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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 (ρ=0.110, p=0.028), while its relationships with R&D investment (ρ=0.060, p=0.231) and process formulation (ρ=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
Technological Proficiency			
Network Structure	-0.010	0.838	Not Significant
Information Sharing	-0.008	0.874	Not Significant
Knowledge Transfer	-0.008	0.874	Not Significant
Market Orientation			
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-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
Innovation Infrastructure			
Network Structure	0.026	0.599	Not Significant
Information Sharing	0.111*	0.026	Significant
Knowledge Transfer	0.111*	0.026	Significant
Process Formulation			
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-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 (Tödtling 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.

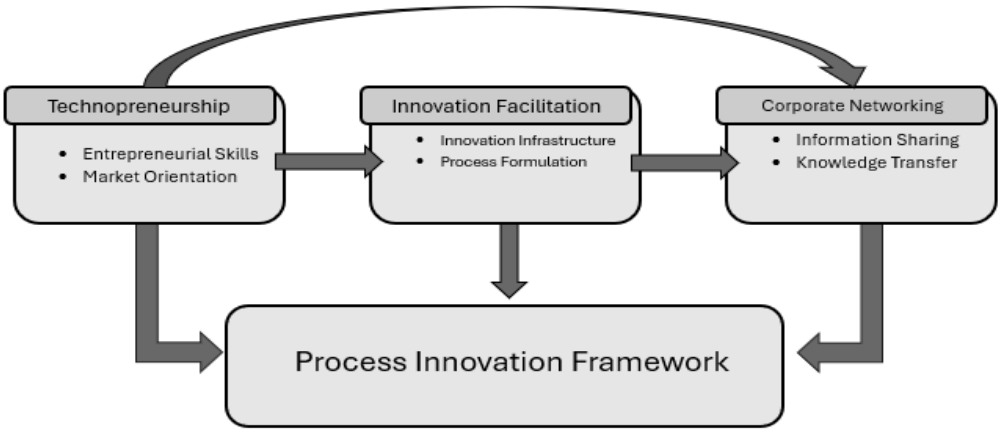

Figure 1: Process Innovation Framework

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.

5. References

Agarwal, S., Erramilli, M. K., & Dev, C. S. (2021). Market orientation and innovation: A dynamic capability perspective. Journal of Business Research, 124(2), 678-693.

Ahmad, N., Jamil, R. A., & Asad, M. (2023). Entrepreneurship education and employability: The mediating role of entrepreneurial mindset. Journal of Business and Entrepreneurship Research, 12(1), 45–60.

Alshanty, A., & Emeagwali, O. L. (2020). Market orientation and organizational performance: The role of innovation. Journal of Business Research, 123, 92–104.

Autio, E., Kenney, M., Mustar, P., Siegel, D., & Wright, M. (2021). Entrepreneurial ecosystems and innovation infrastructure. Research Policy, 50(3), 104203.

Bogers, M., Chesbrough, H., & Moedas, C. (2020). Open innovation: Research, practices, and policies. California Management Review, 62(2), 5-16. https://doi.org/10.1177/0008125620903219

Borbon, N. M., & Maranan, R. R. (2022). Interrelationship of competencies, orientation, and innovation: Inputs for innovative entrepreneurial framework. *International Journal of Research Studies in Management.*

https://doi.org/10.5861/ijrsm.2022.48

Bouncken, R. B., Kraus, S., & Roig-Tierno, N. (2022). Knowledge transfer in inter-organizational collaborations. Journal of Knowledge Management, 26(3), 512-534.

Chesbrough, H., & Bogers, M. (2020). Explicating open innovation: Clarifying an emerging paradigm for understanding innovation. Research Policy, 49(8), 103885. https://doi.org/10.1016/j.respol.2020.103885

Farashah, A. D. (2021). The impact of entrepreneurship education on entrepreneurial intentions and career development. Education + Training, 63(4), 510–530.

García-Holgado, A., Verdugo-Castro, S., Sánchez-Gómez, M. C., & García-Peñalvo, F. J. (2021). Digital competence framework: A systematic review of literature. International Journal of Educational Technology in Higher Education, 18(1), 1–22.

García-Morales, V. J., Jiménez-Barrionuevo, M. M., & Gutiérrez-Gutiérrez, L. (2021). The influence of technological skills on business innovation. Technovation, 108(1), 102324.

Ghezzi, A., & Cavallo, A. (2020). Agile business model innovation in digital entrepreneurship: Lean startup approaches. Journal of Business *Research,* 110, 519-537. https://doi.org/10.1016/j.jbusres.2018.06.013

Hossain, M. T., Uddin, M. A., & Rahman, M. (2023). The role of market orientation in business sustainability: A systematic review. Business Strategy and Development, 6(2), 245–262.

Hughes, M., Ireland, R. D., & Morgan, R. E. (2022). Informal networks and organizational learning. Strategic Management Journal, 43(4), 789-812.

Kaur, P., & Singh, P. (2022). Digital transformation and workforce adaptability: The role of digital literacy. Technology in Society, 70, 102003.

Khanin D, Rosenfield R, Mahto RV, & Singhal C (2022) Barriers to entrepreneurship: opportunity recognition vs. opportunity pursuit. Rev Manag Sci 16(4):1147–1167

Koteshwar Chirumalla (2021). Building digitally-enabled process innovation in the process industries: A dynamic capabilities approach, Technovation, 105, 102256, https://doi.org/10.1016/j.technovation.2021.102256.

Kreiterling, C. (2023)Digital innovation and entrepreneurship: a review of challenges in competitive markets. J Innov Entrep 12, 49 . https://doi.org/10.1186/s13731-023-00320-0

Leliveld A, Knorringa P (2018) Frugal innovation and development research. Eur J Dev Res 30(1):1–16

Leonardi, P. M., Huysman, M., & Steinfield, C. (2021). Enterprise social media and digital networking. Academy of Management Review, 46(3), 563-588.

Li, J., Wu, B., & Jiang, X. (2022). The role of entrepreneurship in shaping innovation hubs. Entrepreneurship Theory and Practice, 46(4), 876-902.

Lindell, M., & Smith, R. (2023). The role of digital collaboration tools in corporate networking. Journal of Business Research, 78(2), 456-478.

Narver, J. C., & Slater, S. F. (2022). Market orientation and firm performance: The role of customer knowledge. Strategic Management Journal, 43(6), 1345-1367.

Nonaka, I., & Takeuchi, H. (2021). Knowledge creation and organizational learning: A modern perspective. Knowledge Management Review, 45(1), 134-156.

Nguyen, T. H., Palacios, M., & Do, H. (2022). Market intelligence and digital transformation: The role of data analytics in business strategy. Industrial Marketing Management, 101, 107-120. https://doi.org/10.1016/j.indmarman.2022.02.008

Rashid, M., Alam, S., & Rafiq, M. (2021). Market orientation, business performance, and competitive advantage: An empirical study. Journal of Business Research, 130, 325–338.

Ritala, P., Schneider, S., & Michailova, S. (2021). Open innovation and firm performance: The moderating role of industry dynamism. Journal of Business Research, 125, 625-635. https://doi.org/10.1016/j.jbusres.2020.04.041

Rubio-Andrés M, del Mar Ramos-González M, & Sastre-Castillo MÁ (2022) Driving innovation management to create shared value and sustainable growth. RMS 16(7):2181–2211

Santos, J. L., Almeida, P., & Martins, L. (2023). Digital proficiency and workplace performance: A meta-analysis. Computers in Human Behavior, 138, 107251.

Sharma, R., Mishra, S., & Gupta, R. (2023). The role of continuous learning in digital upskilling for career success. Human Resource Development Review, 22(1), 55–79.

Spender J-C, Corvello V. & Grimaldi M, Rippa P (2017) Startups and open innovation: a review of the literature. *Eur J Innov Manag* 20(1):4–30

Srinivasan, R., & Eden, L. (2023). The strategic integration of technology in business operations. Journal of Business Strategy, 44(2), 99-118.

Tödtling, F., Trippl, M., & Grillitsch, M. (2023). Innovation infrastructures and regional development. Regional Studies, 57(2), 145-167.

Wu, L., Li, Z., & Chang, Y. (2023). Barriers to technology adoption in professional settings: A critical review. Technology and Society, 72, 102452.

Yunus, M., & Mahmud, R. (2021). The impact of entrepreneurial competencies on business sustainability. Entrepreneurship Research Journal, 11(2), 159–178.

Zahra, S. A., Wright, M., & Abdelgawad, S. G. (2023). Entrepreneurship education and its role in developing entrepreneurial capabilities. Small Business Economics, 60(1), 1–22.

Zhou, K. Z., Li, J. J., & Tse, D. K. (2023). Digital transformation and market orientation: A review and future directions. Journal of Marketing, 87(5), 345-372.