

The Integration of Supply Chain and Digitalization: The Influence on SME's Business Performance in Chengdu, Sichuan Province, China

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ABSTRACT

The scale of the enterprise organization industry has steadily grown in recent years as a result of the rapid development of the global economy; however, the situation additionally contends with obstacles such as natural catastrophes, policy changes, political situations, and other unforeseen factors that may also trigger threats in the supply chain. The objective of this research is to examine the impact of supply chain digitalization and internal integration, also referred to as Supply Chain 4.0, on the performance of small medium businesses. This research illuminates the advantages and prospects associated with the implementation of contemporary supply chain strategies. It accomplishes this by examining the impact of incorporating digital technologies and integrating supply chain processes on different dimensions of small business performance, including efficiency, cost-effectiveness, and customer satisfaction. The development of conceptual framework in this study will be able to contribute the digital transformation of supply chain theoretically through our framework and expansion of knowledge by examining the influence between digitalization, supply chain integration, and small business performance such as operational efficiency, cost reduction, customer satisfaction, and overall competitiveness.

Keywords: supply chain digitalization, internal integration, performance, small medium enterprises, technologies

I. INTRODUCTION

The scale of the enterprise organization industry has steadily grown in recent years because of the rapid development of the global economy; however, the situation additionally contends with obstacles such as natural catastrophes, policy changes, political situations, and other unforeseen factors that may also trigger threats in the supply chain (Li & Zhang, 2023). These challenges not only impede the organization's internal advantages, but also have a direct impact on the overall efficiency of the supply chain. In the year 2019, the United States implemented fresh import tariffs on a range of commodities originating from China, consequently impacting the

global supply chain to differing extents. The COVID-19 pandemic emerged in the year 2020. The availability of epidemic prevention materials has been jeopardised by potential disruptions in the supply chain, resulting in significant setbacks to the worldwide supply chain (Das & Dey, 2021). Based on prior study, it can be inferred that the digital transformation of supply chains is an area of research that has not yet reached a mature level, and the existing body of research is now undergoing refinement. The COVID-19 pandemic has heightened the significance and urgency of implementing digital transformation in supply chain management.

Based on the Research Report of China Enterprise Digital Development in 2021, it is indicated that the digital economy in China attained a scale of CNY 47.6 trillion in the same year. Furthermore, it was found that a significant proportion of companies, specifically 95.9%, have either successfully accomplished or are now engaged in the process of digital transformation. All of the firms questioned anticipate fulfilling industry demands by implementing digital transformation strategies inside their supply chain operations. There is a limited body of study on the digital transformation of supply chains, and the current research landscape lacks a broad exploration of research directions in this area. The existing framework lacks a comprehensive theoretical foundation and tool model to adequately support firms. According to Yang, Fu, and Zhang (2021), in order to address the increasing demands of rapid development, it is imperative to adopt a multi-faceted approach that focuses on high-quality development.

Supply chain digitization refers to the process of replacing outdated manual or analogue procedures with advanced technological solutions that are rooted on digital transformation. Organisations have the option to utilise software applications in order to integrate many data sources into a unified system that prioritises automation and business intelligence. The process of digitalisation offers substantial prospects for the supply chain, such as enhanced access to information and improved efficiency in inter-company logistics. It also enables greater visibility and transparency throughout the supply chain by providing real-time access to information and control. Additionally, digitalisation facilitates operational efficiency, maintenance, integration, collaboration, innovation, product design, and effective inventory management (Fatorachian & Kazemi, 2020). The digitization of supply chains has emerged as a prominent phenomenon in the corporate sector over the past several years, and its importance has further escalated in the wake of the global pandemic.

In the context of Supply Chain 4.0, characterised by the widespread integration of digital technology, there exists a notable knowledge deficit regarding the intricate dynamics between the digitalization of supply chains and its impact on the performance of small businesses. Although the potential benefits are readily apparent, there is a limited scope of research that thoroughly examines the specific mechanisms via which these advancements affect many aspects of organisational performance. The development of conceptual framework in this study will be able to contribute the digital transformation of supply chain theoretically through our framework and expansion of knowledge by examining the influence between digitalization, supply chain integration, and small business performance such as operational efficiency, cost reduction, customer satisfaction, and overall competitiveness. An examination of the impact of supply chain digitization and integration on the performance of small businesses can offer valuable insights for business leaders, supply chain managers, and policymakers in

making well-informed decisions regarding the implementation of digital technologies and strategies aimed at optimising supply chain operations.

II. LITERATURE REVIEW

A. Defining Variable

1) *SME's Performance*

The concept of firm performance has garnered significant attention in scholarly investigations pertaining to strategic management and is frequently utilised as a dependent variable. While the notion is commonly accepted within scholarly discourse, there is a lack of consensus over its precise definition and standardised means of quantification. The evaluation of a small business's ability to achieve its goals and objectives is commonly referred to as firm performance (AlMulhim, 2021). Multiple metrics can be employed to assess it, encompassing financial indicators like revenue, profitability, and cash flow, as well as market share, customer satisfaction, staff productivity, and innovation. Good firm performance can be measured by various factors such as effective management, opportunities for expansion, and overall success in a highly competitive market (Sharma, Luthra, Joshi & Kumar, 2020). The impact of a company's supply network on its overall success can be significant, highlighting the interconnectedness of supply chain management and business performance. Small and medium companies (SMEs) play a significant role in the global economy, accounting for 90% of all businesses and contributing to 50% of employment opportunities. It is worth noting that a substantial portion of these employment opportunities are occupied by women. Hence, the evaluation of small and medium enterprises' (SMEs) performance within the context of digital transformation (DT) using approaches that incorporate sustainability emerges as a crucial mechanism for mitigating poverty and addressing gender disparities, in alignment with the United Nations Sustainable Development Goals (Melo et al., 2023).

In other perspective, the establishment of financial stability is crucial for ensuring the resilience of businesses. This involves undertaking comprehensive preparations, meticulous monitoring of expenditures, and regular financial analysis to optimise resource allocation and maintain profitability. The development of a highly motivated and skilled personnel is likewise of utmost importance. In order to effectively attract and retain highly skilled individuals, organisations must allocate resources towards the enhancement of employee development, foster a congenial and inclusive workplace environment, and provide competitive compensation packages. Operational efficiency methods have been found to enhance processes, minimise waste, and ultimately boost overall productivity (Benzidia & Makaoui, 2020). According to Okyere, Osei, Akuh, and Addo (2023), the implementation of digital technologies in supply chains has the capacity to augment the flexibility, effectiveness, and reactivity of supply chains, thereby positively impacting a company's performance by enhancing productivity, reducing costs, and improving customer satisfaction.

2) *Supply Chain Digitalization*

A digital supply chain is characterised by its reliance on capabilities afforded by the World Wide Web. Supply chain digitalization, sometimes referred to as the practise of replacing outdated manual or analogue activities with current high-tech solutions offered through digital transformation. According to Itang et al. (2022), Supply chain digitization pertains to the endeavour of assuring effective collaboration across diverse supply chain instruments in order to optimise the integration of processes. The approach involves integrating accurate data and procedures into a unified platform to facilitate comprehensive understanding (Deepu & Ravi, 2021). Software enables brands to consolidate data into a unified solution that emphasises automation and business insight. The process of digitalisation facilitates enhanced inventory and materials management, ensuring precise monitoring of expiry dates and mitigating the occurrence of materials shortages. Consequently, this results in a reduction of waste within the supply chain and a diminished need for accelerated freight services (Liu & Chiu, 2021).

In order to maintain a competitive edge in a dynamic global landscape, it is imperative for organisations to possess the qualities of agility and innovation. Regularly monitoring industry trends and being abreast of emerging technology enables firms to effectively adapt and incorporate novel tools or methodologies that enhance operational efficiency and effectively address evolving client demands (Oubrahim, Sefiani & Happonen, 2023). This may entail the use of data analytics, the adoption of sustainable practises, or the exploration of novel revenue generation avenues. The primary determinant of sustained success lies in the adoption of an entrepreneurial mindset that embraces and fosters both adaptability and creativity. By proactively addressing these interconnected elements, the small firm not only sustains its operations but also experiences growth, so securing a prosperous and enduring future (Zhou & Wang, 2021).

The resource-based view (RBV) posits that organisational resources, possessing characteristics of value, rarity, non-substitutability, and inimitability, serve as a foundation for attaining a competitive advantage (Nayak, Bhattacharyya & Krishnamoorthy, 2022). The Resource-Based View (RBV) has been commonly employed to evaluate the utilisation of digital technologies in enhancing organisational capabilities and optimising supply chain efficiency. Digital technology is a tangible asset that is employed within the framework of organisational strategy to augment its capabilities (Argyropoulou, Garcia, Nemati & Spanaki, 2023). The utilisation of digital technology enhances the capacities of supply chains, hence exerting a direct influence on business operations. This influence is manifested through the reduction of operating costs, enhancement of product quality, facilitation of new product development, expansion of market share, and fulfilment of consumer satisfaction (Kalogiannidis, Kalfas, Chatzitheodoridis & Kotsas, 2022).

3) Internal Integration

The integration of supply chains has the potential to enhance corporate performance by serving as a catalyst for stability and establishing a robust framework. Integration involves the process of amalgamating disparate components into a unified whole. The concept of integrated research pertains to the ideas of establishing connections and interdependencies between studies conducted on the environment and management. Moreover, within the framework of dynamic market conditions, it is imperative to effectively incorporate all elements of the supply chain to facilitate seamless collaboration among all stakeholders. The exploration of integration is

necessary in order to demonstrate how a corporation can achieve a broader objective by effectively aligning and coordinating several divisions (Saryatmo & Sukhotu, 2021). Internal integration is commonly utilised during the process of developing new products. Internal integration refers to the extent to which a company is able to promote internal collaboration, as indicated by the sharing of information among various departments within the organisation. This encompasses factors such as product development, manufacturing planning, quality inspections, production of high-quality goods, distribution, and the reliability of data. According to Erboz, Hüseyinoğlu, and Szegedi (2021), the entity in question operates as a cohesive entity that facilitates the coordination of data movement, facilitates the exchange of resources, and fosters collaboration in order to achieve a shared organisational objective.

According to Zhang et al. (2022), one of the primary internal factors that influences an organisation is its corporate strategy, specifically in relation to sustainable development. The implementation of digital transformation within the supply chain is a strategic endeavour that should be approached with a long-term perspective, as it plays a crucial role in the overall development plan of organisations. The objective of sustainable supply chain development is to effectively mitigate the environmental impact resulting from natural or political factors throughout the entire supply chain cycle, while simultaneously promoting the protection of human rights and the implementation of ethical work practises. The implementation of digital technologies in the supply chain is crucial for achieving both business and environmental sustainability, as highlighted by Ye et al. (2022).

Another significant aspect to consider is the performance of business operations, specifically the supply chain. The utilisation of digital technology within an enterprise has the potential to enhance operational effectiveness across the supply chain. During the early phase of supply chain operations, certain manufacturers and suppliers possess a solid groundwork for undertaking digital transformation, resulting in a comparatively smoother and more proactive implementation of the transformation process. The digital supply chain platform has the capability to forecast the sales of items and the rate at which sales are increasing for the purpose of providing guidance to manufacturers and enhancing the shopping experience for customers. Additionally, this platform facilitates efficiency improvements for members of the supply chain, ultimately leading to a mutually beneficial outcome (Ageron, Bentahar & Gunasekaran, 2020).

Moreover, the establishment of robust client connections, predicated on consistently providing exceptional products or services that surpass expectations, is important to this endeavour. The active solicitation and implementation of feedback play a crucial role in effectively addressing client demands and maintaining brand loyalty and advocacy (Sharma & Joshi, 2020). In the contemporary digital landscape, the establishment of a robust online presence is a need that cannot be disregarded. This involves the development of a website that is easy to navigate and serves as an online retail platform, alongside active engagement on various social media channels to foster a thriving virtual community (Dudukalov et al., 2021). An all-encompassing digital marketing strategy that incorporates search engine optimisation (SEO), content marketing, pay-per-click (PPC) advertising, and email campaigns has the potential to enhance both the reach and effectiveness of your marketing efforts. This illustrates the potential for the organisation to enhance internal integration through the implementation of a digitalization

revolution, resulting in streamlined internal operations (Dias, Marín & Moyano-Fuentes, 2022). This study additionally demonstrates the significant relationship between internal integration and the adoption of technical breakthroughs. The efficiency of supply chains has been enhanced by the internal interconnectivity resulting from the process of digitization.

Based on supporting literature, the researchers generating three hypotheses that can be tested to either support or refute in subsequent phases of the research as below:

Hypothesis 1 (H1): Supply chain digitalization has a positive influence on SME's performance mediated by internal integration.

Hypothesis 2 (H2): Supply chain digitalization has a direct positive influence on SME's performance.

Hypothesis 3 (H3): Internal integration has a direct positive influence on SME's performance.

III. CONCEPTUAL DEVELOPMENT

A. Underpinning Theory

The rapid expansion of digital technology necessitates the use of theory-driven research as a crucial component. The comprehension of supply chain digitization might be facilitated by employing appropriate theoretical frameworks. The dearth of comprehensive information and scholarly literature poses challenges in the application of theory and the generation of valuable insights and guidance in the field of supply chain digitization research. The present study will investigate the potential enhancement of supply chain performance through the implementation of digitalization strategies, drawing upon the theoretical frameworks of the firm's resource-based view (RBV) and the Diffusion of Innovation (DOI) theory. Interorganizational resources can be leveraged by firms through supply chain networks, enabling them to gain a competitive advantage by utilising the resources. To achieve successful digitization, it is imperative to establish and exploit a competitive edge through the utilisation of both tangible and intangible resources to achieve company's performance.

1) *The Resource-Based View (RBV)*

The origins of resource-based view (RBV) theory may be traced back to the time when Penrose (1959) asserted that having, using, and deploying resources effectively will offer superior results than other industrial systems. This theory strongly linked to support the independent variables. This technique defined the firm's long-term competitive advantage in terms of resource performance (Wernerfelt, 1984), and he used the phrase "resource base view" to express how the researcher viewed firms in terms of key resources. Researchers emphasise the notion of "core competency," while placing a priority on a variety of significant resources (Prahalad & Hamel, 1990), called the corporate capability, which they referred to as competitive advantage (Barney, 1991).

Moreover, the Resource-Based View (RBV) are fundamental theoretical frameworks that elucidate the manner in which organisations engage in value creation and capture in the pursuit of their strategic and operational goals (Som & Anyigba, 2022). RBV, which is based on two fundamental principles that elucidate the mechanisms through which firm-specific resources generate enduring competitive advantage and the reasons behind certain organisations consistently surpassing others in terms of competitiveness (Utami & Alamanos, 2023), is complemented by RV, a study of relational strategies that originates from the field of strategic management (Zakrzewska-Bielawska & Lewicka, 2021).

The primary objective of strategic management is to enhance a firm's market standing through the optimisation of its most valuable assets, hence increasing their overall value. Zahra (2021) asserts that the resource-based view (RBV) provides a comprehensive framework for analysing the ways in which a company's tangible and intangible assets contribute to the establishment and sustenance of its competitive advantage. One of the fundamental tenets of this theory posits that enhanced corporate performance is contingent upon the possession of unique resources and capabilities by the organisation.

2) *Diffusion of Innovation (DOI)*

The second theory supported and compliment the Resource Based View (RBV) theory. Predicated on Rogers' definition of innovation as a notion or practising, it was necessary to conceptualise the innovation components or prowess in this study in order to support sustainable growth (Rogers, 1983). These capabilities include company culture, strategic alignment, technology orientation, and business strategic model. Contribute to the fulfilment of economic obligations according with Agenda 2030 and the Sustainable Development Goals of the United Nations (Francke & Alexander, 2019). In a new market dynamic, innovation diffusion necessitates developing innovation culture capacities that increase the efficacy of innovation competitive edge that support the long-term expansion of small and medium-sized firms.

Research typically involves technological innovation, and Rogers (2003) used the terms technological innovation and research simultaneously. Rogers defined diffusion as the mechanism by which technologies are successfully disseminated within a social system via specific routes at some point in time. The four main elements of innovation dissemination, according to Chege & Wang (2020), are invention, channels of communication, timing, and social structure, and many of prior study has demonstrated that corporate culture fosters innovation. Hence, the objective of the current study is to examine the connections between supply chain digitalization, internal integration, and small business performance synchronize with the usage of these theories. This will be achieved by proposing a research framework derived from a comprehensive review of existing literature, with the aim of addressing a gap in knowledge within this domain.

B. CONCEPTUAL FRAMEWORK

The researchers propose the use of the mentioned conceptual framework (Figure 1) for the purpose of conducting a quantitative evaluation of the performance of small and medium-sized enterprises (SMEs) in Chengdu, located in the Sichuan Province of China. This assessment will focus on the various elements pertaining

to the supply chain within the specific context of digitalization, with the mediating factor being internal integration. In order to establish the verifiability of the observed correlation between an exogenous factor, namely supply chain digitization, it is recommended to utilize supplementary survey instruments in forthcoming studies. This study provides a thorough analysis of the fundamental elements that lay the groundwork for future research on the phenomena of digitalization and its impact on the development of innovative business models.

Additionally, the technique takes into account the potential contributions that business organizations, particularly those operating in China as a whole, could offer in enhancing the effectiveness of the enterprises being examined. The adoption of a holistic perspective enables humans to comprehend and offer explanations for complex and highly coordinated occurrences, in which all constituent elements are interrelated and contribute significantly.

The sample for this study will include owners of small and medium-sized enterprises (SMEs) in Chengdu, China. These participants have been chosen because they are representative of the population of interest, as highlighted by Ruta and Macchitella (2008). There is a clear distinction observed in the various components of digital supply chain management and its impact on business performance. Moreover, the framework exhibits a significant degree of effectiveness when employed in combination with other management systems, and its flexibility enables smooth incorporation into innovative management frameworks (Sharin, Hernandez & Sentosa, 2023).

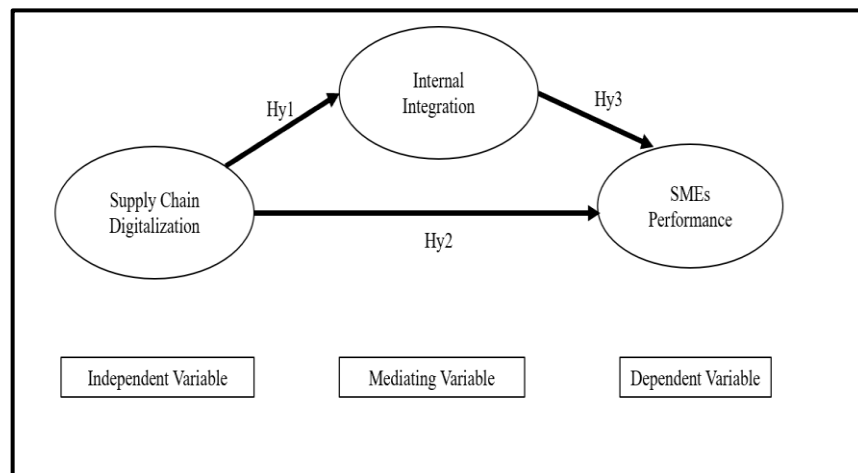


Figure 1. Conceptual Framework

IV. CONCLUSION AND RECOMMENDATION

In conclusion, this study highlights the significant influence of supply chain digitalization and integration on the performance of small-medium businesses. This paradigm change enhances operational efficiency, enhances customer satisfaction, and confers a competitive edge. Facilitating real-time data sharing and boosting communication can enable small firms to expedite decision-making processes, minimise operational expenses, and deliver exceptional customer care. Furthermore, the adoption of digitization empowers small enterprises with the capacity to effectively navigate dynamic markets, as highlighted by Sharin and Sentosa (2023). The

implementation of digitization and integration within supply chains has a significant impact on improving the operational efficiency and overall performance of small firms. Nevertheless, the effective execution necessitates the allocation of resources and the installation of cybersecurity protocols. Small enterprises that proactively adopt digital initiatives are well-positioned for expansion and adaptability in an ever-evolving digital business environment. The process of digitalization presents a viable avenue for small firms to achieve enhanced efficiency, competitiveness, and customer-centricity, hence emerging as a crucial strategic approach for attaining sustained growth and success.

The primary objective of this study was to examine the relationships between supply chain digitization, internal integration, and the performance of small and medium-sized enterprises (SMEs). Consequently, a conceptual framework (Figure 1) has been created, along with the development of three hypotheses. Future research expected to examine the role of internal integration as a mediator between supply chain digitization and business performance, as hypothesised in H1. Other than that, the researcher will look forward to examining the direct effect of supply chain digitization on the performance of small and medium-sized enterprises (SMEs) (H2) and explore how the adoption of digital supply chains enhances the efficiency of business processes. The integration of digital technologies into systems and procedures has been found to streamline the customer experience, leading to heightened levels of satisfaction among consumers (Shahadat et al., 2023).

Additionally, the digitization of supply chain processes has been observed to elevate the overall standard of manufacturing procedures. Furthermore, it is anticipated that future studies will establish a clear and direct correlation between the level of internal integration inside small and medium enterprises (SMEs) and their overall performance, as indicated by hypothesis H3. In summary, the process of digitization facilitates the reduction of risk by allowing for the proactive detection and control of problems within the supply chain. In the contemporary landscape, the process of digital integration has emerged as a catalyst for accessing global markets, hence enabling seamless collaboration with international partners and augmenting avenues for generating money. It is imperative for small enterprises to evaluate their unique requirements and demonstrate a steadfast dedication to continuous administration.

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