International Journal of Research Studies in Management
2024 Volume 12 Number 6, 11-21

Organizational structure, business integration and technological innovation of manufacturing industry: Basis for digitally transformed manufacturing industry framework

Chen, Chunhai ✉
Graduate School, Lyceum of the Philippines University - Batangas, Philippines

ISSN: 2243-7770
Online ISSN: 2243-7789

OPEN ACCESS

Received: 25 May 2024 **Revised**: 25 June 2024 **Accepted**: 10 July 2024
Available Online: 15 July 2024 **DOI**: 10.5861/ijrsm.2024.1074

Abstract

China's manufacturing sector has experienced rapid growth, becoming a vital part of the global economy. This growth, powered by industrial policies, infrastructure investment, and a vast labor force, is now at a crossroads due to technological advancements and market dynamics. The sector's future depends on navigating digital transformation and embracing technological innovation to maintain its competitive edge and sustain growth. The study aimed to explore the interplay between organizational structure, business integration, and technological innovation within China's manufacturing industry. Its primary goal was to assess how these elements influenced the industry's capability to adapt to technological advancements and market uncertainties. Additionally, the research sought to develop a digitally transformed manufacturing industry framework tailored to the unique context of China's manufacturing sector, guiding enterprises in leveraging their organizational and business integration practices to foster innovation. Employing a descriptive correlational research design, this study examined the relationship between organizational structure, business integration, and technological innovation without manipulating the variables. Data were collected from professionals across various levels in the manufacturing industry using stratified random sampling and analyzed using non-parametric statistical methods due to the data's non-normal distribution. The findings indicate a generally positive perception of organizational support for digital transformation, with emphasis on corporate culture, adaptable internal processes, and employee acceptance of digital tools. However, there were nuances in the effectiveness of cross-functional collaboration, information sharing, and process integration across departments. Moreover, the significant barriers to technological innovation included digital security concerns, infrastructural inadequacies, and organizational resistance, particularly concerning cultural alignment and job security fears. The study concluded that the relationship between organizational structure, business integration, and technological innovation significantly impacts the digital transformation readiness of China's manufacturing enterprises. Effective business integration, especially in terms of

cross-functional collaboration and information sharing, emerged as crucial for technological innovation. Nonetheless, addressing technological barriers and organizational resistance was vital for realizing the full potential of digital transformation initiatives. The research recommends enhancing cross-departmental cooperation and developing a unified digital framework to improve process integration. It also suggests investing in technological infrastructure and training programs to overcome barriers and mitigate resistance by aligning organizational culture with digital transformation goals. Lastly, adapting to market uncertainties through agile strategic planning and fostering employee engagement in digital initiatives is advised. The paper culminated in the proposition of a Digital Transformation Framework specifically designed for China's manufacturing sector. This framework was grounded in the study's findings and aimed to support manufacturing enterprises in navigating the complexities of digital transformation. By addressing the identified barriers and leveraging the strengths in organizational and business integration practices, the framework serves as a strategic guide for sustaining competitive advantages in the global market.

Keywords: organizational structure, business integration, technological innovation, manufacturing industry

Organizational structure, business integration and technological innovation of manufacturing industry: Basis for digitally transformed manufacturing industry framework

1. Introduction

The Chinese manufacturing industry, a global powerhouse, faces a critical juncture. While it has enjoyed remarkable success in recent decades, maintaining its competitive edge demands a paradigm shift towards digital transformation. The digital revolution is rapidly reshaping industries worldwide, and manufacturing is no exception. Emerging technologies like artificial intelligence, big data analytics, and the Internet of Things (IoT) are revolutionizing production processes, supply chain management, and customer interaction. Chinese manufacturers, historically renowned for their efficiency and cost-competitiveness, must embrace these advancements to remain at the forefront of the global market.

In the rapidly evolving global economic landscape, the intricate interplay between organizational structure, business integration, and technological innovation has emerged as a critical determinant of competitive advantage, particularly for manufacturing firms. This research delved into the multifaceted dynamics of these elements within the context of China's manufacturing sector, a pivotal engine of the country's economic growth and a significant player on the world stage. The study aimed to unravel how organizational structures adapt to and facilitate business integration and technological innovation, thereby influencing performance, resilience, and strategic positioning of manufacturing firms in China. Chinda-Nwokeazu et al. (2022) explored the importance of organizational structure and business integration for implementing data analytics, a key component of digital transformation. The proposed framework emphasized collaboration and seamless information flow across departments, which was crucial for successful digital transformation in any industry, including manufacturing. **N**ajafi et.al., (2020), on the other hand, explored the impact of big data, a key driver of technological innovation, on project management practices. It highlighted how big data empowered data-driven decision-making and facilitated process optimization, both of which were crucial aspects of digital transformation in manufacturing.

China's manufacturing sector, characterized by its vast scale, diversity, and state-of-the-art manufacturing capabilities, presents a unique backdrop against which the complexities of organizational adaptation and innovation can be examined. The country's recent push towards "Made in China 2025," coupled with its ambitious Belt and Road Initiative, underscores the government's commitment to elevating the quality, sophistication, and global reach of its manufacturing industries. This strategic pivot towards high-tech, high-value manufacturing necessitates a reevaluation of traditional organizational models, business integration strategies, and innovation pathways to ensure alignment with the evolving industrial policy and global market demands.

Organizational structure, the framework within which an entity's operations are conducted, plays a pivotal role in determining a firm's agility, efficiency, and innovation capacity. Chinese manufacturing firms, historically characterized by hierarchical, top-down structures, are increasingly exploring more flexible, decentralized organizational models to foster creativity, responsiveness, and cross-functional collaboration. This shift is driven by the recognition that traditional structures may impede rapid decision-making, knowledge sharing, and adaptation to market changes—elements crucial for sustaining competitiveness in today's fast-paced business environment. Business integration, the process of aligning a company's operations, strategies, and technologies across its various divisions, is a critical factor in achieving operational excellence and market responsiveness. In the context of China's manufacturing sector, business integration encompasses a wide range of practices, from supply chain optimization and cross-functional teamwork to strategic alliances and digital transformation initiatives. The research explores how Chinese manufacturing firms are leveraging business integration to

streamline operations, improve supply chain resilience, and enhance customer value propositions. Technological innovation, the development and application of new technologies to improve products, processes, or services, is a critical driver of competitive advantage in the manufacturing sector. For Chinese manufacturing firms, the imperative to innovate is not only a response to domestic policy directives but also a strategic necessity in the face of intensifying global competition and escalating technological standards. This research examines the innovation strategies of Chinese manufacturing firms, focusing on how they are cultivating innovation ecosystems, investing in R&D, and fostering collaborations with academic institutions, startups, and industry partners. By analyzing these interrelated aspects, this dissertation aimed to establish a comprehensive framework for digital transformation in the Chinese manufacturing industry. This framework will act as a roadmap for manufacturers navigating the complexities of digitalization, empowering them to adapt, thrive, and maintain their competitive edge in the global market.

Objectives of the Study - This study determined the organizational structure, business integration and technological innovation of manufacturing industry in China. Specifically; the study determined the organizational structure of the enterprise in terms of enterprise environment, enterprise size and strategic objective. It also assessed the level of business integration within manufacturing enterprises, in terms of cross-functional collaboration, information sharing and knowledge management, and process integration. Furthermore it evaluated the technological innovation of the enterprise in terms of technological barriers organizational resistance market uncertainty Additionally, it tested the significant relationship between organizational structure, business integration and technological innovation and lastly it developed digitally transformed manufacturing industry framework

2. Methods

Research Design - The research employed a descriptive correlational design to investigate the potential associations between organizational structure, business integration, and technological innovation. This approach allowed the researchers to describe the characteristics of each variable and assess the strength and direction of any relationships between them, without manipulating the variables themselves. The main purpose was to provide a detailed picture of the subject being studied. This can involve identifying trends, patterns, and relationships within the data. Descriptive research design is a scientific method which involves describing individuals, events or conditions by studying them as they are and not trying to manipulate any of the variables.

Participants - To ensure a representative sample across different organizational levels and departments within the Chinese manufacturing industry, the study employed a stratified random sampling technique. Participants included professionals from various levels, ranging from management to front-line employees. Stratification was based on enterprise size, functional department, and role in the digital transformation initiative.

Instrument of the Study - A self-made questionnaire served as the primary data collection tool. The questionnaire was tailored to the study's objectives and comprised three sections: organizational structure, business integration levels, and challenges associated with technological innovation. Likert-type scales were used within each section to measure respondents' level of agreement with various statements or the frequency of specific experiences. The questionnaire was validated by expert and underwent the reliability test.

Data Gathering Procedure - To ensure a comprehensive data collection process, the study employed a mixed-methods approach utilizing both online surveys and on-site visits to participating manufacturing firms. Secure survey platforms were utilized to distribute the questionnaire electronically. These platforms prioritize data security by employing encryption protocols and adhering to data privacy regulations. Utilizing online surveys offered several advantages: Increased accessibility: Participants could complete the survey at their convenience, potentially leading to a higher response rate. Geographic reach: This method allowed for data collection from a wider range of manufacturing firms across China. Data quality control: Secure platforms often offer features to ensure data integrity, such as filtering out incomplete submissions or duplicate entries.

In addition to online surveys, the research team conducted on-site visits to a selection of participating manufacturing firms. During these visits, researchers facilitated questionnaire completion by: Providing a personalized introduction to the study and its objectives. Addressing any questions or concerns participants might have about the questionnaire or the research process. Offering assistance with completing the questionnaire, especially for individuals who might be less comfortable with online surveys. On-site visits further enriched the data collection by fostering direct engagement with participants. This allowed researchers to: Gain deeper insights and context beyond the questionnaire responses through informal discussions. Observe the work environment and potential challenges related to organizational structure, business integration, and technological innovation firsthand.

Data Analysis - Weighted mean and rank were used to determine the organizational structure of the enterprise in terms of enterprise environment, enterprise size and strategic objective; to determine the level of business integration within manufacturing enterprises, in terms of cross-functional collaboration, information sharing and knowledge management, and process integration; and to assess technological innovation of the enterprise in terms of technological barriers organizational resistance market uncertainty. 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 - Ethical considerations were paramount throughout the study. To ensure participant privacy and uphold the highest ethical standards, the research team implemented the following measures: Confidentiality and Anonymity: The study guaranteed the confidentiality of all participant responses. No identifiable information will be linked to the data. Additionally, anonymity was ensured by not collecting any personal details within the questionnaire. Prior to participation, all respondents were provided with a detailed informed consent form explaining the study's objectives, data collection methods, how confidentiality will be maintained, and their right to withdraw at any time without penalty. Participation in the survey was entirely voluntary. Respondents were free to choose whether or not to participate and could stop the survey at any point. All collected data were stored securely using encryption protocols to prevent unauthorized access. Only aggregate results were reported, ensuring that individual responses cannot be traced back to specific participants.

3. Results and discussion

Table 1

Summary Table on Organizational Structure of the Enterprise

Key Result Areas	Composite Mean	VI	Rank
Enterprise Environment	2.93	Agree	1.5
Enterprise Size	2.92	Agree	3
Strategic Objective	2.93	Agree	1.5
Grand Composite Mean	**2.93**	**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 1 presents the summary of organizational structure of the enterprise with an overall mean of 2.93 (agree). Enterprise Environment and strategic objective topped the ranking with a weighted mean of 2.93. This was followed by enterprise size which obtained weighted mean of 2.92. The high ranking of Enterprise Environment and Strategic Objective suggests that these factors were perceived as the most critical in determining an organization's structure. This aligned with the idea that structure should be designed to fit the specific context and goals of the enterprise. Organizations that prioritize these factors likely strive for adaptable structures that can be tailored to changing market conditions and evolving strategic objectives. This adaptability

is crucial in today's dynamic business environment. The emphasis on strategic objectives suggests a focus on aligning structure with achieving specific goals. This ensures the organization has the right structure in place to execute its chosen strategies effectively. While environment and objectives might rank highest, they are likely interrelated with enterprise size. For example, the optimal structure for a large enterprise operating in a competitive global environment might differ significantly from a smaller company in a niche market. The results highlight the importance of enterprise environment and strategic objectives in shaping organizational structure. However, it's important to consider the interplay with other factors like size and industry. Effective organizational design requires careful consideration of the entire context in which the enterprise operates and the goals it seeks to achieve.

Table 2

Summary Table on Level of Business Integration within Manufacturing Enterprises

Key Result Areas	Composite Mean	VI	Rank
Cross-functional Collaboration	2.94	Agree	1.5
Information Sharing and Knowledge Management	2.94	Agree	1.5
Process Integration	2.93	Agree	3
Grand Composite Mean	**2.94**	**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 presents the summary of level of business integration within manufacturing enterprises with an overall mean of 2.94 (agree). Cross functional collaboration and information sharing and knowledge management topped the ranking with a weighted mean of 2.94. This was followed by process integration which obtained weighted mean of 2.93. The mean score of 2.94 (agree) suggests a generally positive perception of business integration within the enterprise. Employees seem to agree that different departments collaborate, share information, and processes are somewhat integrated to support digital transformation. Cross-Functional Collaboration (2.94): This indicates a strong emphasis on collaboration between different departments, which is crucial for successful digital transformation. Employees perceive a willingness to work together to achieve shared goals. Information Sharing and Knowledge Management (2.94): A high score in this area suggests a focus on sharing information and best practices across departments. This can facilitate learning, improve decision-making, and support collaboration efforts. Process Integration (2.93): While perceived positively, process integration scores slightly lower than the other areas. This suggests there might be room for improvement in how different business processes are interconnected and function as a unified system. The findings painted a picture of a manufacturing enterprise with a positive foundation for digital transformation. There was an emphasis on collaboration and knowledge sharing, which were essential building blocks for successful integration. However, focusing on strengthening process integration could yield further benefits.

Table 3

Summary Table on Technological Innovation of the Enterprise

Key Result Areas	Composite Mean	VI	Rank
Technological Barriers	2.92	Agree	3
Organizational Resistance	2.94	Agree	1.5
Market Uncertainty	2.94	Agree	1.5
Grand Composite Mean	**2.93**	**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 of technological innovation of the enterprise with an overall mean of 2.93 (agree). Organizational resistance and market uncertainty topped the ranking with a weighted mean of 2.94. This was followed by technological barriers which obtained weighted mean of 2.92. The mean score of 2.93 suggests that most respondents acknowledged these factors as challenges to some extent, but they might not be perceived as major roadblocks. Organizational Resistance (2.94): This was the highest-ranked factor, indicating that employee resistance, lack of cultural alignment, or concerns about change are perceived as significant barriers to technological innovation. Market Uncertainty (2.94): This also received a high ranking, suggesting that a volatile market environment, unpredictable risks, or difficulty with long-term planning due to constant change were seen as major hurdles. Technological Barriers (2.92): This factor scored slightly lower than the others, but it still suggests that a lack of technical expertise, infrastructure limitations, or issues integrating new technologies are perceived as challenges.

While organizational resistance and market uncertainty were ranked highest, all three factors likely contributed to hindering technological innovation. Addressing all of them is crucial for successful innovation efforts. The survey findings suggested that the enterprise needs to address both internal cultural resistance and external market uncertainty to foster a more innovation-friendly environment.

Table 4

Relationship Between Organizational Structure and Business Integration

Variables	Rho	p-value	Interpretation
Enterprise Environment			
Cross-functional Collaboration	0.848**	<.001	Highly Significant
Information Sharing and Knowledge Management	0.803**	<.001	Highly Significant
Process Integration	0.872**	<.001	Highly Significant
Enterprise Size			
Cross-functional Collaboration	0.870**	<.001	Highly Significant
Information Sharing and Knowledge Management	0.799**	<.001	Highly Significant
Process Integration	0.871**	<.001	Highly Significant
Strategic Objective			
Cross-functional Collaboration	0.867**	<.001	Highly Significant
Information Sharing and Knowledge Management	0.789**	<.001	Highly Significant
Process Integration	0.898**	<.001	Highly Significant

***. Correlation is significant at the 0.01 level*

As seen in the table, the computed rho-values ranging from 0.789 to 0.898 indicate a strong to very strong direct relationship among the sub variables of organizational structure and business integration. There was a statistically significant relationship between organizational structure and business integration because the obtained p-values were less than 0.01.

Spearman's rho values indicate the strength and direction of the relationship, with values closer to 1 indicating a stronger positive correlation. The p-values test for the statistical significance of the correlations found, with values less than 0.05 (or in this case, <.001) indicating that the results were highly unlikely to be due to chance. All listed correlations were highly significant, demonstrating that the organizational structure had a strong influence on the effectiveness of business integration efforts in the areas of cross-functional collaboration, information sharing and knowledge management, and process integration.

The highest correlations (suggesting the strongest relationships) were between: (a) Process Integration and Strategic Objective (rho = 0.898), and (b) Cross-functional Collaboration and Enterprise Size (rho = 0.870). This suggests that how an enterprise integrated its processes was strongly aligned with its strategic objectives, and that the size of the enterprise was highly relevant to how well it can collaborate across different functions.

The lowest correlations (though still highly significant) were between: (a) Information Sharing and Knowledge Management with Enterprise Size (rho = 0.799), and (b) Information Sharing and Knowledge Management with Strategic Objective (rho = 0.789). While these aspects of business integration were still strongly influenced by organizational structure, they were slightly less so than process integration. This may indicate that other factors also played an important role in how information was shared and knowledge was managed within an enterprise.

The following scholarly articles aligned with these findings, discussing the impact of organizational structure on business process integration. First, the paper of Aouachria et. al.,(2023) proposed a method for integrating business processes across multiple organizations, which was relevant to understanding how organizational structure can facilitate or hinder such integration. Gruzina (2023), on the other hand, delved into how an organization's life cycle impacts its ability to integrate competencies, which was closely related to organizational structure and its effect on business integration.

As seen in table 5, the computed rho-values ranging from 0.857 to 0.899 indicate a very strong direct relationship among the sub variables of organizational structure and technological innovation. There was a statistically significant relationship between organizational structure and technological innovation because the obtained p-values were less than 0.01. Spearman’s rho values were used to measure the strength and direction of association, with values closer to 1 indicating a stronger positive correlation. The p-values show the statistical significance of these correlations, with all correlations in the table being highly significant ($p < .001$), suggesting a definitive link between the structure of an organization and its capacity for technological innovation.

Table 5

Relationship Between Organizational Structure and Technological Innovation

Variables	Rho	p-value	Interpretation
Enterprise Environment			
Technological Barriers	0.859**	<.001	Highly Significant
Organizational Resistance	.0857**	<.001	Highly Significant
Market Uncertainty	0.860**	<.001	Highly Significant
Enterprise Size			
Technological Barriers	0.878**	<.001	Highly Significant
Organizational Resistance	0.878**	<.001	Highly Significant
Market Uncertainty	0.863**	<.001	Highly Significant
Strategic Objective			
Technological Barriers	0.876**	<.001	Highly Significant
Organizational Resistance	0.888**	<.001	Highly Significant
Market Uncertainty	0.899**	<.001	Highly Significant

***. Correlation is significant at the 0.01 level*

The highest correlations, indicating the strongest relationships were Market Uncertainty with Strategic Objective (rho = 0.899), and Organizational Resistance with Strategic Objective (rho = 0.888). These findings

suggest that an organization's strategic objective is deeply intertwined with its response to market uncertainty and internal resistance, both of which are critical to technological innovation.

The lowest correlations, though still highly significant were Technological Barriers with Enterprise Environment (rho = 0.859), and Organizational Resistance with Enterprise Environment (rho = 0.857). These correlations were relatively lower, indicating that while the enterprise environment is important, it may have a slightly lesser impact on technological barriers and organizational resistance compared to strategic objectives.

Considering these insights along with the other tables, it is evident that strategic objectives have a central role in navigating the complexities of technological innovation, particularly in how an enterprise responds to both external market conditions and internal resistance.

These findings also connected with scholarly articles, such as the one from Danuta Rojek. Rojek (2021) discussed the strategic factors of enterprise innovativeness in the area of technology, which could provide insights into the relationship between strategic objectives and technological innovation. On the other hand, Dong et. al., (2022) explored the impact of the business environment on the sustainable development of enterprises and analyzed the impact path from the perspective of enterprise innovation.

Table 6

Relationship Between Business Integration and Technological Innovation

Variables	Rho	p-value	Interpretation
Cross-functional Collaboration			
Technological Barriers	0.883**	<.001	Highly Significant
Organizational Resistance	0.853**	<.001	Highly Significant
Market Uncertainty	0.859**	<.001	Highly Significant
Information Sharing and Knowledge Management			
Technological Barriers	0.804**	<.001	Highly Significant
Organizational Resistance	0.796**	<.001	Highly Significant
Market Uncertainty	0.781**	<.001	Highly Significant
Process Integration			
Technological Barriers	0.870**	<.001	Highly Significant
Organizational Resistance	0.879**	<.001	Highly Significant
Market Uncertainty	0.876**	<.001	Highly Significant

***. Correlation is significant at the 0.01 level*

As seen in table 6, the computed rho-values ranging from 0.796 to 0.883 indicate a strong to very strong direct relationship among the sub variables of business integration and technological innovation. There was a statistically significant relationship between business integration and technological innovation because the obtained p-values were less than 0.01. The table lists the Spearman's rho correlation coefficients and the p-values for statistical significance, all of which indicate highly significant relationships. It implies that factors such as Cross-functional Collaboration, Information Sharing and Knowledge Management, and Process Integration have a strong and statistically significant correlation with technological innovation when considering the challenges of Technological Barriers, Organizational Resistance, and Market Uncertainty.

The variables with the highest correlation coefficients, indicating the strongest relationships were Process Integration with Market Uncertainty (rho = 0.876), and Cross-functional Collaboration with Technological Barriers (rho = 0.883). These suggest that market uncertainty had the strongest correlation with process

integration, indicating that the more integrated the processes within the business, the better it can manage market uncertainty. Similarly, cross-functional collaboration had a strong relationship with overcoming technological barriers, suggesting that cooperation between different departments is crucial for innovation.

The lowest correlations, albeit still significant were Information Sharing and Knowledge Management with Market Uncertainty (rho = 0.781), and Information Sharing and Knowledge Management with Organizational Resistance (rho = 0.796). While these aspects of business integration were still strongly related to innovation, they showed a slightly weaker relationship with market uncertainty and organizational resistance, indicating other factors may also play a significant role in managing these innovation challenges.

When considering these findings along with the other tables, it is clear that the way businesses integrate their processes and collaborate across functions significantly affects their ability to innovate, particularly in the face of technological, organizational, and market-related challenges.

Dai et. al.,(2022) explored the impact mechanism of big data technical skills on business model innovation, considering the role of resource integration and the moderator of environmental uncertainty, which connects with the theme of managing market uncertainty and technological barriers. Moreover, Khuan et. al.,(2023) presented a bibliometric analysis of the role of technology in business innovation and growth, highlighting the interplay between technology and startup success, which is relevant to understanding the relationship between technological innovation and business integration.

Digital Transformation Framework

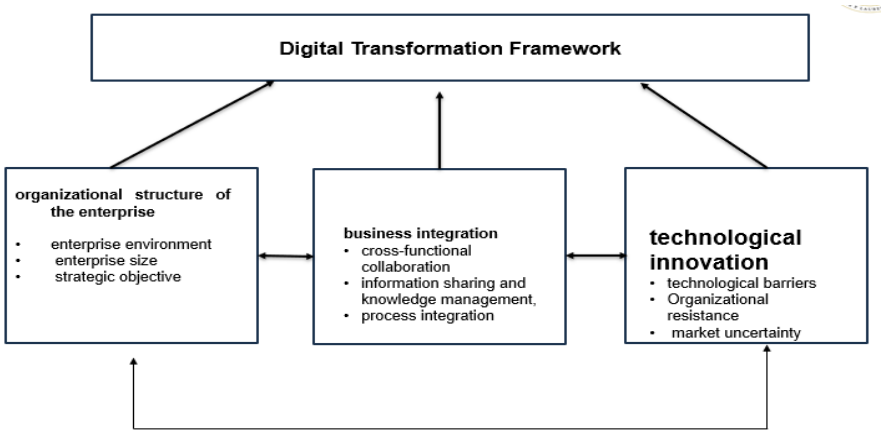

Figure 1. Framework for Digital transformation

Organizational Structure of the Enterprise: This refers to the way the company is structured, including its departments, hierarchy, and decision-making processes. Enterprise Environment: This considers the internal and external factors that can affect the company, such as its industry, competition, and economic conditions. Business Integration: This refers to how well the company's different departments and functions work together. Technological Barriers: These are the obstacles that can prevent the company from adopting new technologies, such as a lack of infrastructure or expertise.

The framework also identifies some key areas that need to be addressed in order to achieve digital transformation. Strategic Objectives: The company needs to have a clear understanding of what it wants to achieve through digital transformation. Cross-Functional Collaboration: Different departments within the company need to work together to implement digital transformation. Information Sharing and Knowledge Management: The company needs to have systems in place to share information and knowledge across the organization. Process Integration: The company's business processes need to be integrated with new technologies. Market Uncertainty: The company needs to be able to adapt to changes in the market.

Overall, the framework suggests that digital transformation is a complex process that requires careful planning and execution. It is important to consider all of the factors involved in order to ensure a successful transformation.

4. Conclusion and recommendation

The respondents moderately agreed in the organizational structure of the enterprise in terms of enterprise environment, enterprise size and strategic objective. The respondents moderately agreed on level of business integration within manufacturing enterprises, in terms of cross-functional collaboration, information sharing and knowledge management, and process integration. The respondents moderately agreed on the data application of the company in terms of construction practices, quality management, productivity and project dependability. There was a highly significant relationship between organizational structure, business integration and technological innovation. Digitally transformed manufacturing industry framework was developed.

Senior Management Team may analyze how the current organizational structure supports the achievement of the company's strategic objectives. HR Department may evaluate if the structure is well-suited to the current business environment and company size. The Senior Management Team may develop and implement a knowledge management system to capture, store, and share best practices and lessons learned across the organization. This could be a centralized database, knowledge-sharing platform, or internal communication channels. Digitally transformed framework maybe adopted by the manufacturing companies. Future researchers may expand the research scope to include manufacturing enterprises in different regions across the globe. This can help identify best practices and variations in business integration approaches across different contexts.

5. References

Aouachria, M., Leshob, A., Ghomari, A. R., & Aouache, M. (2023). A Process Mining Method for Inter-organizational Business Process Integration. ACM Transactions on Management Information Systems.

Chinda-Nwokeazu, P. C., Igbinomwanhia, O. I., & Anumba, L. O. (2022). A Framework for Implementing Data Analytics in Construction Projects: A Systematic Review. *Journal: Automation in Construction,* 130, 103827

Dai, B., & Liang, W. (2022). The impact of big data technical skills on novel business model innovation based on the role of resource integration and environmental uncertainty. Sustainability, 14(5), 2670.

Dong, Z., & Zhang, Z. (2022). Does the Business Environment Improve the Sustainable Development of Enterprises?. Sustainability, 14(20), 13499.

Gruzina, I. (2023). SUBSTANTIATION OF THE IMPACT OF LIFE CYCLE STAGES ON THE ORGANIZATION'S COMPETENCE STRUCTURE. Economic scope. https://doi.org/10.32782/2224-6282/187-16.

Khuan, H., Andriani, E., & Rukmana, A. Y. (2023). The Role of Technology in Fostering Innovation and Growth in Start-up Businesses. *West Science Journal Economic and Entrepreneurship*, 1(08), 348-357.

Najafi, M., Azimi, M., & Zainuddin, M. (2020). The Impact of Big Data on Project Management Practices in the Construction Industry: A Literature Review. Journal*: International Journal of Project Management,* 38(2), 182-197.

Rojek, D. (2021). The Technological Factors of Enterprise Innovation in a Strategic Perspective. Management and Production Engineering Review, 14.