurses are creative enough to make both ends meet by doing side jobs and small business during off duty hours. The majority of respondents said that working as a mental health nurse is their bread and butter, thus they believe they should love their work and dedicate their lives towards the improvement of their craft as mental health nurses. Gjergji et al. (2022) conducted a study to investigate employee compensations and benefits through pre-and post-COVID-19 periods and discovered that although medical insurance and bonuses exist among benefits the overall satisfaction level regarding compensation packages is low because staff members think their earnings only cover basic necessities. The data matches the nurse respondents’ opinions about financial stress thus confirming its enduring nature which compels them to supplement their income through outside sources. Numerous healthcare professionals continue working due to intrinsic work pleasures instead of monetary compensation even though the research indicates relationship between proper pay rates and employee satisfaction and workplace retention (Gjergji et al.,2022).

A significant number of mental health nurses maintain dedication to their vocation although they face financial hurdles because they consider their work both their main source of income and a life purpose. According to Hartley et al. (2020) nurses maintain their dedication through therapeutic alliances with patients which bring intrinsic job satisfaction in mental health care. The statements match how your participants believe work should be a beloved profession and service area where one strives to reach mastery. When it comes to career growth and development, there is little information shared by the respondents on the organization’s effort to better their career development. Nonetheless, the respondents confirmed that they are receiving various training for the different aspects of mental health nursing and they feel that these training are very important for

them to carry out their duties excellently.

Mlambo et al. (2021) analyzed nurses' CPD experiences by synthesizing qualitative research results in 2021. Nurses recognize targeted training as an essential part of CPD for staying knowledge and skill current to deliver high-quality patient care. The evaluation of clinically focused training by mental health nurses demonstrated its essential role for daily practice since this sort of training improves their duty performance excellence. The research discovered inconsistent organizational support for nurses' long-term career development despite noting that training advancement (above immediate training) would beneficially impact their professional progression. The study published by Howard et al. (2023) demonstrated that mental health nurses believed training specifically about physical health care integration would improve their practice performance alongside patient results. Staff members presented strong appreciation for these learning opportunities because they enhanced their job competence as well as self-confidence. The research revealed one main challenge but the study showed organizations do not have structured career paths which causes nurses to explore professional growth opportunities on their own. The current situation demonstrates a favorable attitude toward education yet exhibits weakness in comprehensive growth opportunities.

Different contradictions appear in both types of data. Based on the figures, average organizational commitment is moderate, with the highest number for normative commitment and the lowest for affective. Alternatively, the qualitative observations reveal a strong emotional commitment from all five participants, as they all reported being strongly loyal and engaged with the organization. The discrepancy likely arises from sample size where the few numbers in the sample (only 5 vs.101) may mean that those interviewed were more committed nurses. Additionally, data analysis can indicate various commitments, but positive experiences are stressed more in qualitative disclosure. This analysis could mean that even if someone has a high commitment score in qualitative terms, it does not mean their rating is truly high in numbers.

**Table 6**  
*Mental Health Nurses' Level of Resilience*

Variables	N	Minimum	Maximum	Mean	STD.Deviation
Positivity	101	3.25	5.00	4.4274	.44548
Interpersonal	101	2.80	5.00	4.0277	.50042
Anchor	101	2.20	5.00	3.9168	.46927
Response to novelty	101	2.50	5.00	3.7104	.55310
General Mean: 4.0206			Average SD: 0.4920675		

Table 6 highlights the resilience level of mental health nurses in terms of being positive: It appears that nurses maintain optimistic attitudes when under stress. The strong positive trait of nurses appears through their 4.43 rating out of 5 which leads to a high evaluation of resilience features. Group members exhibit similar levels of the measured value as demonstrated by the small standard deviation of 0.45. The high score suggests that nurses base their resilience upon their ability to maintain interpersonal relationships or social support. These nurses display strong relationship utilization skills for resilience since their average score of 4.03 is elevated. Variation is classified as moderate because the SD measures 0.50. A stable anchor for resilience appears through personal values and sense of purpose together with established routines. Average score of 3.92 reveals that nursing professionals have an established capacity for resilience which remains solid. Subjects displayed similar levels of scoring according to 0.47 SD value. The test seems designed to assess how well nurses respond to unexpected or new situations. Adaptability serves as a central concept. The score of 3.71 represents moderate-to-high adaptability even though it stands as the lowest among four measurements. The wide range of scores indicated by SD 0.55 reveals that nurses exhibit different levels of success and difficulty when it comes to this competency.

The research shows that mental health nursing staff demonstrate elevated resilience capacities when dealing with emotional and occupational requirements including work-related stress as well as burnout and traumatic events. Interpersonal resilience and optimism are essential skills of mental health nurses because they practice these capabilities effectively in healthcare environments. The ability to adapt to new situations is an area where



some nurses need help which can be solved through specific training together with support systems. The consistent mental health nurse resilience levels have low standard deviations that indicate shared cultural or training aspects among mental health nursing professionals. Research points to adequate emotional and professional readiness among nurses to address their occupational and psychological needs. Bui et al.'s (2023) review aligns with the high positivity score in this study, as positivity often correlates with well-being and growth. The review found that mental health nurses' resilience is generally moderate to high and positively associated with psychological well-being, post-traumatic growth, and compassion satisfaction.

**Table 7***Emergence of the Theme: Adaptability*

Respondents	Significant Statements	Emerging Concepts	Level	Category	Theme
R1	"Minsan napapagod pero ganun 237aming e, itulog mo lang yan, ok kana ulit bukas"	Consistency	High	Resilience	Adaptability
R2	"Mahalaga ang day off sa amin para makarecover kami sa stress"	Recovery	High	Resilience	Adaptability
R3	"Dapat lagi kang passive, don't take everything too seriously"	Coping Mechanisms	High	Resilience	Adaptive Resilience
R4	Malaking bagay ang suporta sa min ng aming mga mahal sa buhay"	Support System	High	Resilience	Adaptive Resilience
R5	"Mahalaga din sa amin 237aming-apreciate ng nakatataas yung ginagawa 237aming, kasi na-momotivate kami"	Support System	High	Resilience	Adaptive Resilience

The respondents' level of resilience is also considered high based on reactions and statements provided by respondents. Primarily, according to the respondents, a positive mindset towards their job allows the nurses to absorb pressure and repel burn out tendency. Sporadic acts of violence and verbal abuses are common in the psychological wards however, the respondents believe that an open mind keeps them afloat and they consider these things as part of the challenges in their workplace. Being passive and not overreacting with the patients' actions also help them to cope up with daily pressure. Interestingly, the respondents believed that days off from work provides them opportunity to regain energy and composure to face future challenges. Bui et al. (2023) established that nurses must develop positive thinking supported by professional dedication to confront adversity effectively. Nurses who understood patient aggression as a part of their duties demonstrated stronger abilities to manage emotional stability while managing stress in their work similarly to the idea of an open mind keeping them "afloat."

Research demonstrates that family support serves as a primary coping strategy for mental health nurses because nurses consider their work as essential for family support leading to professional devotion and career evolution. A review authored by Labrague (2021) examined how social support from families along with other caregivers strongly improved health worker psychological resilience particularly within nursing professions during the COVID-19 pandemic. Family support worked as a protective factor in workplace stress which allowed nurses to handle their emotional workload. Analysis supports the notion that family support serves as a critical stress management tool for mental health nurses because it stabilizes emotions and ties their purpose to family duties.

The research conducted by Zhou et al. (2023) validated the importance of family-based external backing for nurse resilience development. The research focused on generic nursing staff but its results indicate that family-backed support enhances emotional management and resilience mechanisms which mental health nurses may also benefit from. Moreover, organizational support from the institution's higher authorities and colleagues through a systematic and the harmonious relationship also uplifts the respondents' motivation towards their job. Some of the respondents mentioned honesty to one's self and dignity as their wall to shield them from emotional exhaustion and intrigues in the work place. These values auto-generate moral boost for the nurses and aid them to stay confident and self-assured.

The quantitative and qualitative data partially contradict each other regarding adaptability. The statistical findings suggest that although adaptability is positive for the nurses, it is not consistent for all with different levels (SD=0.55). However, the qualitative feedback from the 5 respondents consistently shows that their adaptability factor is “High,” which relies on coping, recovery and support systems. This discrepancy likely stems from small sample size: Nurses who are highly adaptable are more likely found in the qualitative group, whereas the quantitative results include a bigger range. Another possible reason is that the qualitative part of the data covers various aspects of adaptability such as recovery and support, whereas the quantitative data examines Adjustment to Novelty. Both quantitative and qualitative results recognize resilience, but the qualitative data overstates adaptability compared to the quantitative findings, suggesting a potential over representation of positive adaptive experiences in the smaller sample.

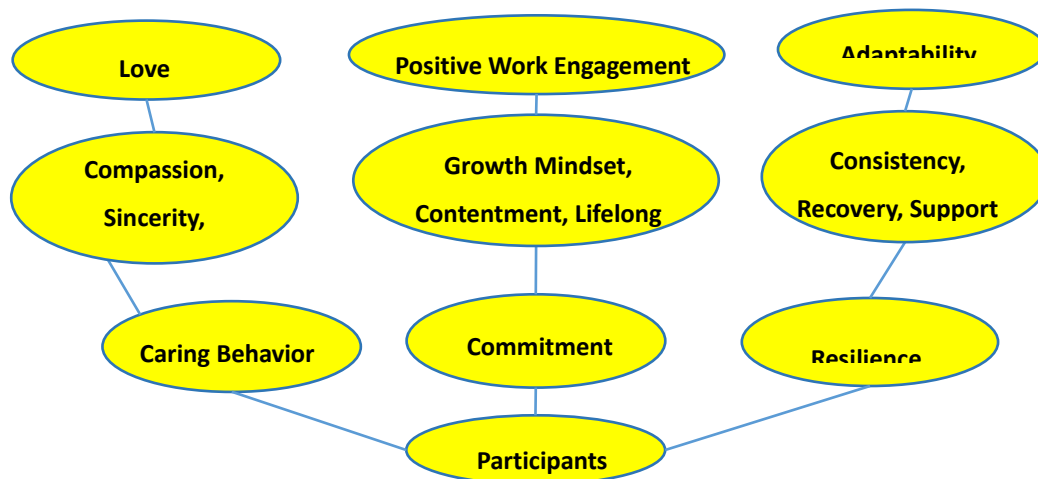


Figure 1 Psychiatric Nurses' Pathway to Excellent Care Giving

The diagram presents a hierarchical model where participants’ core attributes (caring behavior, commitment, resilience) contribute to meaningful outcomes in their professional practice. It emphasizes the interplay between individual traits and broader concepts, showing how nurses’ behaviors and resilience lead to compassionate, consistent care and a supportive environment. This framework aims to explain how mental health nurses’ characteristics enhance their effectiveness and well-being in their roles, aligning with the study’s focus on caring behavior, organizational commitment and resilience.

**Table 8**  
*Differences on the Respondent’s Caring Behavior (n=101)*

	Assurance		Knowledge		Respect		Connectedness	
	t/F	p-value	t/F	p-value	t/F	p-value	t/F	p-value
Age	.407	.803	.558	.694	1.177	.326	.090	.985
Sex	-2.854	.005	-1.678	.096	-1.697	.093	-.229	.819
Marital Status	-1.145	.255	.088	.930	-1.063	.290	-.928	.356
Length of Experience	.849	.519	1.702	.142	.482	.789	.411	.840
No.of Patients Handled	1.190	.318	.943	.468	1.002	.429	1.173	.327

*For interpretation: Those highlighted in green is considered significant  
Mean difference is significant at 0.05 alpha level*

Table 8 above shows that among the profile variables, only that of sex produced significant change/difference on the respondents caring behavior specifically for the sub scale assurance with computed p-values lower than 0.05. The results imply that female nurses show higher caring assurance than their male counterparts. While, table 9 presents the differences on the respondents’ organizational commitment when grouped according to profile. Findings reveal that no significant difference were found in organizational commitment of the respondents except for the variable length of service under Normative sub-scale. Data reveals that nurses with longer years of experience tend to believe that they should stay in their organization.

**Table 9**  
*Differences on the Respondent's Organizational Commitment (n=101)*

	Affective			Continuance			Normative		
	t/F	p-value	I	t/F	p-value	I	t/F	p-value	I
Age	.372	.828	NS	.396	.811	NS	1.307	.273	NS
Sex	-.108	.914	NS	-.013	.990	NS	-.308	.759	NS
Marital Status	.957	.341	NS	-.543	.588	NS	.488	.627	NS
Length of Experience	.519	.761	NS	.359	.875	NS	2.606	.030	S
No.of Patients Handled	1.116	.359	NS	.669	.675	NS	.250	.958	NS

Mean difference is significant at 0.05 alpha level

**Table 10**  
*Differences on the Respondent's Resilience (n=101)*

	Positivity		Interpersonal Skills		Having an Anchor		Response to Novelty	
	t/F	p-value	t/F	p-value	t/F	p-value	t/F	p-value
Age	1.411	.236	1.379	.247	1.412	.236	2.006	.100
Sex	-1.536	.128	-.906	.367	-1.020	.310	.806	.422
Marital Status	-.691	.491	-.938	.350	-2.201	.030	-2.476	.015
Length of Experience	.869	.505	1.703	.141	1.682	.146	1.833	.114
No.of Patients Handled	1.271	.278	.527	.787	.243	.961	.214	.972

For interpretation: Those highlighted in green is considered significant  
Mean difference is significant at 0.05 alpha level

Table 9 highlights the differences on the respondents' resilience when grouped according to profile. Data analysis show that only the profile variable *marital status* with the sub scales *having an anchor* and response to novelty produced a significant difference (<0.05 alpha level) among sub-scales and variable profiles of respondents. The rest of the subscales and variable profiles show no significant relationship with p-value>0.05 alpha level. This means that married respondents believe they can overcome adversities and challenges because they have long term trusted friends and colleagues that they can count on. Response to novelty shows that mental health nurses who are already married believed that they can overcome challenges and could adapt to changes and innovation implemented in their workplace possibly indicated by moral and psychological support provided by their spouses.

Yu et al. (2023) found a similar findings in their study that focused on resilience and burnout in Chinese psychiatric nurses. Their quantitative findings showed that marital status played a significant role in resilience, with married nurses scoring higher in their ability to adapt to changes at work—similar to the "response to novelty" subscale. The qualitative interviews further emphasized that support from spouses provided psychological stability, enabling these nurses to tackle new challenges like updated treatment protocols or administrative changes with more confidence.

**Table 11**  
*Correlation of Caring Behavior, Organizational Commitment and Resilience of Mental Health Nurses*

Variables	CB assurance	CB knowledge	CB respect	CBconnectedness	OC affective	OCcontinuance	OC normative	R positivity	Rinterpersonal	R anchor	R response to novelty
CBassurance	1.000	0.608**	0.685**	0.655**	0.005	0.022	0.104	0.455**	0.224*	0.291**	0.168
CBknowledge	0.608**	1.000	0.597**	0.515**	0.005	0.118	0.132	0.325**	0.205*	0.087	0.096
CBrespect	0.685**	0.597**	1.000	0.747**	0.075	0.094	0.127	0.430**	0.194	0.198*	0.136
CBconnectedness	0.655**	0.515**	0.747**	1.000	0.037	0.002	0.037	0.373**	0.085	0.098	0.068
OCaffective	0.005	0.005	0.075	0.037	1.000	-	-	-	-	-	-
OCcontinuance	0.022	0.118	0.094	0.002	-	1.000	-	-	-	-	-
OCnormative	0.104	0.132	0.127	0.037	-	-	1.000	-	-	-	-
Rpositivity	0.455**	0.325**	0.430**	0.373**	-	-	-	1.000	-	-	-
Rinterpersonal	0.224*	0.205*	0.194	0.085	-	-	-	-	1.000	-	-
Ranchor	0.291**	0.087	0.198*	0.098	-	-	-	-	-	1.000	-
Rresponse to novelty	0.168	0.096	0.136	0.068	-	-	-	-	-	-	1.000

Legend: p<0.01=Significant at 0.01 level (\*\*)  
p<0.05=Significant at 0.05 level (\*)

This table shows the correlation values between elements related to caring behavior along with

organizational commitment and resilience among mental health nursing staff. The four essential variables composing Caring Behavior (CB) in nursing show a complete connection between nursing practices that affect patient care quality. Research variables establish mutual causation and show that nursing interventions create the quality of patient-nurse relationships. Professional respect shows such a strong relationship with connectedness ( $r=0.747, p<0.01$ ). This implies that nurses who respect patients professionally create deeper patient relationships automatically. Nurses who establish confidence through their actions equally maintain respect for their patients ( $r=0.685, p<0.01$ ) due to their strong knowledge of patient care which enables them to offer reassurance. The inspiration of absolute confidence among patients leads them to develop stronger interpersonal bonds since all these caring behaviors reinforce each other.

Karaca et al. (2022) provide empirical support for these relationships in their study of nurses in Istanbul, utilizing the CBI-24 inventory, which encompasses all four dimensions of care. The study conducted with nurses in Istanbul uses CBI-24 inventory to demonstrate mathematics between these relationships regarding all care dimensions. Nurses reported clinical abilities as their most valuable aspect of care according to their evaluation which surpassed assurance then respect and finally connectedness. First-place rating for technical proficiency in nurse self-assessments confirms their view that high proficiency levels create greater reassurance opportunities. The research confirmed that nurses consider both interpersonal components of respect and connectedness essential for quality care despite their confirmation of knowledge as their most significant aspect. Integration of technical skills with reassurance and respect and connection stand as the essential factors that elevate total care delivery because nurses' caring activities maintain continuous reinforcement of each other in clinical settings.

Özparlak et al. (2023) investigated the relationship between self-compassion and caring behaviors between nurses. However, the findings indicated a positive relationship between self-compassion and caring behaviors in knowledge and skill, assurance, respectfulness and connectedness. The significance of nurses' emotional welfare in helping nurses in nurturing effective patient relationship to deliver total care is reinforced. Furthermore, Ashagere et al. (2023) assessed the caring behaviors of nurses with respect to the self-compassion and the correlation of caring behavior with the self-compassion. They found that greater levels of self-compassion were associated with more caring behaviors in the areas of knowledge and skill, assurance, respectfulness and connectedness. It highlights the significance of nurses' emotional health in promoting good patient related caring. Mean score for assurance ( $4.23\pm 0.43$ ), respectfulness ( $4.39\pm 0.56$ ), knowledge and skill ( $4.45\pm 0.55$ ), and connectedness ( $4.48\pm 0.63$ ), are the same, which means that all are so close and they collectively play a role in total caring behavior.

The next three variables— affective, continuance and normative type of commitment to the organization. Show no meaningful relationships to caring behavior. The test result is statistically insignificant ( $r=0.075$ ) ( $p=0.456$ ), for which the strongest association is between affective and respect. Meanwhile, the 0.03 level correlation for both continuance and normative is low in the cases of services that exhibit compassion in the treatment of patients. The level of organizational loyalty of mental health nurses does not depend upon the extent of the caring they show. A nurse's emotional bond and work loyalty for the government do not rely on high levels of working care.

The study of Thomas et al. (2019) focused on how nurses feel about caring behaviors with their patients in a long term acute care hospital. However, it discovered disagreements between nurses' and patients' views as to what caring involved, with patients favoring emotional support and nurses emphasizing task oriented care. The current finding that organizational commitment does not robustly predict caring behavior is supported by the fact that not caring can be inconsistent with the organizational expectations—something which the study is not specific to mental health nurses but, in general, it can be assumed that caring behaviors do not necessarily have to match up with the organizational loyalty. The weak statistical association ( $r=0.075$ ) that this study reported could represent this disconnect wherein affective commitment (emotional bond) may slightly affect respect but not caring in general.

Al-Hamdan et al. (2021) studied how organizational support and commitment influence nurses' performance to a crisis. Such indirect caring behavior and the effect of affective commitment on performance were both revealed through the effects found, which showed that affective commitment positively influenced performance and that perceived organizational support mediated the effect. This aligns with the low correlation the current study noted for continuance and normative commitment ( $r=0.03$ ) which suggests that when people get committed to an organization unemotionally (continuance) or because they are stressed to be held accountable for an emotional reason (normative) in a mental health environment where there are high emotional demands, compassionate care won't be forthcoming.

The last section provides insight on the correlation of caring behavior and resilience of mental health nurses. The findings from the data given demonstrate the relationships between caring behavior (CB) variables and resilience related factors in nurses. Rpositivity is also the variable with greatest and most consistent correlations to other caring behaviors. Rpositivity & CBassurance ( $r=0.455$ ,  $p<0.01$ ) have moderate positive correlation. Nurses are not only confident and reliable, but also reassured, this would imply a higher resilient and optimistic result. A strong relationship is established because of statistical significance ( $p<0.01$ ). Findings from recent studies on positive psychological attributes are consistent with the association between positivity and nurses' resilience ability in coping with stressors in the workplace.

Similarly, Zhang et al. (2022) studied the interactions between resilience, self-efficacy and compassion fatigue, and determined that positive caring behavior has significantly predicted higher resilience and lower burnout. This holds in the given data, since the provided data reveals a moderate positive correlation between positivity and assurance ( $r=0.455$ ), meaning that nurses that project positivity and assurance are more capable of handling adversity and thus, better able to be resilient. Yan et al. (2022) also provided further corroborations by demonstrating that the occupational stress was positively associated with quality of life in nurses and psychological resilience act as a protecting factor in mediating the relationship internalized occupational stress and quality of life in nurses. CBrespect & Rpositivity have moderately strong correlation ( $r=0.430$ ,  $p<0.01$ ): nurses who demonstrate respect towards patients tend to have higher resilience and higher positivity. Respect would probably help create a healthy environment where people would feel more resilient.

Zhou et al. (2023) had revealed that organizational support (i.e. respectful interactions), as a mediator, links to the association between resilience and work engagement in nurses. This implies that the culture of mutual respect might be wider in respect to nurses to patients and that can lead to positivity and resilience. Nassar et al. (2024) also shown that the ability of nurses to work with resilience and compassionate care (which is inevitably tied to it: respect) enhances well-being in nurses creating a wonderful positivity and resilience environment.

**CBconnectedness & Rpositivity** ( $r=0.373$ ,  $p<0.01$ ): revealed a slightly weaker correlation, but not showing statistical significance, yet still potentially significant in suggesting that nurses who are connected to another could be patients, colleagues or perhaps their purpose is associated with higher positive and resilient caring behavior.

**CBknowledge & Rpositivity** have moderate correlation ( $r=0.325$ ,  $p<0.01$ ). This moderate correlation indicates that nurses with greater knowledge tend to maintain a positive outlook, possibly due to confidence in their skills contributing to resilience. Utne et al. (2019) investigated nurses' knowledge about pain management and found that increasing knowledge is associated with diminished stress and more optimistic attitude regarding the ability to cope. Authors showed that nurses with higher level of knowledge had lower stress and perceived level optimism. Badriyah et al. (2025) also conducted a systematic review and meta-analysis on effectiveness of cognitive behavioral therapy (CBT) in the decrease of psychological distress in nurses. According to their findings, being taught how to apply cognitive techniques in CBT helped reduce nurses' anxiety and depression but also increased positivity because of their ability in using CBT in their personal and professional lives. This mirrors the moderate correlation registered as knowledge of cognitive behavioral techniques strengthens a positive view by means of practical application and resilience building. Allahverdi et al. (2024), studied

cognitive control and flexibility in intensive care unit nurses and found that those with stronger cognitive skills would report higher intrinsic job satisfaction and positivity. The authors reasoned that this was consequent of confidence in handling complex situations, with the resilience drawing a parallel from the knowledge-positivity correlation. Taken together, these studies imply that the knowledge of the practicing nurses of cognitive behavioral techniques equips them with real life practical and strengthens their emotional attitudes and positivity, which is concordant with the moderate correlation.

**Rinterpersonal & CBassurance** have weak correlation ( $r=0.224$ ,  $p<0.05$ ): This weaker correlation, significant at a less stringent threshold ( $p<0.05$ ), suggests that nurses with strong interpersonal skills are somewhat more likely to provide assurance. While the relationship is positive, its lower magnitude indicates it's less influential than the positivity-related factors. Tajigharajeh et al. (2021) conducted an insightful study that explored how emotional intelligence and interpersonal sensitivity—both vital aspects of interpersonal skills—connect with the professional outcomes of nurses. Their findings revealed a positive link between interpersonal sensitivity and nurses' ability to build trust and reassurance during patient interactions, although the strength of this correlation was moderate rather than strong. This aligns with the current findings ( $r=0.224$ ,  $p<0.05$ ), indicating that while interpersonal skills play a role in fostering assurance, they aren't the only or most significant factor. The study highlights that emotional intelligence, which shares some common ground with interpersonal skills, boosts nurses' ability to provide reassurance, but its effectiveness can vary based on factors like workload and the severity of patient conditions.

Iwanow et al. (2021) looked into how nurses' communication skills impact patient care outcomes. They found a positive, albeit weak link between how well nurses communicate and how assured patients feel, with a correlation strength that mirrors the current findings ( $r=0.224$ ). The authors point out that while good interpersonal skills can help nurses reassure patients, other elements—like clinical knowledge or the support from the environment—are even more crucial in boosting patient confidence. This aligns with your observation that, although the relationship is meaningful, it's not as powerful as factors related to positivity. Chrzan-Rodak et al. (2022) discovered that nurses who excel in interpersonal skills tend to be a bit more effective at instilling trust in their patients, as indicated by patient-reported trust scores ( $r\approx 0.20-0.25$ ,  $p<0.05$ ). While this correlation is relatively weak, it's still significant and aligns with the current findings. It suggests that while interpersonal skills play a role in building assurance, they might be influenced by personality traits or the emotional context of the situation. This supports the notion that factors related to positivity could potentially overshadow the impact of interpersonal skills.

**Ranchor & CBassurance** have moderate correlation ( $r=0.291$ ,  $p<0.01$ ): An “anchor” between emotional stability and the capacity to give assurance is this moderate correlation. There are those nurses who have a more stable emotional foundation, to reassure with more courage and that is what reinforces resilience. This connection is backed by recent studies highlighting how crucial emotional regulation and stability are in the field of professional caregiving. For example, Gómez-Urquiza et al. (2020) pointed out that emotional stability plays a key role in reducing burnout and helps nurses handle stress more effectively. This, in turn, boosts their ability to provide emotional support to patients. Al Maqbal et al. (2022) found that emotional stability acts as a mediator between job stress and the quality of care provided by nurses. This suggests that nurses who are emotionally grounded are better prepared to maintain their supportive roles, even under pressure. Their research confirms that having a strong emotional foundation not only safeguards the well-being of nurses but also enhances their capacity to reassure patients—an essential aspect of compassionate care and therapeutic presence. A study by Abshire et al. (2019) also showed that nurses with emotional resilience are more inclined to engage in patient-centered communication, often providing reassurance through active listening and emotional presence. This approach is directly linked to higher patient satisfaction and lower anxiety levels. All these findings highlight the importance of the connection: emotional stability (Ranchor) serves as a solid psychological foundation for providing reassurance (CBassurance), ultimately nurturing a resilient nursing workforce that can effectively navigate emotionally charged clinical settings.

**Table 12**  
*Modular Intervention Plan*

Topics	Objective	Target Construct	Activities	Duration	Target Group	Expected Outcome
Psychological Wellness	Enhance empathetic and respectful patient interactions to support mental well-being	Caring Behavior (Focus: Respect subscale)	-Role-playing sessions for empathetic communication -Workshops on patient-centered care -Reflective exercises on respectful caregiving	2 hours/ week for 4 weeks	All nurses, with focus on married and single nurses (due to significant differences in respect subscale)	Improved patient-nurse relationships, higher scores in respect subscale, reduced emotional fatigue
Enhancing Caring Behavior	Strengthen respectful and empathetic interactions with patients	Caring Behavior (Focus: Respect subscale)	-Role-playing exercises to practice respectful communication -Workshops on empathy and patient-centered care	2 hours/ week for 4 weeks	All nurses, with emphasis on married and single nurses (due to significant differences in respect subscale)	Improved patient interactions, increased scores in respect subscale of caring behavior
Building Organizational Commitment	Foster loyalty and normative commitment to the organization	Organizational Commitment (Focus: Normative subscale)	Training on organizational values and mission -Mentorship programs pairing experienced nurses(>11 years)with newer staff -Group discussions on workplace challenges and solution	1.5 hours/ week for 6 weeks	Nurses with varying lengths of experience particularly those with>11 years	Enhanced normative commitment, stronger alignment with organizational goals
Boosting Resilience	Develop coping mechanisms and adaptability to workplace stressors	Resilience (Focus: Having an Anchor and Response to Novelty subscales)	-Mindfulness and stress management workshops -Resilience-building activities(e.g.,scenario-based problem-solving) -Support groups to share experiences and coping strategies	2 hours/ week for 5 weeks	All nurses, with tailored sessions for married/ single nurses (due to significant differences in anchor and novelty subscales)	Increased resilience scores, better stress management, and adaptability to new challenges
<b>Integrating Professional Functioning</b>	Enhance motivation, decision-making, competence, and reliability	All Constructs (Caring Behavior, Organizational Commitment, Resilience)  All Constructs	Interdisciplinary team-building exercises -Reflective journaling on professional growth -Simulation-based training for complex decision-making in mental health settings	2 hours/ week for 4 weeks	All nurses	Improved professional performance, higher motivation, and enhanced competence in mental health nursing
Ongoing Support and Evaluation	Ensure sustained well-being and professional growth	All Constructs	-Monthly peer support meetings -Regular feedback sessions with supervisors -Pre-and post-intervention surveys to measure changes in caring behavior, commitment, and resilience	On going, with evaluations every 3 months	All nurses	Sustained improvements in well-being, measurable increases in construct levels, and long-term professional benefits

#### 4. Conclusions and recommendations

Results show mental health nurses in the Greater Manila area maintain high job satisfaction through sustained employment over time since they have been active in the field for an equal distribution of years

spanning 11 to 24 months. Mental health nurses exhibited outstanding caring behavior together with moderate organizational commitment and average resilience levels. The practice foundation of their caring behavior and the support provided by their resilience keep them strong in difficult nursing situations. The nurses' moderate commitment rating reveals opportunities for workplace improvement since it indicates limited workplace engagement although they provide excellent patient care now. These nurses can maximize their mental health care delivery by organizations dedicating efforts toward improving support resources alongside recognition platforms and adaptability capabilities. There is no significant difference on the respondents' caring behavior except for the variable marital status under the subscale respect. Conclusively, married and single respondents have different ideas and practices of caring acts specifically for the concept of respect for their patients. The same findings is identical with the results of organizational commitment whereas there are no significant differences when profile variables were considered. Only one profile variable, *length of experience*, under the subscale *normative* shows a significant difference. For the value of resilience, this study found no significant differences when profile variable was considered except for the variable marital status under subscales *having an anchor* and *response to novelty*. There are some strong positive connections among most of the variables, particularly assurance, respect, and connectedness. On the other hand, affective, continuance, and normative don't seem to have significant relationships with the other variables. This suggests that affective, continuance, and normative commitments might not have a direct impact on the caring behavior variables in this scenario. Interestingly, positivity shows notable positive relationships with several other variables, indicating a general trend of positivity that ties community elements together. In summary, assurance stands out as the variable most strongly linked to others, especially influencing respect, connectedness, and positivity. The effect of high level of caring behavior, commitment and resilience to the respondents' function as mental health nurses proves highly reflective on nurses motivations, actions and decisions. The respondents are highly functional and dependable considering they have the skills, knowledge, experience, right intentions and support system from their own family and organization.

For Hospital Administrators. Address Low Nurse-to-Patient Ratios: The alarming patient loads are beyond the recommended ratios to minimize burnout and better the results. Make staffing changes with the addition of more mental health nurses or the re-allocation of patients' assignments in accordance with evidence-based ratios. This will promote job satisfaction and quality of care to patients. Enhance Organizational Commitment: Nurses show a moderate level of organizational commitment implying low level of workplace engagement. Implement such recognition platforms as monthly recognition of exceptional care or peer-nominated awards that will increase morale and engagement rates. Also, offer professional development opportunities, such as workshops for state-of-the-art mental health care techniques to make the employees feel that they are part of the organization. Strengthen Support Resources: Invest in in-work environment resources like access to counseling, stress management workshops, and support groups from co-workers for married and single nurses. This is crucial because the single nurses depend much on provisions at the workplace, but in the case of married nurses there is spousal support.

For Psychiatric Nursing Supervisors. Customize Support on the Basis of Marital Status: Married nurses differ from single ones in the aspect of patient care and resilience subscales (having an anchor and response to novelty). For these differences, hold special training sessions such as workshops on patient. Practice respect by accommodating various personal opinions and making sure that all the nurses follow the best practices. Leverage Length of Experience: Variations in the lapse of experience of nurses (11-24 months) exhibit differences in normative organizational commitment. Match up less experienced nurses with mentors who have stayed longer to offer insights on workplace norms and commitment, creating a greater loyalty and engagement.

For Mental Health Nurses. Build Resilience Through Community Connections: The single nurses, who depend on work-place and community resources, should engage themselves in professional networks or community-based mental health initiatives to develop resilience. Support groups at local associations of nursing or peer communities can also be helpful on an emotional and professional basis. Focus on Positivity and Assurance: The high level of positive relationships between assurance, respect, connectedness, and positivity



indicates that a positive mindset and focus on assurance while interacting with patients may increase the general caring behavior. Journalling or even team debriefs can be used to promote these qualities through reflective practices.

For the Healthcare Policy Makers in the Philippines. Create national guidelines on nurse to patients ratio. The overwhelming patient loads described (71–100 patients per nurse) emphasize the importance of national standards of mental health nursing ratios that could be enforced. Formulate and put in place policies which require ratios of 1:4 or 1:5 in mental health facilities in order to eliminate stress and enhance standards of care. Fund Resilience and Support Programs: Provide funds for those programs dedicated to increasing the nurses' resilience and organizational support (subsidized mental health services or grants to hospitals to introduce recognition platforms). This will cater for the moderate level of resilience and commitment identified.

For Professional Nursing Organizations. Advocate for Workplace Improvements: Apply the results of moderate organizational commitment to lobby for the improvements in conditions of work such as improving patient burdens and improving support systems. Work with hospitals to implement programs with a view to enhancing nurse engagement and resilience. Design Specialized Training in Respect and Resilience: Considering the variations in the manner married and single nurses apply respect and resilience, design continuing education modules that focus on these differences. These modules need to have culturally sensitive care practices and adaptive resilience strategies.

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# Learning and development culture, technology adoption, and change management strategies: Basis for a dynamic and positive learning environment framework

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## Abstract

This study investigated the interconnected roles of learning and development culture, technology adoption, and change management strategies in creating dynamic and positive learning environments within universities. Focusing on top universities in Hunan Province, China, the research explored these elements through a descriptive design, surveying 400 teaching and non-teaching personnel. The study described the learning and development culture (opportunities for growth, collaborative environment, support), technology adoption (infrastructure, training, support, evaluation), and change management strategies (engagement, communication, resistance management). Key findings revealed general agreement among respondents regarding the presence and effectiveness of these elements within their institutions. Crucially, the study found a strong, significant relationship among these three factors. Based on these findings, a framework for fostering dynamic and positive learning environments was developed. This framework provides valuable guidance for universities seeking to enhance their learning ecosystems, promoting continuous growth and development by strategically integrating learning culture, technology, and change management. The study offers practical insights for university leaders and administrators aiming to cultivate thriving learning environments in the rapidly evolving higher education landscape.

**Keywords:** learning and development culture, technology adoption, change management, positive learning environment

## **Learning and development culture, technology adoption, and change management strategies: Basis for a dynamic and positive learning environment framework**

### **1. Introduction**

The modern business landscape is characterized by constant technological disruption. To remain competitive, organizations must not only embrace new technologies but also ensure their workforce can effectively utilize them. This necessitates a learning and development (L&D) culture that fosters continuous learning and adaptability alongside a well-defined technology adoption and change management strategy. A culture of L&D prioritizes continuous learning and development for all employees. This fosters a growth mindset, where employees embrace challenges and view them as opportunities to improve. According to a 2018 report by Deloitte, organizations with a strong L&D culture experience 21.8% higher profitability compared to those with a weak L&D culture. Learning programs should cater to individual needs and learning styles.

The landscape of higher education is undergoing a significant transformation driven by the relentless pace of technological innovation. Universities across the globe are increasingly embracing technology to enhance learning experiences, improve operational efficiency, and prepare students for the demands of the digital workplace. Technology plays a crucial role in driving L&D initiatives. E-learning platforms, microlearning modules, and gamified learning experiences can deliver effective and engaging training at scale. However, successful technology adoption goes beyond simply acquiring new tools. Ensure the chosen technology is user-friendly and aligns with employee preferences. Complex interfaces can lead to frustration and hinder adoption rates. Integrate new L&D technologies with existing HR and learning management systems to streamline work-flows and improve data accessibility. Technology offers solutions for addressing the growing student populations in universities.

Universities are complex ecosystems constantly adapting to a dynamic world. By employing well-defined change management strategies, universities can navigate the complexities of transformation effectively. A clear vision, strong leadership, and active stakeholder engagement are essential for fostering a culture of continuous improvement and ensuring a successful transition towards a more dynamic and future-proof higher education institution. By employing well-defined change management strategies, universities can navigate the complexities of transformation effectively. A clear vision, strong leadership, and active stakeholder engagement are essential for fostering a culture of continuous improvement and ensuring a successful transition towards a more dynamic and future-proof higher education institution. A strong L&D culture fosters a willingness to learn and embrace new technologies. This, coupled with a strategic technology adoption plan, empowers employees to effectively utilize new tools. Finally, a robust change management strategy ensures a smooth transition and maximizes the benefits of technology implementation. By effectively integrating these three elements, organizations can create a dynamic and adaptable workforce that thrives in the ever-evolving technological landscape.

Chinese universities are undergoing a significant transformation in their approach to Learning & Development (L&D) culture, technology adoption, and change management strategies. The Chinese government actively promotes a culture of lifelong learning through policies and funding initiatives. However, a shift towards student-centered learning models is still in progress. Many universities emphasize skill development and employability, leading to a curriculum that prioritizes practical skills and industry certifications. While faculty development programs exist, equipping educators with effective L&D practices remains a challenge. Management Systems (LMS) are becoming increasingly prevalent, facilitating blended learning environments and centralized access to course materials. Domestic platforms like XuetangX offer free online courses, increasing access to education and fostering collaboration within China. The application of Artificial Intelligence (AI) in personalized learning or intelligent tutoring systems is still in its nascent stages. Change initiatives are often driven by government mandates or university leadership, with limited stakeholder engagement. The

emphasis is often on immediate outcomes, potentially hindering long-term cultural shifts or faculty buy-in. Transparency and clear communication about change goals and rationale can be limited, leading to resistance. Chinese universities have made significant strides in technology adoption and L&D infrastructure development. However, fostering a strong learning culture that empowers faculty and students requires continued efforts in: Equipping faculty with effective L&D practices and technology integration skills is crucial. Engaging stakeholders in the change process leads to stronger buy-in and smoother implementation. Developing a clear vision for a learning-centered culture and providing sustained support for faculty and students are essential for long-term success.

The researcher has a strong personal interest in the field of Learning & Development. The researcher sees that technology adoption and change management as crucial tools for fostering a dynamic and effective L&D environment.

**Objectives of the Study** - The study aimed to assess learning and development culture, technology adoption, and change management strategies to develop a dynamic and positive learning environment framework. Specifically, this study described the learning and development culture of the universities in terms of opportunities for growth, collaborative learning environment, and supportive environment; determined the level of technology adoption in terms of infrastructure, training, support and evaluation; assessed the change management strategies in terms of engagement, communication channels and resistance management; tested the significant relationship between learning and development culture, technology adoption and change management; and developed a framework for a Dynamic and Positive Learning Environment.

## 2. Methods

**Research Design** - The study employs a descriptive design to evaluate learning and development culture, technology adoption, and change management practices within universities in China. This design is suitable for systematically describing the state of affairs as it exists and exploring relationships between these variables without manipulating them. Correlation analysis was used to understand how these practices are interconnected and can inform the development of a management strategy framework for Chinese universities.

**Participants of the Study** - The participants of this study comprised teaching and non-teaching personnel from the top five universities in Hunan Province, China. A purposive random sampling technique was employed to ensure representation from various academic departments (e.g., humanities, social sciences, sciences, engineering) and administrative units (e.g., admissions, libraries, IT services). The researcher asked permission from the Human Resource Department to distribute the questionnaire. A total of 400 participated in this study, with a proportional allocation of participants from each stratum based on the size of each university. This approach captures a wide range of perspectives on the learning and development culture, technology adoption and change management strategies under investigation.

**Data Gathering Instruments** - The research instruments included structured questionnaires and checklists designed to capture quantitative data on the learning and development culture, technology adoption, and change management strategies employed by the universities. The questionnaire items were developed based on established scales and best practices in the field. For example, the learning and development culture questionnaire might include items that assess faculty and staff perceptions of opportunities for professional development, the availability of resources for continuous learning, and the overall emphasis on lifelong learning within the university. The technology adoption questionnaire explored faculty and staff experiences with different educational technologies, their level of comfort using these technologies, and the perceived impact of technology on teaching and learning. Similarly, the change management questionnaire investigated faculty and staff awareness of recent university reforms, their level of involvement in decision-making processes, and their perceptions of the effectiveness of change management strategies. All questionnaire items were measured using a Likert scale to assess agreement levels (e.g., strongly disagree, disagree, agree, strongly agree). The

questionnaire is self-made; this was constructed based on the previous related research literature, it has three part, the first part is intended to described the learning and development culture of the universities in terms of opportunities for growth, collaborative learning environment, and supportive environment; the second part is designed determined the level of technology adoption in terms of infrastructure, training, support and evaluation; the third part is assessed the change management strategies, in terms of engagement, communication channels and resistance management, each part contains five indicators .

In addition to the questionnaires, a standardized checklist has been used to corroborate the survey responses with actual documentation and practices observed within the universities. This checklist included items related to the availability of specific professional development programs, the types of educational technologies used in classrooms, and evidence of documented change management procedures. The questionnaires have been validated and pilot tested with a small sample of faculty and staff before being administered to the main study participants. Overall, the implemented measures enhanced the validity and reliability of the questionnaires. The content validity was ensured through expert review, and the internal consistency is confirmed by the high Cronbach's Alpha score. Utilizing multiple questionnaires with multi-item measurement and the Likert scale allows for a comprehensive and nuanced assessment of the target constructs.

**Table 1***Reliability Results*

Variables	No. of Items	$\alpha$ value	Interpretation
<b>Learning and Development Culture</b>			
Opportunities for growth	5	0.923	Excellent
Collaborative Learning Environment	5	0.927	Excellent
Supportive Environment	5	0.921	Excellent
Overall	15	0.924	Excellent
<b>Technology adoption infrastructure, training, support and evaluation;</b>			
Infrastructure	5	0.905	Excellent
Training	5	0.937	Excellent
Support and evaluation	5	0.929	Excellent
Overall	15	0.924	Excellent
<b>Change management strategy</b>			
engagement	5	0.927	Excellent
Communication channel	5	0.920	Excellent
Resistance management	5	0.927	Excellent
Overall	15	0.925	Excellent

*Legend* > 0.9 =Excellent; >0.8=Good; >0.7=Acceptable; >0.6=Questionable; >0.5=Poor; <0.5=Unacceptable

**Data Gathering Procedure** - By using a combination of questionnaires and checklists, the study gathered comprehensive and reliable data to address the research questions. An online questionnaire has been developed and distributed to the selected participants using a secure platform. The questionnaire was designed to be user-friendly and accessible on various devices. Following ethical guidelines, participants were provided with an informed consent form that explained the purpose of the study, the use of their data, and their right to withdraw at any point. University documents relevant to the study, such as project reports, strategic management plans, and progress tracking systems, were collected and analyzed. This process allowed for triangulation with questionnaire data and provided insights into the formal procedures for learning and development culture, technology adoption, and change management practices. Semi-structured interviews have been conducted with key university personnel, such as academic deans, department heads, and IT administrators.

Throughout the data collection process, the anonymity and confidentiality of participant data were ensured. By employing a combination of online questionnaires, document analysis, and interviews, the study gathered comprehensive data from various sources. This enriched data-set was analyzed using appropriate statistical methods in SPSS version 28, including the Shapiro-Wilk Test for normality and Spearman's rho for non-parametric correlation analysis. Addressing the potential non-normal distribution of the data ensured the validity and reliability of the findings, ultimately informing the development of an optimized management



strategy framework for Chinese universities.

**Data Analysis** - Weighted mean and rank were used to describe the learning and development culture of the universities in terms of opportunities for growth, collaborative learning environment and supportive environment; to determine technology adoption in terms of infrastructure, training, support and evaluation; and to assess the change management strategy, in terms of engagement, communication channel and resistance management. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

**Ethical Considerations** - The study adheres to the highest ethical standards of research. To ensure informed consent, participants received a detailed explanation of the study's purpose, data collection methods, and how their responses were used. This information was provided through an accompanying consent form presented before participants begin the online questionnaire. The consent form also clearly stated that participation is voluntary and that participants have the right to withdraw from the study at any point without penalty. Confidentiality and anonymity of participant data were maintained throughout the research process. All data were stored securely. Only aggregate results were reported, ensuring that individual responses cannot be traced back to specific participants. These measures ensure that participants feel comfortable and protected when providing their honest responses, contributing to the overall validity and integrity of the research findings.

### 3. Result and discussion

**Table 2**

*Summary Table of Learning and Development Culture*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Opportunities for Growth	3.04	Agree	2
Collaborative Learning Environment	2.81	Agree	3
Supportive Environment	3.05	Agree	1
Composite Mean	2.97	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 2 reveals a generally positive perception of the learning and development (L&D) culture within the organization, with all the dimensions receiving an "Agree" rating. The highest-ranked indicator is "Supportive Environment", suggesting strong employee support for learning initiatives. The lowest-ranked indicator is "Collaborative Learning Environment", indicating a potential area for improvement in fostering peer-to-peer learning and knowledge sharing. Supportive Environment, ranks highest with a weighted mean of 3.05 and "Agree" as the verbal interpretation. This suggests that respondents perceive a generally positive and supportive learning and development environment within the organization. A strong supportive environment fosters a sense of belonging, security, and psychological safety. This can significantly impact employee well-being, reducing stress and anxiety, and increasing job satisfaction. When employees feel supported and valued, they are more likely to be motivated, engaged, and productive. A supportive environment encourages open communication, risk-taking, and continuous learning.

Reeve (2013) showed how agentic engagement functions as a proactive, intentional, collaborative, and constructive student-initiated pathway to greater achievement. The benefits of mentoring and contribution of early career professional development for doctoral students related to the rigors of the academy cannot be denied. Grönlund et al. (2017) highlighted that collaborative learning, when effectively implemented, goes beyond individual learning experiences. Through social interaction and the dynamic exchange of ideas, learners are empowered to develop deeper understanding, refine their thinking processes, and ultimately achieve higher levels of cognitive growth.

**Table 3***Summary Table of Technology Adoption*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Infrastructure	2.91	Agree	2
Training	2.97	Agree	1
Support and Evaluation	2.77	Agree	3
Composite Mean	2.88	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

The overall "Agree" rating in Table 3 indicates a generally positive perception of technology adoption within the organization. Training" ranks highest, suggesting that the organization is prioritizing the development of employee skills and knowledge related to technology. Infrastructure" scores closely behind "Training," indicating a solid foundation for technology adoption with adequate hardware, software, and connectivity. Meanwhile, "Support and Evaluation" receives an "Agree" rating, it ranks lowest, suggesting a potential area for improvement. Several studies emphasize the critical role of training and professional development in successful technology integration. Zuckerman et al. (2017) directly examined this, highlighting that effective training and professional development are crucial for fostering teacher motivation and technology use. Hrastinski et al. (2015) further emphasized this, stating that ongoing professional development and support are essential for teachers to effectively utilize technology in their classrooms. This aligns with findings of Cuban (2016), which highlighted the importance of professional development, support, and recognition for teachers to effectively integrate technology into their teaching practices.

**Table 4***Summary Table of Change Management Strategy*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Engagement	3.01	Agree	1
Communication Channel	2.82	Agree	3
Resistance Management	2.85	Agree	2
Composite Mean	2.89	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

Table 4 presents the summary table of change management strategy, agree rating across all dimensions indicates a generally positive perception of the organization's change management strategy. This suggests that the organization understands that effectively managing resistance requires engaging employees, establishing clear communication channels, and proactively addressing potential sources of resistance. Engagement ranks highest (3.01), suggesting that the organization effectively engages employees in the change process. This is crucial for successful change implementation as it fosters buy-in, reduces resistance, and increases employee ownership. This dimension likely includes indicators such as employee involvement in planning and decision-making, clear communication of expectations, and providing opportunities for feedback. The high ranking suggests that the organization effectively engages employees throughout the change process, fostering a sense of ownership and reducing resistance.

Communication Channels ranks second. This dimension likely includes indicators such as clear and consistent communication protocols, effective use of communication channels, and timely dissemination of information. The mid-ranking suggests that the organization has established communication channels, but there may be areas for improvement in terms of consistency, timeliness, and the clarity of messages. Resistance Management" ranks lowest. The agreement among respondents suggests that while the organization recognizes the importance of managing resistance, there may be areas for improvement in this area. This dimension likely includes indicators such as proactive identification and addressing of potential resistance, providing clear explanations for change, and recognizing and rewarding those who support change. While the organization acknowledges the importance of resistance management, the lower ranking suggests potential areas for improvement, such as: Insufficient proactive identification and addressing of resistance. Limited communication

of the rationale and expected benefits of change. Inadequate recognition and rewards for employees who support change.

Agreement on all dimensions of change management – Engagement, Communication Channels, and Resistance Management – signifies a comprehensive and proactive approach to managing change within the organization. This holistic approach can significantly enhance likelihood of successful change implementation, improve organizational agility, and create a more positive and supportive environment for change.

**Table 5**

*Relationship Between Learning and Development Culture and Technology Adoption*

Variables	rho-value	p-value	Interpretation
<b>Opportunities for Growth</b>			
Infrastructure	.707**	<.001	Highly Significant
Training	.442**	<.001	Highly Significant
Support and Evaluation	.400**	<.001	Highly Significant
<b>Collaborative Learning Environment</b>			
Infrastructure	.679**	<.001	Highly Significant
Training	.440**	<.001	Highly Significant
Support and Evaluation	.599**	<.001	Highly Significant
<b>Supportive Environment</b>			
Infrastructure	.316**	<.001	Highly Significant
Training	.264**	<.001	Highly Significant
Support and Evaluation	.277**	<.001	Highly Significant

Legend: Significant at p-value<0.01

Table 5 presents the relationship between learning and development culture variables and technology adoption, as assessed through rho-values and p-values. The findings indicate several highly significant correlations across different dimensions. The table demonstrates strong and statistically significant positive correlations between all dimensions of Learning and Development Culture and Technology Adoption. This indicates that a robust Learning and Development Culture is crucial for successful Technology Adoption. In terms of opportunities for growth, infrastructure exhibits the strongest correlation with a rho-value of .707 ( $p < .001$ ), followed by training (.442,  $p < .001$ ) and support and evaluation (.400,  $p < .001$ ). This suggests that infrastructure plays a pivotal role in enhancing opportunities for growth in the context of technology adoption. Organizations should prioritize employee development by providing ample opportunities for growth, such as training programs, mentorship, and career development opportunities. This will not only enhance employee skills and knowledge but foster culture that supports and encourages adoption of new technologies.

For the collaborative learning environment, infrastructure again shows a strong correlation (.679,  $p < .001$ ), followed by support and evaluation (.599,  $p < .001$ ) and training (.440,  $p < .001$ ). These results highlight the importance of robust infrastructure and evaluation mechanisms in fostering a collaborative environment conducive to technology adoption. Cultivate a culture of collaboration and knowledge sharing among employees. This can be achieved through initiatives such as cross-functional teams, knowledge sharing platforms, and peer-to-peer learning opportunities. A collaborative environment facilitates the effective sharing of knowledge and best practices related to technology use. Lastly, supportive environment demonstrates comparatively lower but still significant correlations with infrastructure (.316,  $p < .001$ ), training (.264,  $p < .001$ ), and support and evaluation (.277,  $p < .001$ ). While all relationships are statistically significant, the lower rho-values indicate a weaker association between a supportive environment and technology adoption compared to the other variables. It is essential to create a supportive and encouraging work environment where employees feel comfortable experimenting with new technologies, seeking help when needed, and sharing their experiences with others. This can be achieved by providing adequate support, recognizing and rewarding successful technology integration, and fostering a culture of continuous learning.

This highlights the critical role of a strong Learning and Development Culture in facilitating successful Technology Adoption. By investing in employee development, fostering collaboration, and creating a supportive

environment, organizations can enhance employee skills, knowledge, and confidence in using technology, ultimately leading to more effective and efficient use of technology in achieving organizational goals. Zuckerman et al. (2017) specifically examined the relationship between teacher motivation, professional development, and technology use, highlighting the importance of a supportive learning environment and ongoing professional development opportunities for teachers. Hrastinski et al. (2015) further emphasized this by highlighting the crucial role of teacher training and support, including access to professional development opportunities and a supportive learning environment, in facilitating the effective integration of ICT in education.

**Table 6***Relationship Between Learning and Development Culture and Change Management Strategy*

Variables	rho-value	p-value	Interpretation
<b>Opportunities for Growth</b>			
Engagement	.417**	<.001	Highly Significant
Communication Channel	.356**	<.001	Highly Significant
Resistance Management	.359**	<.001	Highly Significant
<b>Collaborative Learning Environment</b>			
Engagement	.301**	<.001	Highly Significant
Communication Channel	.366**	<.001	Highly Significant
Resistance Management	.302**	<.001	Highly Significant
<b>Supportive Environment</b>			
Engagement	.313**	<.001	Highly Significant
Communication Channel	.232**	<.001	Highly Significant
Resistance Management	.382**	<.001	Highly Significant

Legend: Significant at p-value<0.01

Table 6 illustrates the relationship between learning and development culture variables and change management strategy, with all associations found to be highly significant ( $p < .001$ ). This demonstrates strong and statistically significant positive correlations (rho-values) between all dimensions of Learning and Development Culture and Change Management Strategy. This suggests that a robust Learning and Development Culture is crucial for effective Change Management. For opportunities for growth, the moderate correlation is observed with engagement ( $\rho = .417$ ), followed closely by resistance management (.359) and communication channels (.356) with weak correlation. These results suggest that fostering opportunities for growth significantly enhances engagement and the ability to manage resistance during change. Organizations should prioritize employee development by providing ample opportunities for growth, such as training programs, mentorship, and career development opportunities. This will not only enhance employee skills and knowledge but also increase their engagement in change initiatives.

Within the collaborative learning environment, communication channels exhibit the weak correlation ( $\rho = .366$ ), followed by resistance management (.302) and engagement (.301). This highlights the importance of effective communication in promoting collaboration and managing change effectively. Cultivate a culture of collaboration and knowledge sharing among employees. This can be achieved through initiatives such as cross-functional teams, knowledge sharing platforms, and peer-to-peer learning opportunities.

Regarding the supportive environment, resistance management shows the weak relationship ( $\rho = .382$ ), indicating its critical role in a supportive setting. Engagement (.313) and communication channels (.232) also demonstrate significant but slightly weaker associations. It is a must to foster a supportive and encouraging work environment where employees feel valued, respected, and empowered. This will help to reduce resistance to change and increase employee engagement in the change process. By investing in employee development, fostering collaboration, and creating a supportive environment, organizations can enhance employee engagement, improve communication, and effectively manage resistance to change, ultimately leading to more successful and sustainable change initiatives. Rafferty et al. (2016) emphasized the importance of active listening, addressing employee concerns, and fostering open dialogue and engagement. Similarly, Weick et al. (2019) highlighted the need for creating a supportive and engaging environment for employees, fostering open communication, and proactively addressing resistance through dialogue and collaboration.

Table 7 shows the relationship between technology adoption and change management strategy, with all correlations being highly significant ( $p < .001$ ). The table demonstrates strong and statistically significant positive correlations (rho-values) between all dimensions of Technology Adoption and all dimensions of Change Management Strategy. This indicates a strong and positive interrelationship between successful technology adoption and effective change management practices.

**Table 7***Relationship Between Technology Adoption and Change Management Strategy*

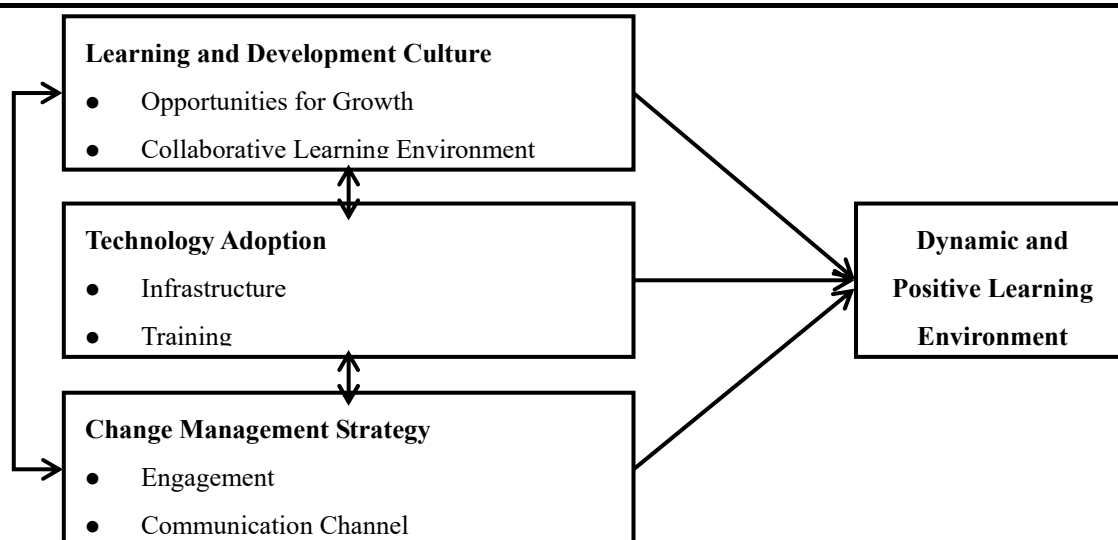
Variables	rho-value	p-value	Interpretation
<b>Infrastructure</b>			
Engagement	.336**	<.001	Highly Significant
Communication Channel	.325**	<.001	Highly Significant
Resistance Management	.317**	<.001	Highly Significant
<b>Training</b>			
Engagement	.696**	<.001	Highly Significant
Communication Channel	.394**	<.001	Highly Significant
Resistance Management	.341**	<.001	Highly Significant
<b>Support and Evaluation</b>			
Engagement	.241**	<.001	Highly Significant
Communication Channel	.320**	<.001	Highly Significant
Resistance Management	.318**	<.001	Highly Significant

Legend: Significant at  $p\text{-value} < 0.01$

For infrastructure, the weak correlation is observed with engagement ( $\rho=.336$ ), followed by communication channels (.325) and resistance management (.317). This suggests that when organizations provide adequate and reliable technological infrastructure, employees are more likely to be engaged in the change process related to technology adoption. In the case of training, engagement exhibits the strong correlation ( $\rho=.696$ ), indicating its critical role in aligning technology adoption with change management strategies. Communication channels (.394) and resistance management (.341) also show significant but comparatively weaker relationships, underscoring the broader influence of training on these dimensions. This suggests that when organizations invest in comprehensive and effective employee training programs related to technology, it significantly enhances employee engagement in the change process associated with technology adoption.

Organizations should prioritize comprehensive training programs that equip employees with the necessary skills and knowledge to effectively utilize new technologies. This includes hands-on training, ongoing support, and opportunities for skill development. Regarding support and evaluation, the weak correlation is observed with communication channels ( $\rho=.320$ ) and resistance management (.318), while engagement shows a slightly lower but still significant association (.241). This highlights the role of ongoing support and evaluation in ensuring effective communication and resistance handling during change processes. All dimensions of Technology Adoption demonstrate significant positive correlations with all dimensions of Change Management Strategy. This highlights the interconnectedness of these factors and emphasizes that successful technology adoption requires a comprehensive approach that considers employee engagement, effective communication, and proactive resistance management.

Both Aydin et al. (2017) and Bhattacharjee (2015) highlighted the crucial role of organizational culture and employee engagement in the successful adoption and continued use of technology. Aydin et al. (2017) specifically investigated the impact of organizational culture on e-learning technology adoption, emphasizing the importance of a supportive organizational culture that includes effective communication, employee engagement, and a focus on continuous learning. Bhattacharjee (2015) further emphasized this point, highlighting the role of organizational culture, employee engagement, and effective change management strategies in ensuring the continued use and adoption of information systems, along with factors such as user satisfaction, perceived usefulness, and perceived ease of use.



*Fig 1. Dynamic and Positive Learning Environment Framework*

A Dynamic and Positive Learning Environment is not just a physical space; it is a holistic ecosystem that fosters growth, engagement, and a love of learning. It's characterized by several key features: **Dynamic:** This implies constant evolution, adaptation, and responsiveness to the needs of learners. It's about embracing change, incorporating new technologies and pedagogical approaches, and creating flexible learning experiences. A dynamic environment is not static; it is constantly evolving to stay relevant and engaging.

**Positive:** This emphasizes the importance of a supportive, inclusive, and encouraging atmosphere. A positive environment fosters psychological safety, where learners feel comfortable taking risks, asking questions, and learning from mistakes. It's about building a sense of community, celebrating successes, and promoting well-being. **Learning Environment:** This encompasses the physical space, the virtual space, and the overall culture. It's about creating an environment that is conducive to learning, whether it's a traditional classroom, an online learning platform, or a blended learning experience. It includes the resources, tools, and support systems that learners need to succeed.

**Connecting the elements:** The "dynamic" aspect ensures the learning environment remains current and adaptable, while the "positive" aspect creates the emotional and social foundation for learners to thrive. Together, they create a powerful synergy that maximizes learning potential. In essence, *Cooperation in the Classroom* makes a strong case for the use of cooperative learning as a powerful instructional strategy. It provides teachers with the theoretical background and practical tools they need to create effective cooperative learning experiences for their students. It emphasizes that cooperative learning is not just about putting students in groups; it requires careful planning, structuring, and monitoring to ensure that all students benefit.

#### **4. Conclusions and recommendations**

The respondents generally agreed on the presence of learning and development culture in terms of opportunities for growth, collaborative learning environment and supportive environment. There is moderate technology adoption in terms of infrastructure, training, support and evaluation; assessed the change management strategy. The respondents moderately observe change management strategy in terms of engagement, communication channel and resistance management. There is highly significant relationship between learning and development culture, technology adoption and change management. A Framework for a Dynamic and Positive Learning Environment has been developed. Department Heads may encourage collaborative projects that require employees to work together and learn from each other. The management may consider creating a dedicated team responsible for both technology support and evaluation, to ensure a coordinated and integrated

approach to improving technology adoption. Human Resources department may regularly evaluate the effectiveness of communication efforts using track metrics, message each employee engagement, and feedback received. The framework may be adopted by the universities as valuable guide for creating dynamic and positive learning environment. Future researchers may investigate potential mediating variables, such as employee motivation and self-efficacy to further the relationship between learning and development culture, technology adoption, change management and positive learning environment

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# Effectiveness of instructional design process on employee performance in the technology development industry

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## ***Abstract***

The study aimed to examine the effectiveness of instructional design process on employee performance in Technology Development Industry. Specifically, it assessed the effectiveness of the instructional design process in terms of Analysis, Development, and Implementation; determined employee performance in terms of task performance, contextual performance, and adaptive performance; tested the significant relationship between the instructional design process and employee performance; proposed a plan of action to improve the instructional design process and employee performance. This study used descriptive quantitative research using 250 participants from well-known companies in technology industry. Findings indicate that employees generally agree that instructional design process across analysis, design, development, and implementation is moderately effective. The employee's performance is at a moderate level in terms of task performance, contextual performance, and adaptive performance. A highly significant relationship between instructional design process and employee performance shows that effectively designing training and learning programs directly and substantially improves employee capabilities and overall work output. A proposed action plan was developed to improve the instructional design process and employee performance in the technology development industry.

***Keywords:*** instructional design process, employee performance, technology development industry

## Effectiveness of instructional design process on employee performance in the technology development industry

### 1. Introduction

The software technology industry in China is known for its rapid innovation, dynamic growth, and intense global competition. To thrive in this environment, companies must not only acquire top talent but also invest in retaining and developing their workforce. One of the most strategic approaches to enhancing employee performance is the implementation of a structured instructional design (ID) process that ensures training programs are relevant, effective, and aligned with business goals. The instructional design process—encompassing Analysis, Design, Development, Implementation, and Evaluation (ADDIE)—serves as a systematic model for creating training solutions that meet organizational and learner needs.

Training and development are vital in equipping employees with the competencies needed to adapt to emerging technologies and evolving business trends. In China's high-tech software firms, employees are often engaged in continuous learning through e-learning platforms, technical workshops, and mentorship programs. These initiatives reflect not only a commitment to skill advancement but also a recognition of the role that well-structured instructional design plays in aligning training with job performance. Programs built around behavior-based and learner-centered instructional design principles can lead to improved knowledge retention, engagement, and application of skills in real-world tasks (Johnson et. al.,2024). Effective instructional design begins with a thorough analysis of performance gaps and learning needs, which forms the foundation for crafting targeted interventions. This is especially crucial in the fast-paced software sector, where skill demands shift rapidly. The design and development phases ensure that instructional content is logically sequenced, aligned with learning objectives, and supported by appropriate multimedia and technology tools (Clark et. al.,2021). The implementation of these programs must consider contextual challenges such as organizational culture, learning preferences, and hybrid work models (Tsai et. al.,2024). Finally, evaluation of training effectiveness helps measure impact on job performance and guides future instructional strategies. In addition to content delivery, the broader goal of instructional design in the software industry is to foster a performance-driven culture. Performance management practices such as SMART goals (Locke et. al.,1990), data-driven feedback systems, and 360-degree evaluations are often integrated into learning systems to ensure alignment between training and employee output (Li et. al.,2021). However, challenges persist, such as the difficulty in evaluating knowledge-based roles, frequent changes in required competencies, and the decentralization of training resources (Chen et al., 2021).

By understanding how instructional design contributes to training quality and performance outcomes, technology companies can refine their learning and development strategies to promote innovation, attract and retain talent, and sustain competitive advantage in the digital economy.

**Objectives of the Study** - The study aims to examine the effectiveness of instructional design process on employee performance in Technology Development Industry. Specifically, it assessed the effectiveness of the instructional design process in terms of Analysis, Design, Development, and Implementation; determine employee performance in terms of task performance, contextual performance, and adaptive performance; tested the significant relationship between the instructional design process and employee performance; proposed a plan of action to improve the instructional design process and employee performance.

### 2. Methods

**Research Design** - Descriptive research design was used in this study for an adequate and precise interpretation of the findings. The descriptive research design in this paper analyzes the correlation between the

three dimensions of information system, knowledge sharing and competitive strategy and the innovation performance of management consulting firms through questionnaire survey. Descriptive research aims to comprehensively depict a group of individuals, events, or phenomena. It is appropriate for identifying characteristics, frequencies, trends, and classifications. It proves valuable when dealing with lesser-known subjects or issues.

**Participants of the Study** - The participants for this study are the 250 employees of top five technology companies in Shanghai City in terms of employee population particularly Lenovo group, Huawei Technologies Co., Ltd., Shanghai Wicresoft Co., Ltd., Tencent and Alibaba Group Holding Limited. Each company have 50 respondents using quota and convenience sampling.

**Instrument of the Study** - This study used a self-made survey questionnaire as the main data input instrument because it is effective and practical in quantitative data collection from many people in an orderly manner. Developing self-made questionnaire can be made to meet all the requirements of the specific study. This also applies to structure, types and phrases of the questions, etc. In addition, self-made questionnaires are less costly whether it is distributed physically or electronically, data can always be collected by the researcher with minimal spending of resources. In addition, survey questionnaires can be distributed over the internet or can be printed in hard copies which means respondents can fill them out at their convenience and time. This technique also has an advantage in that it facilitates uniformity in the data collection process since all the participants respond to the same questions. The questionnaire is composed of two parts. Part 1 is about the effectiveness of the instructional design process in terms of Analysis, Design, Development, and Implementation. Part 2 described employee performance in terms of task performance, contextual performance, and adaptive performance. Validation of the questionnaire through the help of experts was made and pilot testing. Results of reliability is shown below.

**Table 1**

*Reliability Test Result using Cronbach Alpha and its Interpretation*

Cronbach Alpha	Number of Items	Interpretation
<b>Instructional Design</b>		
Analysis	0.747	Acceptable
Design	0.813	Good
Development	0.848	Good
Implementation	0.806	Good
<b>Employee Performance</b>		
Task Performance	0.826	Good
Contextual Performance	0.714	Acceptable
Adaptive Performance	0.730	Acceptable

Legend:  $\geq 0.9$  excellent;  $\geq 0.8$  good;  $\geq 0.7$  acceptable;  $\geq 0.6$  questionable;  $\geq 0.5$  poor;  $0.5 >$  unacceptable;

Table 1 indicates generally acceptable to good internal consistency across the measured constructs. Specifically, the "Design," "Development," "Implementation," and "Task Performance" dimensions demonstrate good reliability with alpha coefficients ranging from 0.806 to 0.848, suggesting that the items within these scales consistently measure the same underlying concept. The "Analysis," "Contextual Performance," and "Adaptive Performance" dimensions show acceptable reliability, with alpha values between 0.714 and 0.747, implying a reasonable level of internal consistency, although potentially with room for improvement in item homogeneity compared to the "good" rated dimensions. Overall, the instrument appears to provide reasonably reliable measures for the intended constructs, with the majority exhibiting good internal consistency.

**Data Gathering Procedure** - The research process followed various stages, such as planning, collection of data, analysis, and interpretation. Most importantly, once the questionnaire is ready, content validation is carried out to confirm the intended purpose and how relevant the contents are without ambiguity. This involves getting an evaluation of the questionnaire items from Human Resource, training, and development experts. In addition, the questionnaire is first tried out on a limited population to assist in spotting problems or lack of clarity in the

questionnaire. Next, the researcher secured permission from the HR head of the five companies to request for the approval of data gathering from their employees. In this case a request letter will be prepared specifying the reasons for the research, the methods to be used in carrying out the research and the possible outcomes. Next is the questionnaire administration which involves distributing the questionnaire to a representative sample of employees. The method of administration of questionnaires may vary including the use of online survey and use of paper-based questionnaires, or a combination of both. Once completed, questionnaires will be retrieved, and data cleaning and preparation will begin. This involves inputting data into statistical software, checking for errors, and ensuring data accuracy. Finally, the data obtained were analyzed using the relevant statistical methods. Some descriptive statistics are obtained to present the data. In analyzing the results, it is important to understand the statistical results relative to the research objectives.

**Data Analysis** - Weighted mean and rank were used to determine effectiveness of instructional design processes and to describe employee performance. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

**Ethical Consideration** - The researcher adhered to ethical standards while carrying out the respective tasks. As such, all data obtained will be anonymized to protect the privacy and confidentiality of participants. There will be no collection or dissemination of any information that directly attributes participants' comments or actions to them. All potential participants will be able to sign a consent form detailing the main objectives of the research, risks associated with the study, as well as benefits that may benefit from the study. To enhance the ethical standards, set in this research study, the research proposal will be sent to the Ethics committee for approval before the commencement of the study. In this case, the committee will evaluate the potential risks and benefits of the study as well as the ethicality of the study itself. This is important because their approval means that the research will be carried out within the limits of ethics and regulations set out regarding the conduct of various types of research.

### 3. Results and discussion

**Table 2**

*Summary Table on Effectiveness of Instructional Design Process*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Analysis	2.95	Agree	3
Design	2.88	Agree	4
Development	2.97	Agree	1
Implementation	2.96	Agree	2
Composite Mean	2.94	Agree	

Legend: 1.00 – 1.49 Strongly Disagree; 1.50 – 2.49 Disagree; 2.50 – 3.49 Agree; 3.50 – 4.00 Strongly Agree

Table 2 presents the assessment of the respondents on the Effectiveness of the Instructional Design Process across on its four areas: Analysis, Design, Development, and Implementation. The composite mean of 2.94 indicates that the respondents Agree in general. This implies that the instructional design process was considered effective by the participants, with each phase contributing positively to the overall training experience. The result reflects a consistent and structured approach to instructional planning and delivery, suggesting that the organization applies standard instructional models such as ADDIE (Analysis, Design, Development, Implementation, Evaluation). This outcome could be influenced by the institution's implementation of employee development programs that follow formal training procedures. The organization might have invested in capacity-building workshops or learning management systems, improving the consistency of instructional design and there may be an internal team or department responsible for quality assurance in training programs, ensuring each phase is planned and executed properly. This result is consistent with the findings of Molenda (2015), who affirmed that when all phases of the instructional design process are properly integrated, the quality and impact

of training increase significantly. Morrison et. al.,(2019) emphasized that comprehensive instructional design leads to greater alignment between learning objectives, content, and outcomes.

Among the items cited, Development ranked first with a mean score of 2.97 and a verbal interpretation of Agree. This implies that the respondents appreciated the quality, accuracy, and clarity of the developed instructional materials. This may be due to the use of up-to-date content, user-friendly formats, or multimedia enhancements that are aligned with the learners' work environment. This could also reflect the organization's effort to standardize materials using templates and updated references, or training developers might have collaborated with subject matter experts to ensure technical accuracy and relevance. This aligns with the findings of Allen et. al.,(2012), who argued that effective development of learning materials enhances learner engagement and knowledge retention. Similarly, Branch (2022) stressed the importance of content quality and usability in instructional development.

Implementation, ranked second with a mean of 2.96, followed by Analysis with 2.95, and Design with 2.88. All the items received a verbal interpretation of Agree, showing a uniformly favorable perception of the instructional design process across all dimensions. Meanwhile, Design ranked fourth with a mean score of 2.88 and a verbal interpretation of Agree. This implies that although the design phase was still positively viewed, it may not have met the same level of excellence as the other phases. Possible reasons for this include limitations in customizing the learning experience, or perhaps insufficient consideration of various learning styles. There may have been time constraints in preparing diverse instructional methods, or design templates might have been reused from previous trainings, limiting innovation. Supporting this, Bates (2019) pointed out that designing learning experiences requires adaptability and learner-centered strategies, which are sometimes constrained by institutional resources or timeline. Dick et. al.,(2014) emphasized that high-quality design requires iterative testing and feedback to maximize effectiveness.

**Table 3**

*Summary Table on Employee Performance*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Task Performance	2.97	Agree	2
Contextual Performance	2.99	Agree	1
Adaptive Performance	2.90	Agree	3
Composite Mean	2.95	Agree	

Legend: 1.00 – 1.49 Strongly Disagree; 1.50 – 2.49 Disagree; 2.50 – 3.49 Agree; 3.50 – 4.00 Strongly Agree

Table 3 presents the assessment of the respondents on employee performance in terms of task performance, contextual performance, and adaptive performance. The composite mean of 2.95 indicates that the respondents generally agree with the effectiveness of these aspects of performance. This implies that employees are perceived as performing adequately in terms of their tasks, contributions to their work environment, and adaptability to changes. The consistent "Agree" response across the performance indicators shows that employees demonstrate satisfactory performance in various areas. According to Rahman et al. (2025), contextual and adaptive performance are critical in fostering overall organizational productivity, which is supported by the fact that these areas received relatively high ratings in this study. Furthermore, Yulianto et al. (2024) highlights the importance of developing learning models that consider both technical and contextual aspects to enhance employee performance.

Contextual Performance, ranked first with a mean score of 2.99 and a verbal interpretation of "Agree." This implies that respondents believe their colleagues contribute positively to the work environment and are generally supportive. Smith-Downing et. al.,(2021) argue that effective contextual performance is essential for maintaining a harmonious work environment, which is evident in the ranking of this indicator. In the local setting, employees in the workplace often rely on each other for collaborative efforts, especially when facing project challenges. Wintersberg et. al.,(2025) point out that fostering a collaborative work culture significantly impacts overall job satisfaction and performance.

Task Performance, ranked second with a mean score of 2.97, followed by Adaptive Performance, with a mean score of 2.90. Both aspects received a verbal interpretation of "Agree," indicating that employees are meeting the required standards for their technical tasks and adapting well to changes. The emphasis on task performance aligns with the findings of Rahman et al. (2025), who highlight that technical proficiency and meeting specific job expectations are crucial in evaluating employee performance.

Adaptive Performance, ranked third with a mean score of 2.90, suggests that while employees are generally adaptable to new technologies and project demands, there is still a gap in their ability to fully embrace all changes. This can be attributed to the ongoing evolution of technology, which requires continuous learning and adjustment. Yulianto et al. (2024) emphasize that adaptability is critical in fast-changing work environments, and while employees may agree with their adaptability, the practical application may take time to develop.

**Table 4**

*Relationship Between the Effectiveness of the Instructional Design Process and Employee Performance*

Analysis	r-value	p-value	Interpretation
Task Performance	0.705**	<0.001	Highly Significant
Contextual Performance	0.694**	<0.001	Highly Significant
Adaptive Performance	0.770**	<0.001	Highly Significant
<b>Design</b>			
Task Performance	0.703**	<0.001	Highly Significant
Contextual Performance	0.705**	<0.001	Highly Significant
Adaptive Performance	0.756**	<0.001	Highly Significant
<b>Development</b>			
Task Performance	0.711**	<0.001	Highly Significant
Contextual Performance	0.755**	<0.001	Highly Significant
Adaptive Performance	0.787**	<0.001	Highly Significant
<b>Implementation</b>			
Task Performance	0.674**	<0.001	Highly Significant
Contextual Performance	0.686**	<0.001	Highly Significant
Adaptive Performance	0.745**	<0.001	Highly Significant

*Legend: Significant at p-value < 0.01*

Table 4 shows the association between the effectiveness of the instructional design process and employee performance. The computed R-values indicate a high direct correlation, and the resulting p-values were less than the alpha level. This means that a significant relationship exists and implies that an effective instructional design process would improve employee performance and vice-versa. The two variables are dependent on one another. This implies that the two variables instructional design processes and employee performance are directly related and mutually influential. In other words, when instructional design is implemented effectively, it tends to enhance employee performance, particularly in the areas of task execution, workplace behavior, and adaptability to change. This finding aligns with the study of Chai et al. (2024), who emphasized that well-structured instructional systems promote knowledge retention, skill development, and work engagement, all of which contribute to improved performance outcomes. Similarly, Johnson et. al.,(2024) observed that behavior-based instructional design processes ensure relevance and alignment with job demands, thereby boosting task performance and employee confidence. The interdependence of these variables reinforces the idea that investing in quality instructional design is not merely a training initiative but a strategic driver of employee productivity and organizational growth.

**Table 5**

*Proposed Action Plan to Improve the Instructional Design Process and Employee Performance*

Key Result Area	Strategies	Person/s Responsible	Success Indicator
Design (Enhanced Relevance of Training Materials to	Needs Assessment with Stakeholders: Conduct thorough needs assessments involving technology developers to identify specific skill gaps and relevant topics for training materials. Contextualized Examples and Case Studies:	HR Department	Increased application of learned concepts in practical technology development scenarios, as observed through project outcomes or feedback.

## Effectiveness of instructional design process on employee performance in the technology development industry

Technology Development Processes)	Incorporate real-world examples and case studies directly related to the technology development processes the learners are involved in. Regular Curriculum Review and Updates: Establish a system for regularly reviewing and updating training materials to reflect the evolving technologies and development processes within the organization.		
Adaptive Performance (Enhanced Adaptability in Dynamic Technological Environments)	Regular Training and Workshops: Conduct regular training sessions and workshops focusing on emerging technologies relevant to the workplace. Cross-Functional Projects: Implement cross-functional projects that expose employees to different technologies and working styles within the organization. Knowledge Sharing Platforms: Establish platforms (e.g., internal wikis, forums) for employees to share knowledge, best practices, and insights on new technologies.	HR Department, IT Department, Department Heads	Increased employee engagement with emerging technologies and cross-functional collaboration, demonstrated by consistent participation in relevant training and workshops, active contribution to knowledge-sharing platforms, and successful involvement in cross-functional projects utilizing diverse technologies.

#### 4. Conclusion and recommendation

The employees generally agree that instructional design process across analysis, design, development, and implementation is moderately effective. The employees generally agree that their performance is at a moderate level in terms of task performance, contextual performance, and adaptive performance. There is a highly significant relationship between instructional design process and employee performance. A proposed plan of action was developed to improve the instructional design process and employee performance in technology development industry.

The Human Resource Department may establish a formal mechanism for regular feedback from learners and instructors during the implementation phase, beyond post-training evaluations, to allow for real-time adjustments and ensure ongoing engagement and comprehension to improve the instructional design process. The department heads may implement a structured mentorship program that pairs high-performing employees with others to facilitate the transfer of best practices, organizational citizenship behaviors, and strategies for navigating change to improve the employee performance. The technology development industry may review and utilized the outlined action plan provided in the study for improving the instructional design process and employee performance. Future researchers can study the long-term impact of instructional design strategies on specific domains of employee performance across various types of technology companies, including startups and large enterprises.

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# Digital transformation, ESG performance, and management cognitive flexibility of manufacturing industries: Basis for sustainable advantage framework

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## Abstract

In such a complex and unstable economic environment, digital transformation, ESG performance and management cognitive flexibility are the three key dimensions for manufacturing enterprises in Shanxi Province to achieve sustainable development. Digital transformation provides technology-driven innovation impetus for enterprises, and ESG performance offers long-term measurement standards for enterprises. The management cognitive flexibility provides the capability guarantee for enterprises to achieve strategic adjustments. For manufacturing enterprises, effectively integrating ESG concepts in the wave of digital transformation and examining the role of management cognitive flexibility in this process to achieve a win-win situation of economic and social benefits is the future development direction. This study aims to explore the relationship among digital transformation, ESG performance and management cognitive flexibility of manufacturing enterprises in Shanxi Province, China, which will serve as the basis for formulating a framework for sustainable advantages in the manufacturing industry. This study employs an empirical research method to systematically analyze the relationships between variables and test hypotheses. The target respondents are employees from manufacturing industries in Shanxi Province. Data was collected through questionnaires and analyzed using SPSS. Research results revealed that there is a significant positive correlation between digital transformation, ESG performance and management cognitive flexibility. Digital transformation moderately integrates technology, customer engagement and value creation. In terms of environmental protection, social responsibility and internal governance, ESG performance is average. The management has demonstrated moderate cognitive flexibility, which is reflected in their strategies, operations and learning methods. On this basis, this study constructs a framework for the sustainable advantages of the manufacturing industry, providing theoretical support and practical guidance for the sustainable development of manufacturing enterprises and promoting the green transformation of the economy.

**Keywords:** digital transformation, ESG performance, management cognitive flexibility, manufacturing industries, sustainable advantage framework

## **Digital transformation, ESG performance, and management cognitive flexibility of manufacturing industries: Basis for sustainable advantage framework**

### **1. Introduction**

In the context of economic globalization and the rapid development of artificial intelligence, digital transformation has become a key factor for manufacturing enterprises to maintain competitiveness. Especially for resource-dependent regions, such as Shanxi Province, China, the upgrading and transformation of the manufacturing industry is particularly important. This paper explores how manufacturing enterprises in Shanxi Province improve their ESG performance in the process of digital transformation and examines the role of management cognitive flexibility in this process, providing theoretical support and practical guidance for the development of a sustainable advantage framework for the manufacturing industry.

In recent years, the emphasis on environmental protection and social responsibility has been increasing around the world, so ESG performance is becoming an important measure of a company's ability to develop sustainably. But for manufacturing enterprises, how to effectively integrate ESG concept into the wave of digital transformation, to achieve both economic and social wins, is still a pressing problem to be solved. Shanxi Province in 2022 year-end released the Implementation Plan on Promoting the Comprehensive Development of Digital Economy in Shanxi Province (2022-2025), explicitly proposing the creation of a new highland for innovation-driven development of digital economy in central and western regions. Manufacturing enterprises in Shanxi Province, as an essential force of regional economic development, the research on the correlation between digital transformation and ESG performance of manufacturing enterprises in Shanxi Province has important theoretical significance, and it is also of great practical significance to promote the green transformation of local economy. As there are many achievements within this study, the empirical research done on certain geographical areas such as in the case of Shanxi, it still remains quite scarce.

Shanxi province, being mainly a region with coal and heavy industries, faces enormous challenges and pressures for transformation and upgrading. The paper focuses on the relation of digital transformation, ESG, management cognitive flexibility and corporate sustainability based on manufacturing companies in Shanxi Province. The variables studied were mainly: digital transformation, ESG performance, and management cognitive flexibility. ESG performance refers to the overall performance of enterprises on environmental protection, social responsibility and governance. Management cognitive flexibility is defined as: The management of an enterprise can flexibly change its own strategies, operations and learning modes when it faces a complex and changeable environment (Mo et. al.,2023). Regarding the dimensions of the research variables, what is mainly looked at with regards to Digital Transformation is technology integration, customer integration and value creation. ESG performance evaluation on environmental protection, social responsibility, and internal governance; Management cognitive flexibility is expressed in terms of strategic flexibility, operational flexibility, and learning flexibility.

There have been some advances in studying digital transformation and ESG performance. But most of the existing studies analyze a single dimension, a certain industry, etc., and the overall research on the specific field of Shanxi's manufacturing industry is still insufficient. Moreover, we need the moderating role of management cognitive flexibility in digital transformation and ESG performance. Thus, based on an in-depth study of real cases of manufacturing enterprises in Shanxi, it reveals the essential impact of management's cognitive flexibility in the process of digital transformation, which affects ESG performance positively.

With the abundant resources, deep cultural heritage and spirit of continuous innovation, Shanxi, manufacturing enterprises in China and even the world's manufacturing enterprises hold an important position. These groups involve many industries including energy, metallurgy, machinery and chemical industry and have

made big contributions to the development of local economy. But under the background of the transformation of digital and sustainable development, these Enterprises are also facing the urgent need for transformation and development. The purpose of the study is to find out how manufacturing firms in Shanxi Province improve their own ESG performance through enhancing management cognitive flexibility during the digital transformation and to develop a sustainable advantage framework for manufacturing industry firms. This study can enrich the theoretical system of digital transformation and ESG performance simultaneously and give practical advice and support for the green transformation of manufacturing companies in Shanxi and even the whole country. After the research, we want to make it for the sustainable development of manufacture enterprises and promote the harmony between economy, society and environment.

**Objectives of the Study** - The study aims to determine the digital transformation, ESG performance and management cognitive flexibility among manufacturing industries in Shanxi Province, China. Specifically, the study will assess the digital transformation in terms of technology integration, customer integration and value creation; Determine the ESG performance as to environmental protection, social responsibility and internal governance; Describe the management cognitive flexibility in terms of strategic flexibility, operational flexibility and learning flexibility. Test the significant relationship between digital transformation, ESG performance and managerial cognitive flexibility. Develop a sustainable advantage framework for manufacturing industries.

## 2. Methods

**Research Design** - Descriptive research design was used in this study for an adequate and precise interpretation of the findings. According to Leiva-Candia et al. (2022), this is a method for gathering information about a topic by observing or surveying a population or phenomenon. It aims to describe the characteristics, frequencies, and patterns of the subject, rather than explaining why things happen.

**Participants of the study** - The respondents of the study will be 400 employees of manufacturing industries in Shanxi Province covering a variety of fields from heavy industry to light industry, from energy mining to material processing. Each company will have 80 respondents using convenience sampling.

**Instrument of the Study** - The study used one set of questionnaires as the major mechanism for collecting the necessary data. The items per instrument have been presented as descriptive statements, and respondents indicate the frequency with which each statement applies on a four-point Likert scale as a 3.50 – 4.0 scale means strongly agree, 2.50 – 3.49 rate means agree, 1.50 – 2.49 scale means disagree and, 1.00 – 1.49 rating means strongly disagree. A self-made questionnaire will be used by the researcher in data gathering. The questionnaire was composed of three parts. Part I contains the assessment of Digital Transformation which consists of technology integration, customer integration, and value creation. In part II, the questionnaire is measuring the assessment of ESG performance which consists of environmental protection, social responsibility, and internal governance. In part III, the questionnaire assesses the management cognitive flexibility which consists of strategic flexibility, operational flexibility, and learning flexibility.

**Table 1**

*Reliability Test Result using Cronbach Alpha and its Interpretation*

Indicators	No. of Items	Cronbach Alpha	Remarks
Technology Integration	5	0.923	Excellent
Customer Integration	5	0.955	Excellent
Value Creation	5	0.955	Excellent
Environmental Protection	5	0.950	Excellent
Social Responsibility	5	0.946	Excellent
Internal Governance	5	0.953	Excellent
Strategic Flexibility	5	0.963	Excellent
Operational Flexibility	5	0.935	Excellent
Learning Flexibility	5	0.950	Excellent

George and Mallery (2003) provide the following rules of thumb: “\_ > .9 – Excellent, \_ > .8 – Good, \_ > .7 – Acceptable, \_ > .6 – Questionable, \_ > .5 – Poor, and \_ < .5 – Unacceptable”

A pilot test was undertaken to determine the survey questionnaire's efficacy. 30 samples were subjected to a reliability test using Cronbach's alpha via SPSS 28. Table 1 shows the reliability test result for each of the variables used in this research.

**Data Gathering Procedure** - To obtain necessary data, the researcher used a survey questionnaire and will write a letter of request to the company to conduct the study. The questionnaires will be distributed by the researcher to the participants of the study through sending them hard copy to their company in any available time and using Google forms that will be sent through emails and other communication platforms that the respondents have. The responses to the survey items will be tallied and sent to the university statisticians for statistical analysis.

**Data Analysis** - Weighted mean and rank were used to assess the digital transformation in terms of technology integration, customer integration and value creation; Determine the ESG performance as to environmental protection, social responsibility and internal governance; Describe the management cognitive flexibility in terms of strategic flexibility, operational flexibility and learning flexibility. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

**Ethical Consideration** - In conducting this research work, ethical considerations were considered of paramount importance to ensure that the highest standards of integrity and quality are maintained throughout the entire process. It was assured that any information gathered will be used exclusively for research purposes, safeguarding the confidentiality and privacy of all participants. This approach is crucial for upholding the credibility and validity of the research findings.

The researcher took proactive steps to obtain consent from the participating companies through formal letters and clear communication. This process was designed to ensure that the target respondents were made fully aware of the research objectives and prepared to provide the necessary information. By seeking explicit consent, the researcher aimed to build a foundation of trust and transparency with the participating organizations. To further protect the confidentiality and anonymity of the respondents, the researcher did not seek their names or any personally identifiable information during the questionnaire process. This measure was intended to create a safe and secure environment where participants would feel comfortable sharing their insights and experiences without fear of repercussions. By maintaining anonymity, the researcher encouraged more honest and candid responses, ultimately enhancing the richness and reliability of the data collected. Additionally, the researcher ensured that the respondents voluntarily answered the questionnaires according to their own will. Participation was made entirely voluntary, and respondents were informed that they have the right to withdraw from the study at any time without any negative consequences. This approach respects the autonomy and agency of the participants, ensuring that their contributions are made willingly and in good faith. Lastly, the researcher prioritized the safety and security of all respondents. were ensured that none of the participants would be subjected to any form of harm or distress as a result of their involvement in the study. The researcher took all necessary precautions to protect the well-being of the participants during and after the research process. By placing the highest priority on the safety and security of the respondents, the researcher created a positive and ethical research experience for everyone involved. Overall, these ethical considerations are fundamental to the conduct of this research. By adhering to these principles, the researcher aims to uphold the highest standards of professionalism and integrity, ensuring that the research process is respectful, transparent, and beneficial for all participants.

### 3. Results and discussion

Table 2 presents the summary Table on Digital Transformation. The composite mean of 3.04 indicates that the respondents agree in general. This implies that the respondents perceive that their companies are

implementing digital transformation initiatives to a moderate degree. This overall "agree" indicates a positive trend towards digitalization, but the mean's proximity to the lower end of the "agree" range suggests that there's potential for more comprehensive and effective implementation. It shows that the respondents are aware of the digital transformations happening within their companies. In the similar study of Wang et al. (2022), this score shows that the companies are implementing digital transformation, but that there is room for improvement. The respondents are generally positive about the digital transformation progress.

**Table 2**

*Summary Table on Digital Transformation*

Key Result Areas	Composite Mean	VI	Rank
Technology Integration	3.04	Agree	1.5
Customer Integration	3.03	Agree	3
Value Creation	3.04	Agree	1.5
Grand Composite Mean	3.04	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Among the items cited, Technology Integration and Value Creation, ranked first with a mean score of 3.04 and verbal interpretation of agree. This implies that: The respondents recognize that technology integration and the resulting value creation are perceived as the strongest aspects of their companies' digital transformation efforts. In the study of Wang et al.(2022), this suggests that the companies have effectively implemented technologies that directly contribute to operational efficiency and tangible benefits. While in the study of (Mann et al.,2022), this indicates that the companies are seeing a return on their investment in technology. It also suggests that the respondents can see the value that technology brings to the company. The alignment of technology integration and value creation suggests the technological implementations are well directed.

Meanwhile, customer Integration, ranked second with a mean score of 3.03 and verbal interpretation of agree. This implies that while still within the "agree" range, the lower mean score for customer integration suggests that this area is perceived as relatively weaker compared to other aspects of digital transformation. This indicates potential challenges in fully integrating digital tools and strategies into customer-facing operations. In the study of Bai et al. (2024), it could also imply that the respondents are less confident in the company's ability to effectively leverage digital channels for customer engagement and relationship management. While in the study of Ai et al. (2024), this lower score suggests that there may be a need for more investment in customer integration strategies. It also shows that the respondents feel that the companies could improve their customer facing digital tools. The companies should look to improve their customer interaction.

In Shanxi Province, heavy industry and manufacturing were traditionally dominant, especially in coal and steel industries. These industries are more traditional and have more legacy processes and systems, so they might pay more attention to using technology to optimize existing production processes during the initial stage of transformation, without considering the management of customer relationships very much. Therefore, the slightly lower score for customer integration is also because such companies still have difficulty in changing from a product perspective to a customer perspective. Many of the skills and resources required for the development and maintenance of customer relationships are not present locally. Shanxi Province is still lacking somewhat in terms of technical talent pools and market resources compared to the coastal economic heavyweights, causing enterprises to hit some snags when it comes to fully implementing customer integration.

Some bigger tech manufacturing companies might spend more on automating assembly lines and connecting internal data systems so they could see faster improvements in making things without spending too much money. These firms will receive substantial benefits for just a short amount of time as they improve their IT infrastructure, when it comes to customer integration, these companies do not have enough experience and data support when moving to a digital customer relationship management system, because they have always paid attention to their products and product quality in the past. and the relatively low level of the local market has made some businesses unenthusiastic about it.

Firms must coordinate their resources and strategy priorities, especially talent, technology. Resource coordination with an emphasis on customer integration is necessary. The use of open cooperation to learn advanced experience and technology at home and abroad, in order to make up for the company's shortcomings in the integration of customers, so as to enhance the competitiveness of the company in the global market. From the results of this study, it can be found that although the manufacturing companies in Shanxi province have made some progress in terms of technology integration and value creation for digitalization, they still have a long way to go in terms of customer integration. Enterprises would be able to improve customer satisfaction and develop more flexible competitive advantages through investments into the creation and effective allocation of CRM resources. By improving the all-around digitalization strategy, Shansui's producing organizations are anticipated to more firmly and powerfully fix and strengthen their situation in the world market.

**Table 3***Summary Table on ESG Performance*

Key Result Areas	Composite Mean	VI	Rank
Environmental Protection	3.05	Agree	3
Social Responsibility	3.08	Agree	1
Internal Governance	3.06	Agree	2
Grand Composite Mean	3.06	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 3 presents the summary table on ESG Performance. The composite mean of 3.06 indicates that the respondents agree in general. This implies that the respondents perceive that their companies are generally committed to ESG principles, but with room for improvement across all areas. The overall "agree" indicates a positive trend, suggesting that ESG considerations are being integrated into company practices. However, with similar study of Liu et al. (2023) the mean's proximity to the lower end of the "agree" range suggests that there's potential for more robust and consistent implementation. It shows that respondents are aware of their companies ESG programs. This score shows that companies are implementing ESG policies, but that those policies could be strengthened (Zeng et al., 2023).

Among the items cited, Social Responsibility, ranked first with a mean score of 3.08 and verbal interpretation of agree. This implies that the respondents recognize that their companies' efforts in social responsibility are perceived as the strongest aspect of their ESG performance. This suggests that the companies have effectively implemented initiatives that positively impact employees, communities, and stakeholders. While in the study of Shrestha et al. (2023), this indicates that the companies are prioritizing social programs. It also suggests that the respondents can see the positive impacts of these programs. The high ranking of social responsibility suggests that this area is a point of strength for the companies involved.

Internal Governance ranked second with a mean of 3.06. This implies that the respondents acknowledge that the companies have established internal governance structures and systems, but with a need for ongoing refinement. In the study of Tang et al. (2024), this indicates a focus on ethical and transparent management practices. The fact that it is close to the composite mean indicates that it is a core part of the companies ESG programs. This score shows that the companies have a good base for internal governance, but that it can be improved Liu et al. (2024). This area is a key part of the ESG programs.

Meanwhile, Environmental Protection, ranked fifth with a mean score of 3.05 and verbal interpretation of agree. This implies that while still within the "agree" range, the lower mean score for environmental protection suggests that this area is perceived as relatively weaker compared to social responsibility and internal governance. From another similar study of Tsang et al. (2024), this indicates potential challenges in fully integrating and implementing effective environmental sustainability initiatives. It could also imply that the respondents are less confident in the company's commitment to environmental stewardship compared to other ESG aspects. While in the study of Chebbi et al. (2024), this lower score suggests that there may be a need for more investment in environmental protection strategies. It also shows that the respondents feel that the

companies could improve their environmental policies. The companies should look to improve their environmental impact.

From the performance data of manufacturing enterprise ESG in Shanxi, even though they have some institutionalization and success in terms of environment, society and governance, there is still a great deal of room for improvement. To improve the company's environmental performance, to further optimize the company's corporate social responsibility strategy, and to strengthen the company's corporate internal control capabilities, these will all be important ways for the company to achieve its own sustainable development. Regarding globalization and digitization, how to use technology to raise overall ESG is what everyone will research and learn.

**Table 4**

*Summary Table on Management Cognitive Flexibility*

Key Result Areas	Composite Mean	VI	Rank
Strategic Flexibility	3.05	Agree	2
Operational Flexibility	2.97	Agree	3
Learning Flexibility	3.15	Agree	1
Grand Composite Mean	3.06	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 4 presents the summary table on Management Cognitive Flexibility. The composite mean of 3.06 indicates that the respondents agree in general. This implies that the respondents perceive that their companies' management demonstrates a moderate level of cognitive flexibility across various dimensions. This "agree" indicates a positive trend towards adaptability and responsiveness. However, the mean's proximity to the lower end of the "agree" range suggests that there's potential for further development and enhancement of management's cognitive flexibility. According to the study of Lackner et al. (2022), it shows that the respondents feel that their company's management is flexible. This score shows that the company's management is flexible, but that their flexibility can be improved.

Among the items cited, Learning Flexibility, ranked first with a mean score of 3.15 and verbal interpretation of agree. This implies that the respondents recognize that learning flexibility is the strongest aspect of their companies' management cognitive flexibility. This suggests that the companies prioritize continuous learning, knowledge acquisition, and innovation. This indicates that the companies are prioritizing learning. In the study of Ma et al. (2023), it also suggests that the respondents can see the positive impacts of these learning programs. The high ranking of Learning flexibility suggests that this area is a point of strength for the companies involved.

Strategic Flexibility ranked second with a mean of 3.05. This implies that: The respondents acknowledge that their companies' management demonstrates a degree of strategic flexibility, allowing them to adapt to changing market conditions and uncertainties. This indicates a focus on agility and responsiveness in strategic decision-making. According to the study of Blom et al. (2021), the fact that it is close to the composite mean indicates that it is a core part of the company's management cognitive flexibility. While in the study of Altan-Atalay et al. (2022), this score shows that the companies have a good base for strategic flexibility, but that it can be improved. This area is a key part of the management cognitive flexibility.

Meanwhile, Operational Flexibility, ranked fifth with a mean score of 2.97 and verbal interpretation of agree. This implies that while still within the "agree" range, the lower mean score for operational flexibility suggests that this area is perceived as relatively weaker compared to learning and strategic flexibility. In the study of Ma et al. (2023), this indicates potential challenges in adapting operational processes to fluctuating demands and emergencies. It could also imply that the respondents are less confident in the company's ability to quickly adjust resource allocation and operational procedures. This lower score suggests that there may be a need for more investment in operational flexibility strategies. While in the study of van Hooijdonk et al. (2022), it also shows that the respondents feel that the companies could improve their operational flexibility. The companies should

look to improve their operational agility.

Although enterprises have a positive attitude towards learning flexibility and strategic agile, many enterprises will face practical resistance to operational agility because of the limitations of traditional management model. SMEs enhance its operational flexibility, it's hard to improve its day-to-day management operation because of resources and technology. thanks to the continuous advancements in technology, newly emerging technologies like AI and big data offer fresh tools which could augment operational versatility for companies. There are more government policies on digitalization and greening transformation, giving enterprise strategic planning and operations external motivation. Shanxi province manufacturing enterprises have a more positive attitude towards management cognitive flexibility, especially learning flexibility, they are key driving forces of enterprise sustainable development, though it is rated with a slightly lower operational agility rate, buy-in to strategy and learning has a strong base for managing overall agility. The companies in Shanxi can further improve their operational flexibility through better allocation of resources, enhancing technology application skills and deepening the degree of policy implementation to comprehensively improve their overall management cognitive flexibility.

**Table 5**

*Relationship Between Digital Transformation and ESG Performance*

Variables	rho	p-value	Interpretation
<b>Technology Integration</b>			
Environmental Protection	0.769**	<.001	Highly Significant
Social Responsibility	0.753**	<.001	Highly Significant
Internal Governance	0.757**	<.001	Highly Significant
<b>Customer Integration</b>			
Environmental Protection	0.734**	<.001	Highly Significant
Social Responsibility	0.707**	<.001	Highly Significant
Internal Governance	0.757**	<.001	Highly Significant
<b>Value Creation</b>			
Environmental Protection	0.780**	<.001	Highly Significant
Social Responsibility	0.775**	<.001	Highly Significant
Internal Governance	0.756**	<.001	Highly Significant

\*\* Correlation is significant at the 0.01 level

Table 5 shows the relationship between digital transformation variables—Technology Integration, Customer Integration, and Value Creation—and Environmental, Social, and Governance (ESG) performance metrics. The rho values indicate a highly significant positive correlation ( $p < 0.001$ ) across all ESG dimensions, including Environmental Protection, Social Responsibility, and Internal Governance. Technology Integration, for example, shows strong correlations with Environmental Protection ( $\rho = 0.769$ ), Social Responsibility ( $\rho = 0.753$ ), and Internal Governance ( $\rho = 0.757$ ). Similarly, Customer Integration and Value Creation also demonstrate robust correlations with all ESG aspects, consistently surpassing a rho of 0.700.

The consistent and highly significant positive correlations underscore a strong interdependency between digital transformation initiatives and ESG performance. This indicates that companies leveraging digital technologies for integration, customer engagement, and value creation are also more likely to achieve superior ESG outcomes. Specifically, the strong correlations suggest that digital tools and strategies facilitate improved environmental management, enhance social responsibility practices, and strengthen internal governance structures. According to the study of Anwer et al. (2023), the fact that Value Creation shows the strongest correlation with Environmental Protection and Social Responsibility implies that companies that are effectively using digital transformation to create value are also the most likely to be implementing strong ESG practices. In the similar study of Zeng et al. (2023), the data strongly suggests that digital transformation is not only a driver of operational efficiency and customer engagement but also a critical enabler of sustainable and responsible business practices. The high correlation values across all variables emphasize that integrating digital transformation with ESG strategies can lead to synergistic benefits, where improvements in one area reinforce positive outcomes in the other.



When combined with the context of Shanxi province, manufacturing companies in Shanxi province must face environmental pressures from both the government and growing consumers and social groups. In this sense, ESG performance is becoming more and more important for companies. The government's support of the digital transformation of companies creates both opportunities and obstacles for manufacturing enterprise. It is driven by this policy backdrop toward digital technology to be competitively advantaged and reach Sustainable development Goals.

In short, this is because the strong ESG performance in the process of digital transformation is mainly because the technology and customer integration and value creation have a major impact on the internal and external operating environment of Shanxi Province. these factors not only help with how well the company runs and makes money but also means the company is trying to help their community and the world around them and then they can stay good at what they do even after a long time has passed Due to policies and markets, digital transformation has become an important way to realize the sustainable development goals.

Table 6 presents the relationship between digital transformation and management cognitive technology. It reveals a highly significant positive relationship between digital transformation variables—Technology Integration, Customer Integration, and Value Creation—and different aspects of management cognitive flexibility, including Strategic, Operational, and Learning Flexibility.

**Table 6**

*Relationship Between Digital Transformation and Management Cognitive Flexibility*

Variables	rho	p-value	Interpretation
<b>Technology Integration</b>			
Strategic Flexibility	0.737**	<.001	Highly Significant
Operational Flexibility	0.738**	<.001	Highly Significant
Learning Flexibility	0.758**	<.001	Highly Significant
<b>Customer Integration</b>			
Strategic Flexibility	0.725**	<.001	Highly Significant
Operational Flexibility	0.734**	<.001	Highly Significant
Learning Flexibility	0.751**	<.001	Highly Significant
<b>Value Creation</b>			
Strategic Flexibility	0.767**	<.001	Highly Significant
Operational Flexibility	0.754**	<.001	Highly Significant
Learning Flexibility	0.750**	<.001	Highly Significant

\*\* Correlation is significant at the 0.01 level

The rho values consistently exceed 0.700, indicating strong correlations with p-values less than 0.001. For example, Technology Integration is strongly correlated with Strategic Flexibility (rho=0.737), Operational Flexibility (rho=0.738), and Learning Flexibility (rho=0.758). Similarly, Customer Integration and Value Creation are also highly associated with all three flexibility dimensions, with Value Creation showing the strongest link to Strategic Flexibility (rho=0.767).

The data presented in Table 6 demonstrates a compelling and statistically significant positive relationship between digital transformation initiatives and management cognitive flexibility. This signifies that companies that effectively implement digital transformation strategies also tend to exhibit greater strategic, operational, and learning flexibility. According to the study of Shrestha et al. (2023), the consistently high rho values across all digital transformation and management flexibility dimensions emphasize that digital technologies are not merely tools for operational improvement, but also catalysts for enhancing management's ability to adapt and innovate. Specifically, the strong correlations suggest that leveraging digital tools for technology integration, customer engagement, and value creation fosters a culture of agility and responsiveness within the organization. While in the study of Bekele et al. (2024), the high association between Value Creation and Strategic Flexibility indicates that companies that are successful in using digital transformation to create value are also those who are the most adaptable in their strategic thinking. The consistent significance across all flexibility dimensions suggests that digital transformation is a holistic driver of management's cognitive capabilities, enabling companies to thrive in

dynamic and unpredictable environments.

Shanxi Province's industrial structure is mainly heavy industry, and the digital transformation of such industries often needs technology to be integrated comprehensively. Take mining and steel manufacturing for example, they need advanced automation plus data processing technologies to help make things more effective and do less harm to nature. Technology is complicated and the change must be quick due to this complex nature thus management has to be more cognitive flexible with regards to embracing uncertainty and a constantly changing environment. Second, as a resource-consuming area, Shanxi is currently going through an economic structural change, thus it has put forward higher requirements for the customer integration capability and market flexibility of enterprises. In order for companies to adapt the shift in the economy from resource-based to innovation-based, the companies must be much more customer-focused when it comes to defining the value of a product or service, which provides more opportunity for fast changes as well as fast iterations.

Table 7 illustrates a strong, highly significant positive relationship between ESG (Environmental, Social, and Governance) performance and management cognitive flexibility, with rho values consistently above 0.74 and p-values below 0.001. Environmental Protection shows strong correlations with Strategic Flexibility (rho=0.751), Operational Flexibility (rho=0.764), and Learning Flexibility (rho=0.781). Similarly, Social Responsibility is significantly linked to Strategic Flexibility (rho=0.760), Operational Flexibility (rho=0.778), and Learning Flexibility (rho=0.749). Internal Governance also correlates strongly with all three cognitive flexibility dimensions.

**Table 7**

*Relationship Between ESG Performance and Management Cognitive Flexibility*

Variables	rho	p-value	Interpretation
<b>Environmental Protection</b>			
Strategic Flexibility	0.751**	<.001	Highly Significant
Operational Flexibility	0.764**	<.001	Highly Significant
Learning Flexibility	0.781**	<.001	Highly Significant
<b>Social Responsibility</b>			
Strategic Flexibility	0.760**	<.001	Highly Significant
Operational Flexibility	0.778**	<.001	Highly Significant
Learning Flexibility	0.749**	<.001	Highly Significant
<b>Internal Governance</b>			
Strategic Flexibility	0.756**	<.001	Highly Significant
Operational Flexibility	0.755**	<.001	Highly Significant
Learning Flexibility	0.764**	<.001	Highly Significant

\*\* Correlation is significant at the 0.01 level

Table 7 demonstrates that companies with strong ESG performance also exhibit high levels of management cognitive flexibility. This indicates that organizations that prioritize environmental sustainability, social responsibility, and sound governance are also more adept at adapting strategically, operationally, and through continuous learning. According to the study of Drobetz et al. (2024), the consistently high correlation values across all ESG and flexibility dimensions highlight that a proactive and adaptable management approach is crucial for achieving and maintaining strong ESG performance. Specifically, the strong correlation between Environmental Protection and Learning Flexibility (rho=0.781) suggests that companies that excel in environmental sustainability are also those that prioritize knowledge acquisition and innovation. Similarly, the high correlation between Social Responsibility and Operational Flexibility (rho=0.778) indicates that companies that are responsive and agile in their operations are also more effective in addressing social issues. While in the study of Liu et al. (2023), the general trend shows that companies that are flexible and willing to learn are also those that are the most successful in implementing strong ESG practices. This data strongly suggests that a synergistic relationship exists where a flexible, learning-oriented management fosters an environment conducive to strong ESG outcomes, and vice versa.

Shanxi is changing from old industries into service and tech industries; local governments wish enterprises

to step up social responsibility activity to create economic harmony. In this process, it is also an organization that must be constantly changing its internal structure and management methods, etc. for corporate responsibility efforts. In this sense, social responsibility performance improves relations with employees and the community, promoting strategic agility and operational agility.

### Research Output

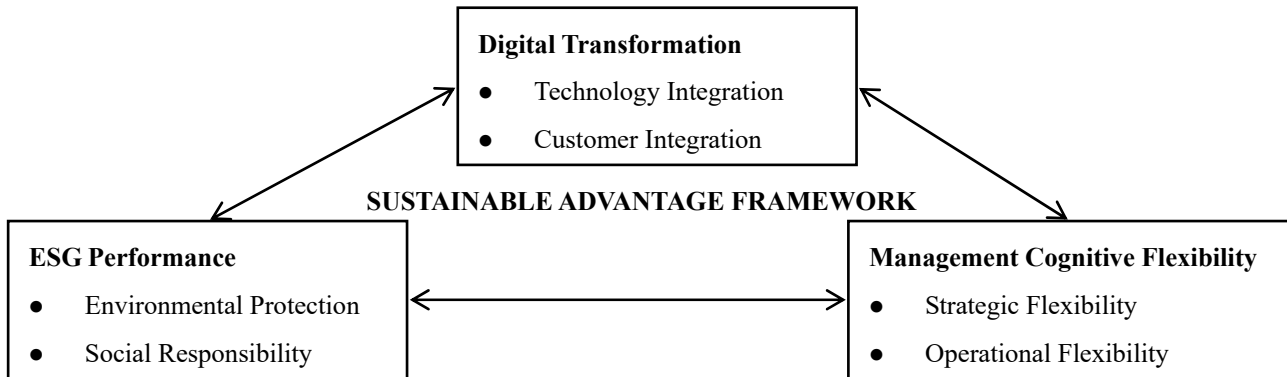


Figure 1. Sustainable Advantage Framework

The proposed Sustainable Advantage Framework shown in the figure 1 presents a holistic approach for manufacturing companies aiming to integrate sustainability into their core operations. By recognizing the inter-connectedness of Digital Transformation, ESG Performance, and Management Cognitive Flexibility, this framework offers a pathway to achieve a competitive edge while minimizing environmental impact and fostering social responsibility. Digital Transformation acts as the catalyst, enabling companies to optimize resource utilization, enhance transparency, and improve customer engagement through technological integration, data-driven decision-making, and value creation. Simultaneously, strong ESG Performance, encompassing environmental protection, social responsibility, and internal governance, ensures that the company's operations are aligned with ethical and sustainable practices. This not only mitigates risks but also enhances brand reputation and stakeholder trust.

To effectively utilize this framework, manufacturing companies should begin by assessing their current standing in each of the three dimensions. This involves evaluating the level of digital technology adoption, analyzing existing ESG practices, and gauging the organization's capacity for strategic, operational, and learning flexibility. Based on this assessment, companies can develop targeted strategies to enhance their performance in each area. For instance, implementing IoT solutions for real-time monitoring of energy consumption can improve both digital transformation and environmental protection. Similarly, fostering a culture of continuous learning and cross-functional collaboration can enhance management's cognitive flexibility, enabling quicker adaptation to market changes and better integration of ESG considerations into strategic planning. Ultimately, the framework underscores the importance of a synergistic approach, where improvements in one area positively influence the others, creating a virtuous cycle that drives sustainable growth and competitive advantage.

### 4. Conclusion and recommendation

The digital transformation is moderately integrated across technology, customer engagement, and value creation. A moderate ESG performance in terms of environmental protection, social responsibility, and internal governance is observed. The management demonstrates a moderate degree of cognitive flexibility, as reflected in their strategic, operational, and learning approaches. There is a highly significant relationship between digital transformation, ESG performance and managerial cognitive flexibility. A proposed sustainable advantage framework was developed for manufacturing industries. To accelerate digital transformation, the company may prioritize data-driven decision-making and invest in scalable technologies that enhance operational efficiency and customer experience. To elevate ESG performance, the management may integrate ESG metrics into core

business strategies and performance evaluations, ensuring transparency and accountability at all levels of the organization. To cultivate management cognitive flexibility, the companies may implement regular cross-functional workshops and training programs focused on strategic thinking, scenario planning, and adaptive leadership, fostering a culture that embraces change and continuous learning. The different manufacturing companies may evaluate and assess the applicability of the proposed framework to improve the sustainable advantage. The future researchers may validate the results of this study by looking into other business sectors in the Shanxi Province, China.


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## Service quality and tourist passenger loyalty: A basis for an action plan at Mindoro Seaports

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### **Abstract**

This study aimed to propose an action plan to improve service delivery and enhance tourist passenger loyalty at Mindoro Sea Ports. The researcher assessed the relationship between service quality and tourist passenger loyalty by examining five key dimensions of service quality: reliability, responsiveness, empathy, tangibility, and safety and assurance. The study described the demographic profile of respondents in terms of age, sex, and civil status, as well as their psychographic profile based on frequency and purpose of travel. It also evaluated tourist passenger loyalty in terms of brand image, passenger engagement, and overall loyalty. Furthermore, the study tested for significant differences in perceptions on service quality and loyalty when grouped according to demographic and psychographic variables and determined the significant relationship between service quality and tourist passenger loyalty. Based on the findings, an action plan was developed to address identified service gaps and support strategic improvements in seaport operations. The researcher used quantitative method and descriptive research design. The respondents of the study were 417 tourists visiting the seaports. The instrument was adapted from two different studies. Further, the statistical tests used in the study included the Shapiro-Wilk test, Kruskal-Wallis Test, and Mann-Whitney U-test to test significant differences; Spearman Rho was used to test relationships; and Linear Regression was employed to determine the predictor variables of service quality and tourist passenger loyalty. The study concluded that most of the respondents are young, female, and single travelers who frequently visit Mindoro Seaports primarily for leisure purposes. The respondents rated the seaport services positively, especially in terms of empathy, safety and assurance. Passenger loyalty is strongly influenced by brand image and passenger engagement. Additionally, frequent and purpose-driven travelers showed higher loyalty levels. Lastly, the study proposed a comprehensive action plan and provided relevant recommendations to enhance seaport services and promote passenger loyalty.

**Keywords:** service quality, tourist passenger loyalty, Mindoro Seaport, action plan

## **Service quality and tourist passenger loyalty: A basis for an action plan at Mindoro Seaports**

### **1. Introduction**

In the modern era of global mobility and integrated tourism systems, seaports are no longer limited to their traditional roles in freight and logistics. They have emerged as pivotal components in the broader tourism infrastructure, particularly as passenger expectations have shifted toward more efficient, comfortable, and service-oriented travel experiences. These maritime gateways serve not only as physical entry points but also as the first impression of a destination, thereby contributing directly to tourist loyalty and overall satisfaction. Prominent seaports across Europe such as those in Venice, Barcelona, and Piraeus serve as prime examples of how port facilities are increasingly being restructured to accommodate the needs of tourists. These ports now prioritize not only transportation efficiency but also the delivery of high-quality services, comfortable waiting areas, and smooth inter-modal connections. This global trend is mirrored in the Asia-Pacific region, where emerging tourist economies are investing heavily in modern port infrastructure to draw more international visitors and improve their competitiveness in the tourism sector. For archipelagic and island nations, such as Indonesia and the Philippines, seaports play a vital role in bridging remote destinations, stimulating regional tourism, and sustaining economic activity. The Philippine archipelago, consisting of over 7,000 islands, relies on a network of functional and service-oriented ports to support both domestic and foreign travel.

In this situation, service quality and tourist passenger loyalty emerge as critical variables in evaluating the effectiveness of port operations. Service Quality, operationally defined using the SERVQUAL model (Parasuraman et. al.,1988), comprises five dimensions: reliability, responsiveness, assurance, empathy and tangibility, each representing distinct aspects of service delivery. Theoretically, it refers to the gap between passenger expectations and their perceptions of the actual service. Tourist Passenger Loyalty is defined based on Oliver's model as the passenger's behavioral intention to reuse, recommend, and remain committed to a port's services. These definitions form the foundation for evaluating seaport performance and determining strategies to enhance user satisfaction and retention. The relationship between service quality and customer loyalty is well established in transport studies. This study adopts a questionnaire adapted from Parasuraman et. al.,(1988) for measuring service quality and integrates Oliver's constructs to assess passenger loyalty. In the context of Mindoro's seaports, service reliability and responsiveness are vital, given the fluctuating nature of sea schedules and regional connectivity. Thus, understanding how each dimension contributes to loyalty will allow port authorities and tourism stakeholders to align service delivery with passenger expectations.

Despite growing scholarly interest in transportation service quality, empirical studies specifically addressing tourist perspectives in regional Philippine seaports, particularly those in Mindoro, remain limited. Preliminary surveys and observations at Mindoro ports reveal recurring issues such as long queues, lack of seating, minimal customer service, and poor signage. Gaps in responsiveness and empathy emerged in initial data collection, highlighting the need for a more structured and context-specific evaluation using SERVQUAL. Mindoro's seaports particularly Calapan Seaport, Abra de Ilog Seaport, and Puerto Galera Seaport serve as vital transportation and tourism gateways within the MIMAROPA region and to adjacent areas such as CALABARZON. According to the Maritime Industry Authority, over 1.8 million passengers travel via Mindoro's ports annually, underscoring their importance in promoting tourism and sustaining local economies. However, unlike larger port systems equipped with institutionalized service feedback mechanisms, these ports operate with limited resources, infrastructural constraints, and inconsistencies in customer service practices. These issues highlight the need for focused research to provide localized insights and benchmark performance improvements.

This study is motivated by the need to address the specific service-related challenges at these three key



seaports in Mindoro. The scope of the research is limited to the tourist passenger experience at Calapan, Abra de Ilog, and Puerto Galera Seaports, using SERVQUAL dimensions as the primary framework for evaluating service quality. The investigation centers on the link between service performance and the loyalty of passengers, particularly their likelihood to return, recommend, and trust the port services. While the study provides valuable insights for improving customer service and enhancing passenger loyalty, its findings are limited by its geographic focus, sample size, and time frame. Operational data were gathered only during a specific period and reflect the perceptions of tourists who traveled at that time, excluding cargo users, port employees, and other stakeholder groups. Additionally, logistical constraints such as limited access to port management records and budgetary restrictions affected the breadth of the analysis. Nevertheless, this study contributes essential information that can help shape future improvements in seaport operations, enrich passenger experiences, and support tourism development initiatives within the region.

**Objectives of the Study** - The study generally assessed the relationship between service quality and tourist passenger loyalty at Mindoro Sea Ports. Specifically, it aimed to: evaluate the service quality of Mindoro Sea Ports based on five dimensions—reliability, responsiveness, empathy, tangibility, and safety and assurance; determine tourist passenger loyalty in terms of brand image, passenger engagement, and overall passenger loyalty; examine the significant relationship between service quality and tourist passenger loyalty; and propose an action plan to improve service delivery and enhance tourist passenger loyalty at Mindoro Sea Ports.

## 2. Methods

**Research Design** - This study employed a quantitative research approach using a descriptive-correlational research design to examine the relationship between service quality and tourist passenger loyalty at Mindoro Sea Ports. The quantitative method was selected due to its ability to systematically gather, analyze, and interpret numerical data to determine the extent and nature of relationships between variables. In particular, the correlational aspect of the research design allowed the study to assess the strength and direction of association between the five dimensions of service quality reliability, responsiveness, tangibility, assurance, and empathy and the sub-variables of tourist passenger loyalty, namely brand image, passenger engagement, and overall loyalty. This non-experimental design was chosen as it did not involve manipulation of variables but instead focused on observing and describing existing conditions. A descriptive-correlational design is most appropriate when the objective is to identify whether and how two or more variables are related within a specific context. The use of this method ensured a realistic analysis of the natural setting of port service delivery without altering the conditions under which passengers interact with the services provided.

**Respondents of the Study** - The participants of this study were composed of tourist passengers who traveled via ferry through the major Mindoro Seaports namely Calapan Seaport, Puerto Galera Seaport, and Abra de Ilog Seaport. These individuals represent the primary users of seaport services in Mindoro and were deemed appropriate for the study because of their direct experience with port facilities, staff, and overall service quality. A total of 384 respondents participated in the study. This sample size was scientifically determined using the Raosoft Sample Size Calculator, considering a 5% margin of error and a 95% confidence level. The calculation was based on the estimated population of ferry passengers traveling through the selected ports during peak seasons. To ensure that the data collected was representative and reliable, the study employed a stratified random sampling technique. The population was first grouped according to the seaport they used, and from each stratum, respondents were selected at random. This approach ensured proportional representation across the three seaports and minimized sampling bias. The researcher personally conducted the distribution of questionnaires at the port terminals during scheduled peak hours to capture passengers with varied travel purposes and demographics.

Respondents were selected based on specific inclusion criteria designed to enhance the quality and relevance of the study. These qualifications were as follows: they must be legally of age (18 years old and above); they must be traveling as tourist passengers, regardless of whether the purpose was for leisure, business, or personal

reasons; they must have used the Mindoro Sea Ports at least twice in the last twelve months, to ensure familiarity with port services; and they must be willing to participate in the survey voluntarily. These qualifications ensured that only informed and experienced seaport users participated in the study, thereby contributing credible and meaningful data for the analysis of service quality and tourist passenger loyalty in Mindoro. The respondents for this study were proportionally selected from three major seaports in Mindoro namely Calapan, Abra de Ilog, and Puerto Galera based on their respective passenger volumes. Passenger data was sourced from official maritime transport records. Using proportional allocation, 384 tourist passengers were surveyed in total, with the highest number (275) from Calapan due to its larger share of total traffic (71.72%). Abra de Ilog contributed 59 respondents (15.33%), and Puerto Galera contributed 50 (12.95%).

**Data Collection Instrument** - This study utilized an adapted questionnaire as its primary research instrument to assess tourist passenger perceptions of service quality and its impact on passenger loyalty in Mindoro Seaports namely Calapan Seaport, Puerto Galera Seaport, and Abra de Ilog Seaport. The instrument was adapted from previously validated studies by Yu et. al.,(2024), “Service Quality and Customer Loyalty in Philippine Ferry Terminals,” and Hife et. al.,(2022), “Passenger Experience and Satisfaction in Regional Port Facilities.” The original questionnaires were modified to suit the contextual realities and operational environment of Mindoro’s seaports while preserving the integrity of the original constructs.

The questionnaire was divided into three (3) major parts. Part I introduced the purpose of the research, presented an informed consent form, and outlined the participants' rights and responsibilities. This section emphasized the confidentiality of responses, the voluntary nature of participation, and compliance with the Data Privacy Act of 2012. It also included qualifier questions to confirm that respondents were legally of age, traveling as tourist passengers, had utilized Mindoro Sea Ports at least twice, and consented to participate. Part II focused on the demographic profile of the respondents. It included variables such as age, sex, civil status, and frequency of travel using Mindoro Seaports. These demographic indicators were intended to aid in the contextual analysis of the passengers' responses and preferences. Part III contained the core items measuring the study’s main variables: service quality, brand image, passenger engagement, and passenger loyalty. Service quality was further divided into five key dimensions: reliability, responsiveness, empathy, tangibility, and safety and assurance. A four-point Likert scale was used to assess each item, ranging from 1 (strongly disagree) to 4 (strongly agree), to capture the intensity of respondent perceptions in a simplified yet measurable format.

To ensure the content validity of the adapted instrument, it underwent expert validation by a panel consisting of a tourism and hospitality academic, a port operations professional, and a statistician with expertise in quantitative research design. The experts assessed the instrument in terms of clarity, relevance, and alignment with the study’s objectives. Based on their feedback, minor modifications were made to ensure that the items were culturally and operationally applicable to the target research setting.

**Table 1**

*Reliability Testing Result*

Indicators	No of Items	Cronbach’s Alpha	Remarks
Reliability	7	0.926	Excellent
Responsiveness	5	0.846	Good
Empathy	6	0.896	Good
Tangibility	12	0.951	Excellent
Safety and Assurance	7	0.950	Excellent
Brand Image	4	0.956	Excellent
Passenger Engagement	7	0.949	Excellent
Overall Passenger Loyalty	8	0.968	Excellent

*Legend > 0.9 =Excellent; >0.8=Good;>0.7=Acceptable;>0.6=Questionable;>0.5=Poor;<0.5=Unacceptable*

A pilot test was also administered to forty (40) tourist passengers who had traveled through one of the targeted seaports at least twice. The pilot testing aimed to determine the internal consistency of each indicator through Cronbach’s Alpha reliability testing. The results of the reliability test are summarized in the table above.

These results confirm the instrument's strong internal reliability, with most constructs falling under the "Excellent" category ( $\alpha \geq 0.90$ ) and others under "Good" ( $\alpha \geq 0.80$ ), thus affirming its appropriateness for use in the main study.

**Data Gathering Procedure** - The researcher employed a hybrid approach in collecting data for this study, utilizing both printed questionnaires and an online platform via Google Forms. This method was chosen to ensure maximum reach and response rate among tourist passengers traveling via ferry through the Mindoro Seaports, particularly at Abra de Ilog Seaport, Calapan Seaport, and Puerto Galera (Balatero) Seaport. The data collection process followed a systematic procedure, beginning with the development and validation of the research instrument. The questionnaire used in this study was adapted from validated instruments previously employed in similar research. The adaptation process involved face and content validation conducted by a panel of academic experts in tourism and statistics. The questionnaire was evaluated in terms of clarity, relevance, and alignment with the research objectives. Following validation, a pilot test was conducted involving forty (40) tourist passengers who were not part of the main sample. Reliability testing using Cronbach's Alpha revealed coefficients above the acceptable threshold, confirming the internal consistency and reliability of the questionnaire items.

Upon approval from port management, printed questionnaires were distributed in high-traffic areas of the selected seaports. These areas included check-in counters, waiting lounges, and ticketing zones. The researcher personally approached potential respondents, explained the purpose of the study, and provided instructions for accomplishing the form. Respondents were given adequate time to answer the survey before collection. Simultaneously, Google Forms was used as an alternative means of data gathering. QR codes linked to the online version of the survey were strategically placed at key points within the ports, allowing passengers to access the questionnaire using their mobile devices. This version was designed to be concise, user-friendly, and identical in structure and content to the printed version. Both formats featured a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree), covering variables related to service quality such as reliability, responsiveness, empathy, tangibility, safety, and assurance as well as indicators of passenger loyalty including brand image, engagement, and overall loyalty. To enrich the quantitative data, the researcher employed triangulation through field observations and informal interviews with selected passengers. Observations focused on staff behavior, facility conditions, and general port services. Informal interviews provided additional context regarding passengers' perceptions and experiences. Data collection was conducted over a four-week period to ensure diversity and capture different waves of tourist traffic across the three seaports.

**Data Analysis** - To perform data analysis, the following statistical tools were used. Weighted mean and ranking were used to assess the service quality of Mindoro Sea Ports in terms of reliability, responsiveness, empathy, tangibility, and safety and assurance and determine the tourist passengers loyalty in terms of brand image, passenger engagement, over-all passenger loyalty. The result of Shapiro-Wilk Test revealed that p-values of the main variable was less than 0.05 which means that the data set is not normally distributed. Therefore, Spearman rho Correlation was used to test the significant relationship of the treated variables. In addition, post hoc test was also conducted. The following Likert Scale was used in assessing the variables: 3.50-4.00=strongly agree; 2.50-3.49=agree; 1.5-2.49=disagree; and 1.00-1.4=strongly disagree. All data were treated using a statistical software known as JAMOVI version 2.6 to further interpret the result of the study using an alpha level of 0.05 and 0.01.

**Ethical Consideration** - This study strictly adhered to ethical principles in conducting research involving human participants. Prior to data collection, informed consent was obtained from all respondents. Participants were informed of the nature and purpose of the study, their right to voluntarily participate or withdraw at any point, and the measures taken to ensure anonymity and confidentiality. The printed and online questionnaires both contained a consent statement which participants had to affirm before answering. The privacy of the respondents was protected in accordance with the Data Privacy Act of 2012. No personally identifiable information was collected, and all responses were treated with strict confidentiality. The Google Forms platform

automatically anonymized the data, while printed responses were securely stored and encoded without recording any names or contact information. Furthermore, the researcher sought formal approval from the original authors of the questionnaire used in this study. Proper acknowledgment and citation were made, and the adapted version retained the structure and intent of the original instrument while aligning with the context of the Mindoro Seaports. Approval to conduct the survey was also obtained from the management of the selected seaports. All interactions with participants were conducted respectfully, ensuring that their rights and well-being were prioritized. The research complied with institutional ethical standards and was carried out with the utmost integrity to ensure reliable and responsible research output.

### 3. Results and discussion

**Table 2**

*Summary Table of Service Quality*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Reliability	3.43	Agree	2
Responsiveness	3.40	Agree	4
Empathy	3.46	Agree	1
Tangibility	3.33	Agree	5
Safety and Assurance	3.41	Agree	3
Composite Mean	3.41	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 2 shows the overall service quality at the port, as perceived by the respondents, is reflected through five dimensions: reliability, responsiveness, empathy, tangibility, and safety and assurance. Among these, empathy emerged as the highest-rated indicator with a weighted mean of 3.46, interpreted as agree, and ranked 1st. This was followed by reliability (3.43, agree, rank 2) and safety and assurance (3.41, agree, rank 3). All dimensions were rated within the agree range, indicating general satisfaction among passengers with the port's service quality, though no dimension reached the strongly agree level. The overall composite mean is 3.41, which also falls under the agree category.

The top-rated dimension, empathy, reflects the respondents' appreciation for the human-centered approach of port staff. It indicates that passengers felt genuinely cared for, with their individual needs considered throughout their travel experience. This suggests that front-line employees have been successful in demonstrating warmth, attentiveness, and respectful treatment particularly for passengers with special needs, cultural differences, and unique travel preferences. The prominence of empathy also aligns with the growing trend in service industries where emotional intelligence and personalized customer care are emphasized. The high rating of empathy may be a reflection of passengers' direct interactions with staff members who go beyond standard service procedures to ensure comfort, inclusivity, and understanding.

Meanwhile, the three lowest-rated service quality dimensions were tangibility (3.33, agree, rank 5), responsiveness (3.40, agree, rank 4), and safety and assurance (3.41, agree, rank 3). Although all fall under the "agree" interpretation, their relatively lower scores suggest areas for improvement. Tangibility, ranked the lowest, implies that physical aspects of the port such as facilities, signage, cleanliness, and equipment may not fully meet passenger expectations. These physical elements are crucial because they form the first impression and shape the perceived quality and professionalism of the port services. Despite the efforts in staff behavior and service consistency, any shortcomings in infrastructure or visible service elements could diminish the overall experience.

According to Parasuraman et. al.,(2018), tangibles are a critical element of the SERVQUAL model as they serve as visual cues of quality. Even if intangible services are delivered well, any perceived inadequacy in tangible components can negatively impact overall service perception. This is particularly true in transportation settings, where passengers expect convenience, modernity, and hygiene to align with safety and efficiency. Inadequate physical conditions may signal neglect, thus weakening passengers' trust and satisfaction.

**Table 3***Summary Table on Impact of Tourist Passenger Loyalty*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Brand Image	3.27	Agree	3
Passenger Engagement	3.42	Agree	1
Overall Passenger Loyalty	3.38	Agree	2
Composite Mean	3.36	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 3 shows the summary of various indicators on tourist passenger loyalty. The indicator “passenger engagement” emerged as the highest-ranked factor, with a weighted mean of 3.42, verbally interpreted as agree, and ranked 1st.

This was followed by “overall passenger loyalty,” with a weighted mean of 3.38, ranked 2nd. The lowest-ranked indicator is “brand image,” with a weighted mean of 3.27, also interpreted as agree, and ranked 3rd. The composite mean of 3.36 indicates that, in general, the respondents agreed with the factors that influence tourist passenger loyalty.

The highest-ranked indicator, “passenger engagement,” highlights the importance of passengers feeling personally connected and involved with the seaport. A weighted mean of 3.42 reflects a strong emotional bond, where passengers take pride in using the local seaport and enjoy interactions with other passengers. This sense of engagement leads to enhanced loyalty, as passengers who feel an emotional connection are more likely to recommend the seaport to others and return for future travels. The analysis suggests that fostering passenger engagement is critical in building long-term loyalty, as it creates an atmosphere where passengers feel valued and integral to the seaport experience.

In contrast, the lowest-ranked indicator, “brand image,” with a weighted mean of 3.27, suggests that while the seaport maintains a generally positive image, it may not have achieved the strong, distinct identity necessary to inspire the highest level of loyalty among passengers. Passengers perceive the seaport favorably, but it may not be their first choice when compared to other seaports. The analysis suggests that strengthening the seaport's brand image could be an effective strategy to enhance passenger loyalty further. A competitive and unique brand image can reinforce the seaport's position as the preferred travel hub, ensuring passengers think of it first when making travel decisions. The seaport could benefit from increasing its brand visibility and distinctiveness, establishing itself as the top choice for passengers.

Table 4 shows the correlation analysis between the dimensions of service quality and the indicators of tourist passenger loyalty, namely brand image, passenger engagement, and overall passenger loyalty. As shown, all computed Pearson *r*-values indicate a strong positive correlation, with corresponding *p*-values of less than 0.001, signifying highly significant relationships across all service quality variables.

Specifically, safety and assurance exhibited the strongest correlation with all three indicators of loyalty: brand image ( $r = 0.697$ ), passenger engagement ( $r = 0.726$ ), and overall passenger loyalty ( $r = 0.710$ ). This finding underscores the vital role of safety-related factors in fostering trust and commitment among passengers. The perception of a secure facility enhances customer confidence, which in turn reinforces brand attachment and loyalty behaviors.

The dimension of reliability also showed strong correlations, notably with passenger engagement ( $r = 0.700$ ) and overall passenger loyalty ( $r = 0.663$ ). This indicates that consistent and dependable service delivery builds affective commitment and a sense of pride and satisfaction among passengers. Furthermore, tangibility and empathy both recorded *r*-values above 0.64 across all loyalty indicators, signifying the importance of well-maintained physical facilities and emotionally intelligent service personnel in driving positive passenger experiences.

**Table 4***Relationship Between Service Quality and Tourist Passenger Loyalty*

Variables	r-value	p-value	Interpretation
<b>Reliability</b>			
Brand Image	0.656**	<.001	Highly Significant
Passenger Engagement	0.700**	<.001	Significant
Overall Passenger Loyalty	0.663**	<.001	Highly Significant
<b>Responsiveness</b>			
Brand Image	0.622**	<.001	Significant
Passenger Engagement	0.610**	<.001	Highly Significant
Overall Passenger Loyalty	0.588**	<.001	Highly Significant
<b>Empathy</b>			
Brand Image	0.672**	<.001	Highly Significant
Passenger Engagement	0.646**	<.001	Highly Significant
Overall Passenger Loyalty	0.670**	<.001	Highly Significant
<b>Tangibility</b>			
Brand Image	0.672**	<.001	Highly Significant
Passenger Engagement	0.646**	<.001	Highly Significant
Overall Passenger Loyalty	0.670**	<.001	Highly Significant
<b>Safety and Assurance</b>			
Brand Image	0.697**	<.001	Highly Significant
Passenger Engagement	0.726**	<.001	Highly Significant
Overall Passenger Loyalty	0.710**	<.001	Highly Significant

Legend: Significant at  $p$ -value < 0.01

Lastly, responsiveness, while slightly lower in r-values (e.g.,  $r = 0.588$  with overall loyalty), still exhibited statistically significant and positive relationships with all loyalty indicators. This suggests that the promptness and willingness of service personnel to assist passengers are critical, albeit secondary to safety, empathy, and reliability, in cultivating loyalty.

**Table 5***Proposed Action Plan to Enhance the Service Quality and Tourist Passenger Loyalty at Mindoro Seaports*

Key Result Area	Objectives	Key Performance Indicators (KPI)	Strategies	Timeline	Expected Outcome
Reliability	Improve Consistency in schedule and service delivery	95% adherence to announced departure and arrival times	Implement real-time tracking systems and pro-active scheduling reviews	1Q	Increased trust and predictability among passengers
Responsiveness	Enhance staff attentiveness and quick resolution of inquiries and complaints	90% customer issue resolution within 24 hours	Train front-liners in rapid response protocols and customer service workshops	2Q	Boost in passenger satisfaction and reduced complaints
Tangibility	Upgrade physical facilities and cleanliness standards	100% compliance with cleanliness audits and visual inspections	Renovate waiting areas, improve signage and enhance visual branding	3Q	More appealing and professional environment, improving first impressions
Empathy	Foster personalized service and attention to diverse passenger needs	85% of surveyed passengers feel "personally attended to"	Establish a feedback system for special needs and train staff in inclusive service delivery	2Q	Stronger emotional connection and positive travel experience
Safety and Assurance	Strengthen confidence in port safety and employee competence	100% safety drill compliance and emergency preparedness certification	Regular safety audits, drills, and staff certifications	Ongoing	Heightened sense of security and reliability in port services

Brand Awareness	Increase public recognition and visibility of port branding	20% increase in recognition scores from passenger surveys	Launch social media campaigns and develop community engagement partnerships	3Q	Stronger brand presence and recall in tourism markets
Passenger Engagement	Boost passenger interaction and involvement in port involvements	75% participation in feedback program and surveys	Initiate monthly suggestion drives and conduct interactive community events	4Q	Improved services aligned with passenger expectations
Overall Tourist Passenger Loyalty	Increase repeat patronage and positive recommendations	30% rise in returning passengers and referrals	Offer loyalty perks (discounts, VIP lanes) and monitor follow up survey data	4Q	Sustainable growth in passenger base through loyalty and advocacy

Table 5 shows the proposed action plan designed to enhance the service quality and promote tourist passenger loyalty at Mindoro Seaports. This plan is grounded in the findings discussed in tables 1 to 11, which assessed the perceptions of tourist passengers on the dimensions of service quality includes tangibility, reliability, responsiveness, assurance, and empathy, alongside sub-variables such as brand awareness, passenger engagement, and passenger loyalty. The data revealed specific service gaps including inadequacies in port facilities, inconsistencies in staff responsiveness, limited promotional visibility, and a lack of active passenger involvement. In response, the proposed activities and strategies were developed to directly address these gaps and to improve both the functional and emotional components of the passenger experience. The plan also seeks to support sustainable improvements in operational efficiency, enhance brand perception, and strengthen the emotional connection between passengers and the port. Each objective, activity, and expected outcome outlined in the action plan serves to reinforce the goal of transforming Mindoro Seaports into a more reliable, engaging, and passenger-centric gateway, ultimately contributing to increased tourist satisfaction and long-term loyalty.

#### 4. Conclusions and recommendations

Mindoro Seaports are generally rated positively across all service quality dimensions, with safety and assurance receiving the highest evaluations. This affirms that passengers feel secure and confident when utilizing the port's facilities, underscoring the importance of maintaining high safety standards and continuously enhancing service reliability. Tourist passenger loyalty is strongly influenced by factors such as brand image and passenger engagement. Ports that offer consistent, pleasant, and personalized experiences foster stronger loyalty among passengers, emphasizing the value of emotional connection and active customer involvement in service design and delivery. A significant positive correlation was found among all five service quality dimensions and the indicators of tourist passenger loyalty. This supports the conclusion that improving service aspects such as reliability, empathy, and tangibility directly enhances brand image, passenger engagement, and overall loyalty. In response to the findings, a comprehensive Action Plan was proposed to improve the delivery of port services and enhance passenger loyalty. This plan focuses on strengthening key service quality dimensions, promoting brand awareness, increasing passenger engagement, and reinforcing safety and reliability ultimately contributing to a sustainable, customer-oriented seaport operation.

Mindoro Seaports may tailor their marketing efforts to specifically target this demographic. Special promotions, such as discounts or loyalty programs for frequent travelers, and leisure-oriented services (e.g., themed events or entertainment offerings), could further engage this group and enhance their overall experience at the seaport. By focusing on this key customer base, the port can maximize passenger engagement and loyalty. Seaports may continue to invest in improving security infrastructure, such as enhanced surveillance systems, better-trained safety personnel, and efficient emergency response mechanisms. Ensuring reliable and consistent services, especially regarding passenger safety, will help strengthen trust and maintain the port's positive image. Seaport management may focus on strengthening its brand identity by communicating clearly the values and promises of the seaport. Engaging with passengers through digital platforms, social media, and personalized

communication can significantly enhance the emotional connection with the port. Seaports may design specialized packages or incentives tailored to the needs of these groups. For instance, providing business lounges, priority boarding services, and exclusive offers for business or educational travelers will improve their overall experience and make the seaport more appealing for these specific customer segments. This approach can contribute to sustained loyalty among high-frequency travelers. Seaports may prioritize continuous improvement across all five service quality dimensions namely reliability, responsiveness, empathy, tangibility, and safety. This can be achieved through regular staff training, infrastructure upgrades, and the introduction of advanced technologies to facilitate smoother operations. A consistent focus on service excellence will contribute to an enhanced passenger experience, thereby fostering greater loyalty and satisfaction. The tourism industry may adopt the proposed Service Quality Improvement Framework. This framework emphasizes key areas such as safety assurance, customer care, service reliability, and staff training. The implementation of this framework should involve setting up systematic feedback mechanisms to continuously assess passenger satisfaction, upgrading facilities, and fostering clear communication to reinforce the port's brand image. Monitoring and adapting services to meet passenger needs will ensure that the seaport maintains long-term passenger loyalty and remains competitive in the tourism sector.

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# Market intelligence, customer experience, and service innovation: Basis for enhanced customer retention framework

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## Abstract

This study examines the interplay between market intelligence, customer experience, and service innovation within Chinese consulting firms to develop an enhanced customer retention framework. Specifically, it evaluates market intelligence through customer, competitor, and product dimensions; assesses customer experience via customer journey, engagement, and service delivery; and analyzes service innovation concerning value proposition, resource integration, and communication technology. This study used descriptive research utilizing 400 client respondents. The findings indicate that respondents perceive consulting firms as effectively leveraging market intelligence and customer experience to improve services, though they express moderate agreement regarding the role of service innovation in client satisfaction and retention. A significant relationship among market intelligence, customer experience, and service innovation in enhancing client retention was identified. Consequently, an enhanced client retention framework was developed, emphasizing the integration of these elements. Recommendations include investing in advanced market intelligence tools, systematically incorporating customer feedback into service processes, fostering a culture of innovation through cross-functional collaboration, providing targeted employee training, and exploring the framework's applicability across various industries and contexts.

**Keywords:** market intelligence, customer experience, service innovation, customer retention, consulting firms

## **Market intelligence, customer experience, and service innovation: Basis for enhanced customer retention framework**

### **1. Introduction**

In today's rapidly evolving business environment, consulting firms in China are under increasing pressure to maintain competitive advantage and sustain long-term client relationships. As consulting firms seek to differentiate themselves, understanding the dynamics of client retention becomes a critical strategic priority. This study explores the role of market intelligence, customer experience, and service innovation as key drivers of client retention, aiming to develop an enhanced client retention framework for consulting firms in China.

The market is characterized by strong competition, rapidly changing customer needs and technological advances that require continuous adaptation (Kumar et. al.,2020). From a macroeconomic point of view, the consulting industry in China is influenced by various factors, including economic changes, regulatory development, and technological disruptions. These external forces create market conditions and customer expectations. Consulting firms should be informed. Competitive intelligence, which includes systematic collection and analysis of data on industry trends, competitive strategies, and customer behavior, plays a critical role in helping businesses proactively anticipate and respond to change. With this competitive intelligence, consulting firms can tailor their services to better meet customer needs and deliver added value, thereby improving customer satisfaction and loyalty (Wang et. al.,2020).

At a more micro level, customer experience is a crucial determinant of client retention. Consulting services are inherently relationship-driven, and the quality of the customer experience directly impacts client perceptions and future engagements. Key aspects of customer experience include personalized service, responsiveness, trust, and effective communication. Service innovation is another key variable in this study, representing the continuous improvement and development of advisory services. In a competitive market, companies that innovate and ensure their service offerings meet changing customer requirements are likely to retain customers. Innovation in services includes the use of modern technologies, the simplification of processes and the development of innovative solutions to solve complex customer problems. Opportunities for innovation not only add value to the company but also strengthen its importance in a dynamic market (Nelson et. al.,2020).

The relationship between these variables (market intelligence, customer experience and service innovation) and customer loyalty is the focus of this study. By examining how these factors interact and enhance customer loyalty, this study provides an overall framework that Chinese consulting firms can use to improve their loyalty strategy. The rationale for conducting this study lies in the growing need for consulting firms to sustain their competitive edge in an increasingly saturated market. As client expectations rise and competition intensifies, traditional approaches to client retention may no longer be sufficient. This study sought to provide actionable insights and strategic recommendations that consulting firms can implement to improve their client retention rates, ensuring long-term success and sustainability in the Chinese market.

**Objectives of the Study** - This study aimed to assess the market intelligence, customer experience, and service innovation in China which will be the basis for the development of an enhanced customer retention framework. Specifically, it aimed to demonstrate market intelligence in terms of customer intelligence, competitor intelligence, and product intelligence; to assess customer experience in terms of customer journey, customer engagement, and service delivery; to assess service innovation in terms of value proposition, resource integration, and communication technology; to test the significant relationships among market intelligence, customer experience, and service innovation; and to develop a framework to improve client retention in consulting firms.

## 2. Methods

**Research Design** - Descriptive research design was used in this study for an adequate and precise interpretation of the findings. The researcher sought to gather information from the respondents through providing survey questionnaires and distributing these to them. This descriptive kind of research was helpful in collecting the respondents' data efficiently.

**Participants of the Study** - This study surveyed 400 employees from government sectors that use consulting firms in China. The reason for choosing is they are highly knowledge-intensive in this matter. To ensure the representativeness and accuracy of the data, this study used a questionnaire survey.

**Instruments of the Study** - This study used a structured questionnaire as the main tool for data collection. The questionnaire was self-made by the researcher and was validated by three experts. The questionnaire is divided into four parts, which aims to fully understand the respondents' views on variables such as market intelligence, customer experience, service innovation and customer retention. Part I: Profile of Respondents. This part collects basic information of the respondents, such as gender, age, education level and years of work experience. This data helped researchers analyze the differences between respondents from different backgrounds on various variables. Part II: Market Intelligence covers the respondents' evaluation of market intelligence in customer understanding; competitor analysis; and product analysis. Through Likert scale, respondents evaluated the importance of market intelligence in their organization and its impact on customer retention. Part III: Customer Experience covers the respondents' evaluation of customer experience, including client journey; client engagement; and service delivery. Based on their experience, respondents evaluated how the company can improve customer retention by optimizing customer experience. Part IV: Service Innovation covers the respondents' evaluation of service innovation, including value proposition, resource integration and communication technology. Respondents provided feedback on their perception of service innovation and its impact on customer retention. The questionnaire was sent to the target group through the online platform of Questionnaire Star to ensure the convenience and extensiveness of data collection. After data collection, researchers used statistical analysis methods to process the data of each part to explore the combined impact of market intelligence, customer experience and service innovation on customer retention.

**Table 1**  
*Reliability Results*

Variables	No. of Items	$\alpha$ value	Interpretation
<b>Market Intelligence Practices</b>			
Customer understanding	5	0.725	Acceptable
Competitor analysis	5	0.820	Good
Product analysis	5	0.780	Acceptable
Overall	15	0.815	Good
<b>Customer Experience</b>			
Client journey	5	0.801	Good
Client engagement	5	0.830	Good
Service delivery	5	0.731	Acceptable
Overall	15	0.740	Acceptable
<b>Service Innovation</b>			
Value proposition	5	0.725	Acceptable
Resource integration	5	0.924	Excellent
Communication technology	5	0.746	Acceptable
Overall	15	0.771	Acceptable

*Legend* > 0.9 =Excellent; >0.8=Good;>0.7=Acceptable;>0.6=Questionable;>0.5=Poor;<0.5=Unacceptable

Reliability results showed that the Cronbach's alpha for marketing practices (0.815), customer experience (0.740), and service innovation (0.771) suggest that the items have relatively high internal consistency. This study employed a structured questionnaire, validated by three experts, to assess respondents' perceptions of market intelligence, customer experience, service innovation, and customer retention. The instrument used a 4-point Likert scale (1=Strongly Disagree to 4=Strongly Agree) across three key sections: market intelligence

(customer understanding, competitor and product analysis), customer experience (journey, engagement, service delivery), and service innovation (value proposition, resource integration, communication technology). Data were collected via Questionnaire Star and analyzed to examine how these variables influenced customer retention. The 4-point scale eliminated neutral responses, yielding more decisive data for analysis.

**Data Gathering Procedure** - This study was conducted following rigorous scientific research procedures to ensure validity and reliability. The research process began with identifying customer retention as a critical challenge for Chinese consulting firms through comprehensive literature review and industry analysis. Based on this, the study focused on examining how market intelligence, customer experience, and service innovation influence customer retention strategies. The researchers developed a structured questionnaire incorporating validated measurement scales adapted to the study context. Before deployment, the instrument underwent expert validation and preliminary reliability testing. Data were collected from 400 Chinese government employees who use consulting services through an online platform, ensuring sample diversity while maintaining strict ethical standards for respondent confidentiality. Collected data were systematically coded and analyzed using statistical techniques including descriptive statistics, correlation analysis, and regression modeling. These methods enabled examination of variable relationships and hypothesis testing. The findings provided both theoretical contributions and practical insights to enhance customer retention frameworks in China's consulting industry. The complete research process, from problem identification to data interpretation, followed methodical steps to yield credible, actionable results.

**Data Analysis** - Weighted mean and rank were used to describe the market intelligence in terms of customer intelligence; competitor intelligence; and product intelligence; to assess the customer experience in terms of customer journey; customer engagement; and service delivery; and to assess the service innovation in terms of value proposition, resource integration and communication technology. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

**Ethical Considerations** - The research adhered strictly to ethical guidelines throughout the study. Prior to participation, all respondents received clear information about the study purpose and provided informed consent. Participant anonymity was guaranteed through anonymous survey links and secure data storage. Respondents could withdraw at any point without consequence. The research protocol received approval from the institutional ethics review board, and all data handling complied with China's data protection regulations. Findings are reported objectively without misrepresentation of the results. Furthermore, ethical clearance was secured from the university's ethics review committee office before data gathering.

### 3. Results and discussion

Table 2 shows the summary table of market intelligence. Customer Intelligence ranks first with a weighted mean of 3.16, indicating that the company excels in understanding customer needs, preferences, and behaviors. This area focuses on leveraging customer feedback, analyzing behavioral changes, and anticipating future market needs. A high score indicates the company's ability to meet customer expectations through its services, which is essential for customer satisfaction and loyalty.

**Table 2**  
*Summary Table of Market Intelligence*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Customer Intelligence	3.16	Agree	1
Competitor Intelligence	3.11	Agree	2
Product Intelligence	3.07	Agree	3
Composite Mean	3.11	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Competitor Intelligence ranks second with a weighted mean of 3.11, indicating that the company effectively monitors and analyzes competitor activities, strengths, and weaknesses. This dimension focuses on tracking competitor strategies, product innovations, and market performance to inform business decisions. The high score reflects the company's ability to stay competitive by adapting to market dynamics and leveraging competitor insights. Product Intelligence ranks third with a weighted mean of 3.07, indicating that the company effectively evaluates and optimizes its product portfolio to meet market demands. This dimension focuses on improving product quality, predicting product life cycles, and analyzing competitive product advantages. The high score reflects the company's ability to deliver products that align with customer needs and market trends.

**Table 3**

*Summary Table of Customer Experience*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Customer Journey	3.09	Agree	1.5
Customer Engagement	3.06	Agree	3
Service Delivery	3.09	Agree	1.5
Composite Mean	3.08	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 3 provides a summary of the respondents' evaluations of Customer Experience across three key dimensions: Customer Journey, Customer Engagement, and Service Delivery. The average composite value of customer experience is 3.08, indicating that respondents generally agree on the company's effectiveness in providing a positive customer experience. This means that the company successfully manages the customer journey, actively participates in it, guarantees the provision of quality services, and all this is important for customer satisfaction and loyalty. Customer journey ranks 1.5 with an average scale of 3.09, indicating that the company is effectively managing the customer journey by ensuring smooth experiences, individual corrections, and one-time support. A well-managed customer journey ensures a smooth and satisfying customer experience at every point of contact, enhancing overall satisfaction and loyalty. The percentage of customers ranks third with a weighted average of 3.06, indicating that the company is effectively engaging customers through ongoing interactions, personal contacts and value-added services. Strong customer engagement strengthens the emotional bonds and loyalty that are essential to the company's long-term success. The service offering ranks 1.5 with an average scale of 3.09, indicating that the company provides services efficiently and on time, maintains quality and professionalism, and adapts to customer needs. Meanwhile, providing quality services ensures that customers receive reliable and efficient services, which increases their overall experience and satisfaction.

**Table 4**

*Summary Table of Service Innovation*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Value Proposition	3.14	Agree	1
Resource Integration	3.09	Agree	2
Communication Technology	3.08	Agree	3
Composite Mean	3.10	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 4 summarizes respondents' assessments of service innovation in three main dimensions: value propositions, resource integration, and communication technologies. The average composite innovation in services is 3.10, indicating that respondents agree on the effectiveness of innovation in the company's services. This means that the company succeeds in developing compelling value propositions, effectively integrating its resources, and using communication technologies to improve service delivery and customer satisfaction. The value proposition ranks first with a weighted average of 3.14, indicating that the company perfectly develops and communicates a unique value proposition that meets customer needs and sets its services apart from its competitors. A strong value proposition ensures that customers consider the company's offerings as valid and worthy of investment.

Resource integration ranks second with a weighted average of 3.09, indicating that the company is effectively integrating internal and external resources to improve service delivery and create added value for customers. Efficient integration of resources ensures that the company can offer complete solutions and respond flexibly to customer needs. Communication technologies rank third with an average scale of 3.08, indicating that the company is effectively using modern communication technologies. Communication technologies play a critical role in real-time response, transparency and process improvement.

**Table 5***Relationship Between Market Intelligence and Customer Experience*

Variables	rho	p-value	Interpretation
<b>Customer Intelligence</b>			
Customer Journey	.772**	<.001	Highly Significant
Customer Engagement	.118*	0.018	Significant
Service Delivery	.189**	<.001	Highly Significant
<b>Competitor Intelligence</b>			
Customer Journey	.130**	0.009	Significant
Customer Engagement	.867**	<.001	Highly Significant
Service Delivery	.266**	<.001	Highly Significant
<b>Product Intelligence</b>			
Customer Journey	.184**	<.001	Highly Significant
Customer Engagement	.241**	<.001	Highly Significant
Service Delivery	.825**	<.001	Highly Significant

*Legend: Significant at p-value<0.01/0.05*

Table 5 presents the relationship between market intelligence and customer experience, as measured by Spearman's rho correlation coefficients and corresponding p-values. The results indicate that customer intelligence is highly significantly associated with the customer journey ( $\rho=.772$ ,  $p<.001$ ) and service delivery ( $\rho=.189$ ,  $p<.001$ ), while its relationship with customer engagement is statistically significant ( $\rho=.118$ ,  $p<0.018$ ). In the case of competitor intelligence, a highly significant correlation is observed with customer engagement ( $\rho=.867$ ,  $p<.001$ ) and service delivery ( $\rho=.266$ ,  $p<.001$ ), whereas its relationship with the customer journey is significant ( $\rho=.130$ ,  $p=0.009$ ). Lastly, product intelligence shows highly significant correlations across all three aspects of customer experience, including customer journey ( $\rho=.184$ ,  $p<.001$ ), customer engagement ( $\rho=.241$ ,  $p<.001$ ), and service delivery ( $\rho=.825$ ,  $p<.001$ ).

Customer Intelligence has a strong positive correlation with the Customer Journey, indicating that understanding customer needs and preferences significantly enhances the seamless and personalized experiences customers have at every touch point. Customer Intelligence has a moderate but significant correlation with Customer Engagement, suggesting that insights into customer behavior and preferences contribute to more meaningful and personalized interactions. Customer information is strongly linked to service delivery, which indicates that understanding customer needs helps the company deliver its services more efficiently and effectively.

Competitive intelligence shows an important, but moderate, link to customer journeys, indicating that understanding competitors' strategy can help businesses design more competitive, customer-centric journeys. Competitor Intelligence has a very strong positive correlation with Customer Engagement, indicating that understanding competitor actions helps the company engage customers more effectively through differentiated and value-added interactions. Competitor Intelligence is highly significantly correlated with Service Delivery, suggesting that insights into competitor practices help the company improve the efficiency and quality of its service delivery.

Product information is closely related to the customer journey, indicating that understanding product performance and customer preferences can help businesses design the most appropriate and satisfying customer journeys. Product information is closely linked to customer engagement, indicating that understanding product performance and customer preferences can help businesses better communicate with their customers through

personalized offers. Likewise, product information is strongly related to service performance, which indicates that understanding the product lifecycle and customer needs can help businesses provide more efficient services.

**Table 6**

*Relationship Between Market Intelligence and Service Innovation*

Variables	rho	p-value	Interpretation
<b>Customer Intelligence</b>			
Value Proposition	.910**	<.001	Highly Significant
Resource Integration	.128*	0.01	Significant
Communication Technology	.219**	<.001	Highly Significant
<b>Competitor Intelligence</b>			
Value Proposition	.125*	0.012	Significant
Resource Integration	.907**	<.001	Highly Significant
Communication Technology	.262**	<.001	Highly Significant
<b>Product Intelligence</b>			
Value Proposition	.257**	<.001	Highly Significant
Resource Integration	.292**	<.001	Highly Significant
Communication Technology	.919**	<.001	Highly Significant

Legend: Significant at p-value<0.01/0.05

Table 6 shows the relationship between market intelligence and service innovation, as measured by Spearman’s rho correlation coefficients and their corresponding p-values. The results show that customer intelligence has a highly significant correlation with value proposition ( $\rho=.910$ ,  $p<.001$ ) and communication technology ( $\rho=.219$ ,  $p<.001$ ), while its relationship with resource integration is statistically significant ( $\rho=.128$ ,  $p=0.01$ ). For competitor intelligence, a highly significant association is observed with resource integration ( $\rho=.907$ ,  $p<.001$ ) and communication technology ( $\rho=.262$ ,  $p<.001$ ), whereas its correlation with value proposition is significant ( $\rho=.125$ ,  $p=0.012$ ). Lastly, product intelligence demonstrates highly significant correlations across all three dimensions of service innovation, including value proposition ( $\rho=.257$ ,  $p<.001$ ), resource integration ( $\rho=.292$ ,  $p<.001$ ), and communication technology ( $\rho=.919$ ,  $p<.001$ ).

Customer intelligence has a very strong and positive link to the value proposition, indicating that an understanding of customer needs and preferences is needed to develop compelling, customer-centric value propositions. Customer information has a moderate but important link to resource integration, indicating that understanding customer behavior and preferences can lead to better resource use and integration. Customer information shows a very important link to communication technologies, indicating that understanding customer needs can help businesses better use these technologies to improve their customer relationships.

Competitor intelligence has an important, but moderate, link to value supply, indicating that competitor strategy insights help the company develop more competitive and distinct value propositions. Competitive intelligence is closely related to resource integration, which indicates that understanding competitors’ procedures can help a company better integrate its resources to get the most out of its value. Competitive intelligence is closely related to communication technologies, which indicates that understanding competitors’ experiences can help companies better use communication technologies to improve their customer interactions.

Product intelligence is strongly linked to value proposition, which indicates that understanding product performance and customer preferences helps the company develop more appropriate and compelling value propositions. Product information is strongly related to resource integration, indicating that views on product performance and customer preferences help the company integrate resources more effectively to deliver superior value. Product Intelligence has a very strong positive correlation with Communication Technology, indicating that understanding product life cycles and customer needs helps the company leverage communication technologies more effectively to enhance customer interactions.

**Table 7***Relationship Between Customer Experience and Service Innovation*

Variables	rho	p-value	Interpretation
<b>Customer Journey</b>			
Value Proposition	.681**	<.001	Highly Significant
Resource Integration	0.081	0.104	Not Significant
Communication Technology	.177**	<.001	Highly Significant
<b>Customer Engagement</b>			
Value Proposition	0.069	0.17	Not Significant
Resource Integration	.777**	<.001	Highly Significant
Communication Technology	.215**	<.001	Highly Significant
<b>Service Delivery</b>			
Value Proposition	.220**	<.001	Highly Significant
Resource Integration	.269**	<.001	Highly Significant
Communication Technology	.744**	<.001	Highly Significant

Legend: Significant at  $p\text{-value} < 0.01$

Table 7 presents the relationship between customer experience and service innovation, as indicated by Spearman's rho correlation coefficients and p-values. The results show that customer journey is highly significantly correlated with value proposition ( $\rho=.681$ ,  $p<.001$ ) and communication technology ( $\rho=.177$ ,  $p<.001$ ), but its relationship with resource integration is not significant ( $\rho=0.081$ ,  $p=0.104$ ). While in, customer engagement is highly significantly associated with resource integration ( $\rho=.777$ ,  $p<.001$ ) and communication technology ( $\rho=.215$ ,  $p<.001$ ), while its correlation with value proposition is not significant ( $\rho=0.069$ ,  $p=0.17$ ). Lastly, service delivery exhibits highly significant correlations across all three dimensions of service innovation, including value proposition ( $\rho=.220$ ,  $p<.001$ ), resource integration ( $\rho=.269$ ,  $p<.001$ ), and communication technology ( $\rho=.744$ ,  $p<.001$ ).

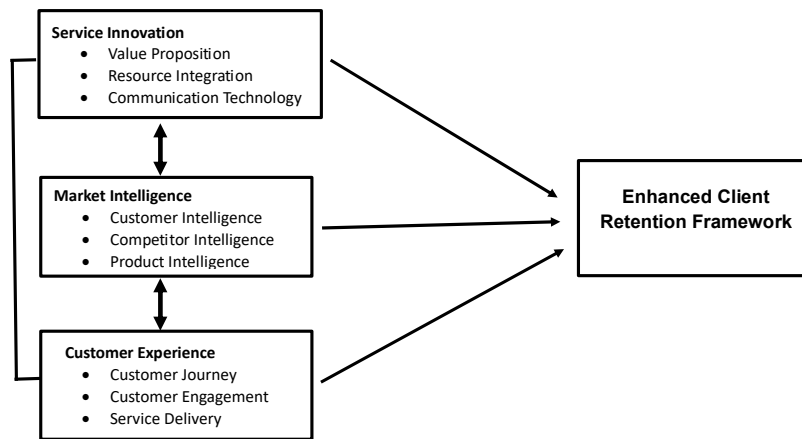
Customer journey has a strong positive correlation with value proposition, indicating that a well-designed customer journey helps the company develop and communicate a compelling value proposition that resonates with customers. Customer journey does not show a significant correlation with resource integration, suggesting that the design of the customer journey may not directly influence how resources are integrated within the company. Customer journey is highly significantly correlated with communication technology, indicating that a well-designed journey leverages communication technologies to enhance customer interactions and experiences.

Customer engagement does not show a significant correlation with value proposition, suggesting that while engagement is important, it may not directly influence the development of the value proposition. Customer engagement has a very strong positive correlation with resource integration, indicating that engaging customers effectively requires the company to integrate resources efficiently to deliver personalized and value-added experiences. Customer engagement is highly significantly correlated with communication technology, suggesting that effective communication technologies enhance customer engagement by enabling personalized and real-time interactions.

Service delivery has a strong positive correlation with value proposition, indicating that efficient and high-quality service delivery enhances the perceived value of the company's offerings. According to Parasuraman et. al.,(2020), service delivery is a key component of value proposition, as it directly impacts customer perceptions of quality and reliability. Service delivery is highly significantly correlated with resource integration, suggesting that effective resource integration is essential for delivering high-quality and efficient services. Service delivery has a very strong positive correlation with communication technology, indicating that leveraging communication technologies enhances the efficiency and quality of service delivery.



**Enhanced Client Retention Framework**



*Fig. 1 Enhanced Customer Retention Framework*

The Figure 1 shows “Enhanced Client Retention Framework” market intelligence and customer experience on service innovation. According to the framework, enhanced client retention framework could be enhanced by improving the three variables in this study: market intelligence and customer experience and service innovation.

The framework emphasizes data-driven decision-making (Market Intelligence), seamless customer interactions (Customer Experience), and innovative service delivery (Service Innovation). By analyzing relationships between these factors, the model helps firms identify strengths, address weaknesses, and enhance long-term client loyalty. This structured approach enables consulting firms to optimize client relationships, differentiate from competitors, and leverage technology for better service. The framework serves as a strategic tool to boost retention by aligning business strategies with evolving customer expectations and market trends. Service innovation relies on the data and insights provided by market intelligence. Market intelligence helps service innovation identify customer needs and market trends, thereby driving the creation of services that better meet customer expectations and market dynamics. Service innovation can therefore be seen as the application and implementation of market information.

Innovations in services have a direct impact on customer experience. Innovations in service excellence can increase customer satisfaction and quality of experience during service delivery and enhance customer loyalty. In other words, innovative forms of services can provide better points of contact for customers and better ways to interact, thereby improving the overall customer experience.

Market intelligence helps businesses design better customer experiences by providing a deep understanding of customer behaviors, needs and preferences. By analyzing customer reactions and behaviors, businesses can improve customer journey and enhance customer engagement by offering them more personalized service experience.

All three variables (service innovation, market intelligence, and customer experience) work together to enhance the customer retention framework. Through mutual promotion and feedback, these three variables form a dynamic cycle with the goal of increasing customer loyalty and retention. Market intelligence provides a decision-making basis; service innovation provides competitive advantage; and good customer experience ensures customer satisfaction and sustained relationships.

**4. Conclusions and recommendations**

In light of the results of the study, the following conclusions were drawn: The government employees agreed on the existence of market intelligence among consulting firms. Respondents revealed moderate

agreement on the role of innovative services in promoting and maintaining customer satisfaction. There is moderate agreement for service innovation in terms of value proposition, integration of resources and communication technologies. There is a very important link between market intelligence, customer experience and service innovation to increase customer retention. An enhanced loyalty framework for consulting firms was developed to emphasize the importance of market information, customer experience and service innovation.

The government offices may prioritize investments in advanced market intelligence tools and platforms to enable data-driven decisions and tailor services more effectively. Department heads may create a structured customer feedback loop to systematically collect, analyze, and integrate data into service design and delivery processes. Employees may seek training to be equipped with the skills needed to leverage market intelligence to effectively contribute to service innovation. Consulting firms may review and utilize the proposed framework to enhance customer retention. Future researchers can expand the scope of the enhanced framework for customer retention by examining its application in different sectors and regulatory contexts. They can also study how emerging technologies such as artificial intelligence and machine learning can improve market intelligence, customer experience and service innovation in consulting firms.

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