# Information and Communication Technology (ICT) Adoption in Supply Chains: A Case of Construction Companies in Iraq

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## ABSTRACT

In contemporary business environments characterized by high competition, integrating supply chain activities and leveraging advanced technology is essential for maintaining competitiveness across diverse industries. Given the ongoing global technological advancements, adopting supply chain technologies represents a viable strategy for organizations. This study aims to explore the significance of implementing supply chain technology within the construction sector and its ramifications on business operations. Through the construction of a comprehensive model, this research endeavours to elucidate the key factors shaping the adoption of supply chain technology. The hypothesized relationship suggests that the adoption rate of technology is contingent upon factors such as firm size, organizational structure, and the alignment of supply chain strategy. Considering these factors enables businesses to make informed decisions regarding technology implementation.

**KEYWORDS:** Information and Communication Technology, Supply Chain, Competitive Advantage, Firm Size, Organizational Design.

## INTRODUCTION

The construction supply chain and procurement exert significant influence on the entire lifecycle

of a project. This holistic framework encompasses all dimensions of project planning, development, and delivery within the broader context of the built environment (Buchmeister & Palcic, 2013). The construction sector grapples with inherent challenges and complexities, including human factors. Recognizing its significance in improving project performance, there's a growing emphasis on developing favourable conditions, methods, and procedures within the industry (Basheer et al., 2019). The 2017 report issued by the McKinsey Global Institute underscored the challenge of low productivity within the construction sector and advocated for the adoption of digital technology as a mechanism to augment the efficiency of the building supply chain (Company, 2017). The foreseeable future portends a gradual transformation of the built environment, attributed to the pervasive availability and utilization of the Internet (Yang et al., 2021). New technologies like blockchain, smart contracts, and the Internet of Things (IoT) are being explored for their application in construction supply chain operations. The sector also employs enterprise resource planning (ERP), e-procurement, and other internet-based technologies to address supply chain challenges. Factors in a business context include material acquisition, supplier selection, competitive analysis, and progress monitoring (Yadav et al., 2020). The push for digitization within the construction supply chain has led to the emergence of a digitalized procurement system, aiming to improve efficiency, coordination, and optimization solutions.

In the contemporary era, decision-making amidst challenges and deviations in construction projects depends on timely information collection, analysis, and sharing. Poor communication among team members leads to project delays, rework, and structural defects, hampering prompt responses from project managers. ICTs enable real-time access and collaboration, enhancing financial control, communication, productivity, and document quality. The construction industry's evolving organizational structures emphasize the need for agile adaptation and competitiveness, supported by continuous real-time information flow. Technology facilitates comprehensive data access, analysis, and management, ensuring information continuity among stakeholders. ICT tools play a pivotal role in providing these services, promoting efficient project management Hafeez et al. (2020). Nonetheless, the construction industry has displayed a hesitancy in embracing ICT, leading to the underutilization of readily accessible and available technological resources.

The rapid expansion of the Internet and ICT has driven the evolution of supply chain technology. These emerging technologies streamline process management, information control, workflow, and communication enhancement. While ICT is widely acknowledged for its role in improving communication, information flow, and productivity, there is a dearth of comprehensive studies investigating its effective applications within the building supply chain. This study aims to explore the factors driving the widespread adoption of technology within the building supply chain and assess the current state of technology adaptability in construction supply chains, considering various elements impacting technology adoption.

## LITERATURE REVIEW

The contemporary market offers technological solutions suitable for supply chain systems. Milrad et al. (1999) and Bellare et al. (2000) have identified significant challenges associated with the effective deployment of technology in the construction sector. These challenges encompass issues such as signature exchange, secure payment mechanisms, and the establishment of equitable contractual practices. The integration of technology into construction operations has led to both direct and indirect consequences. Key impacts include

increased productivity in information-related activities, encompassing the generation, retrieval, dissemination, and transmission of information. The efficacy of material handling in information processing through the utilization of information technology has implications for various aspects, including inventory reduction, decreased reconstructions facilitated by accurate design information, and the development of energy-efficient structures.

The integration of ICT into the construction supply chain offers numerous advantages. Among these, a significant benefit is the reduction in transaction costs. Additionally, ICT facilitates the management of staffing requirements, potentially leading to cost savings through reduced personnel utilization. Another advantage of adopting ICT is the enhanced capability of management to efficiently monitor and control inventory flow, consequently reducing inventory levels and lowering storage costs. Furthermore, ICT outperforms human capabilities by swiftly and accurately providing information as needed (Evangelista & Sweeney, 2006; Loudon, 2016; Shiralkar et al., 2021).

The integration of technology into the supply chain offers manifold benefits; however, the adoption of these innovations also presents a spectrum of challenges. It is noteworthy that numerous enterprises hasten the adoption of technology to leverage its advantages. Nevertheless, the benefits of ICT can turn deleterious without a thorough analysis of a company's strategy and potential. Consequently, the potential for ICT utilization in the supply chain may remain under-realized in such instances. Effectively navigating resistance to change and implementing substantial revisions requires simultaneous attention to pertinent social and cultural concerns. The emergence of e-commerce technology has engendered a significant influx of data across diverse channels like email, websites, and Internet services, resulting in information overload. One of the primary functions of the supply chain is to facilitate the exchange and dissemination of information among its participants, thereby influencing their decision-making and actions (Zhu et al., 2017). In the modern digital age, adept management of information has become pivotal for organizational success. This significance largely stems from the ubiquitous availability of information, easily accessible via numerous digital platforms. The prevailing challenge pertains to promptly accessing relevant information amidst the abundance of data dispersed across various communication channels, leading to fragmentation.

Conventional supply chain processes frequently engendered disjointed interactions among diverse stakeholders. However, organizations have shifted towards embracing strategic partnerships within the realm of supply chain management, viewing suppliers and customers as collaborative allies. The adoption of this cooperative approach fosters the development of mutual cooperation and trust, thereby fostering progress and fulfilment for all involved entities.

Integrated supply chain strategies aim to augment profitability and competitiveness across the entire supply chain network, transcending individual firm concerns. Stakeholders collaborate to attain mutually agreed-upon objectives by aligning goals and consolidating resources. An integrated supply chain offers a primary advantage of improved information sharing among stakeholders. The emergence of information technology has streamlined real-time data sharing, granting widespread access to the latest information. This empowers proactive decision-making and rapid adaptation to fluctuations in demand. Precise and timely information empowers organizations to adeptly regulate their inventory levels. The integration of the supply chain augments visibility, allowing all stakeholders to efficiently monitor the flow of information and goods across multiple tiers. The inherent transparency of this approach

facilitates the deployment of risk management strategies, ensures the implementation of quality assurance measures, and fosters prompt problem-solving capabilities. Supply chain integration endeavours result in diminished lead times and accelerated order fulfilment by optimizing operational processes. The ramifications of heightened efficiency include elevated client satisfaction levels and bolstered competitiveness.

## Antecedents to Adopt Technology in Construction Supply Chain

Prior research has suggested that the adoption of novel technology can be impacted by various factors, including organizational considerations, structural elements within organizations, and the degree of integration across supply chains (Ravet, 2011). The authors suggest that technological adoption varies based on specific criteria. The adoption of new technologies is believed to depend on various organizational characteristics. Size, a well-explored variable, sparks significant debate regarding its relationship. According to Chandler (1962), larger enterprises have the resources and expertise to invest in new technologies and manage associated risks effectively. Large corporations often possess more resources, enabling them to adopt and apply new technologies efficiently. Moreover, they can leverage economies of scale associated with supply chain technology utilization.

The integration of ICT in the construction supply chain is pivotal for enhancing productivity and efficiency. Organizational levels of technology adoption vary, with some entities displaying greater creativity and readiness to embrace new technologies. Scholarly literature extensively explores the impact of organizational size on technology adoption. While smaller enterprises may exhibit higher innovative capabilities due to flexibility and fewer bureaucratic constraints, larger firms often have the financial resources to invest in technology. Smaller organizations are deemed more adaptable and flexible, facilitating quicker decision-making and technological adoption. Moreover, smaller staff sizes may foster cohesion and innovation readiness. Several studies note a positive correlation between organizational size and technology adoption rates. Scholarly investigations by Teece, Pisano, and Shuen (1997) along with Hu et al. (2017) underscore a heightened propensity for larger enterprises to embrace emerging technologies. Previous inquiries have delved into the adoption dynamics of specific technologies like Electronic Data Interchange (EDI), identifying business size as a pivotal factor in this process (Kamariah Kamaruddin & Mohamed Udin, 2009), thus bolstering the aforementioned findings. Numerous research endeavours illuminate the hurdles faced by small enterprises in the adoption and integration of new technological solutions. The utilization of novel technology poses challenges for smaller entities, primarily attributed to a scarcity of technical expertise and financial constraints (Lai & Guynes, 1997). Conversely, larger corporations enjoy a more advantageous position to undertake significant investments in technology owing to their access to ample financial resources. These organizations can allocate substantial funds to training initiatives, technology acquisitions, and research and development endeavours. Additionally, it is noteworthy that larger corporations often possess a more sophisticated information technology infrastructure, facilitating seamless integration of new technological advancements into their existing operational frameworks. Larger corporations are predisposed to adopt and implement advanced supply chain technologies, given their greater financial capacities and willingness to embrace risks. This encompasses various technologies such as advanced supply chain management software, AI-driven analytics, IoT devices, and blockchain technology. These technologies enable larger organizations to optimize resource allocation, enhance supply chain visibility, and improve operational

efficiency. Thus, this study employed quantitative analysis to ascertain the frequency of occurrences;

**H1:** *Adoption of technology in the construction supply chain is more likely for large organizations.*

With the increasing adoption of digital transformation by companies, the examination of how organizational structure influences technology adoption has become prominent. Particularly, the concept of centralization, indicating the consolidation of decision-making within an organization, has sparked discussions in both academic and business spheres. It governs the communication of information, the decision-making process, and the facilitation of communication. Centralization is a fundamental component of organizational structure, representing the concentration of decision-making authority at higher management levels. In contrast, decentralized organizations delegate decision-making authority to lower levels of the organizational hierarchy, while highly centralized organizations vest substantial control over crucial decisions in senior executives or a central governing body.

The existing body of research investigating the influence of centralization on technology adoption has produced mixed findings. While certain studies demonstrate a positive relationship between centralized decision-making and technology adoption, others indicate a negative correlation. Pierce and Delbecq (1977) propose that a centralized organizational structure can facilitate innovation implementation. Centralization streamlines decision-making processes, accelerates the adoption of new technology, and mitigates conflicts among organizational divisions. Centralizing decision-making authority within a single governing body can enhance the effectiveness and coordination of technology adoption efforts. Conversely, Robertson and Gatignon (1986) present an alternative perspective highlighting potential drawbacks of centralization. They argue that highly centralized organizational frameworks may impede technology adoption by stifling innovation and creativity among lower-level employees. This study formulated a hypothesis that;

**H2:** *The decentralized organizational structure facilitates the adoption of Technology in the construction supply chain.*

The seminal work by Patterson et al. (2003) establishes strategy as the primary determinant of organizational structure. Adaptation of organizational structures and management practices to dynamic business environments is crucial for sustained success. Patterson et al. (2003) underscore the importance of aligning organizational structure with strategic objectives to optimize performance and meet market demands effectively. In recent years, the integration of supply chain and logistics strategy with overall corporate strategy has emerged as a critical factor in company performance. Kamariah Kamaruddin and Mohamed Udin (2009) highlight the benefits of enhanced logistics management, leading organizations to prioritize logistics strategy within the supply chain. The incorporation of advanced information technology aligns with the evolution of supply chain integration as a key corporate strategy component. Recognizing enhanced competitiveness through supply chain integration, businesses, as noted by Zhu et al. (2017), are more inclined to adopt technological solutions to improve supply chain management practices when backed by a clearly defined logistics objective statement and strategic plan. The current landscape necessitates strategic technology deployment, enabling firms to enhance decision-making processes, optimize supply chain operations, and maintain

competitiveness.

In addition to internal technology utilization, forging strategic alliances with supply chain stakeholders is imperative for enhancing overall performance. Collaboration within partnerships fosters knowledge, resource, and expertise exchange, thereby bolstering the innovation and effectiveness of supply chain operations. The integration of technology among supply chain participants facilitates efficient communication, minimizes information discrepancies, and enhances operational efficiency (Yuan et al., 1999; Zhu et al., 2017). The strategic integration of supply chain management with overall business strategy fosters long-term success, efficient resource allocation, and heightened consumer satisfaction. Integrated supply chain management and technology adoption improve responsiveness to market dynamics, enabling organizations to swiftly adapt to demand and market shifts. Technology adoption facilitates real-time data analysis and decision-making, enhancing adaptability to evolving business landscapes. Supply chain integration optimizes logistics processes, reduces operational redundancies, and lowers costs, while advanced technology automates procedures, minimizes errors, and boosts efficiency. Strategic alliances and technology integration improve communication, coordination, and performance across the supply chain, enhancing customer experiences through timely deliveries, reduced stockouts, and improved order accuracy, fostering loyalty and satisfaction.

**H3:** *Firms with more integrated supply chain strategies are more inclined to adopt supply chain technologies.*

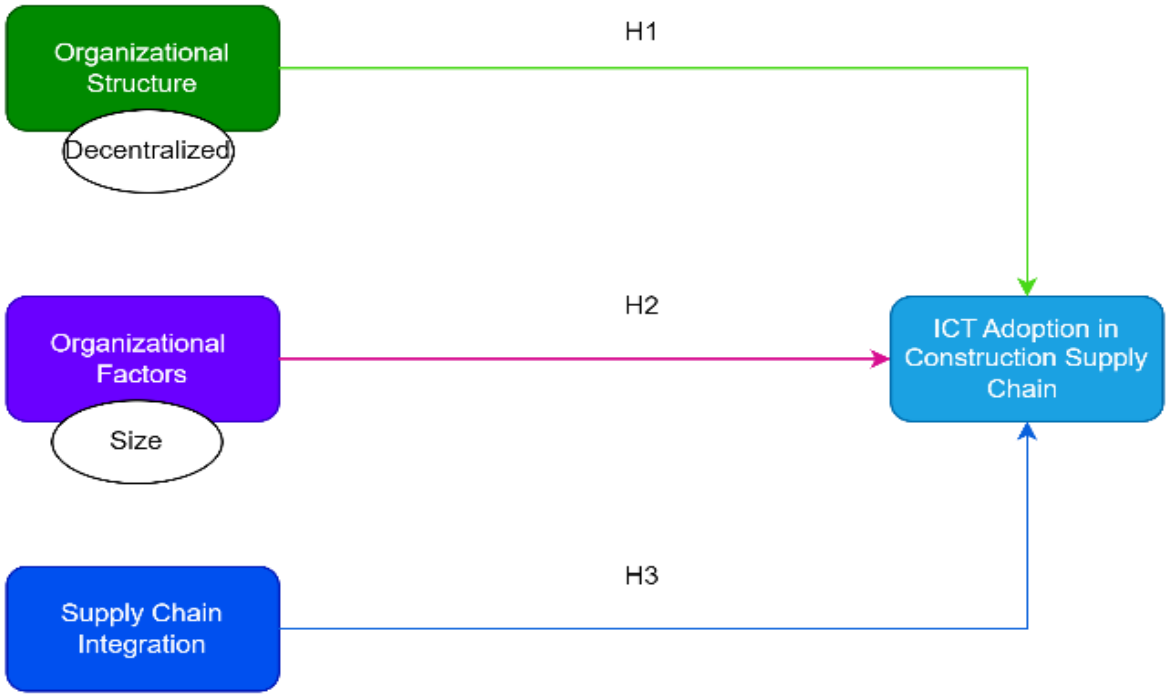


**Figure 1: Conceptual Model of the Study (Source Author).**

## METHODOLOGY

The core aim of this research is to investigate the determinants shaping the adoption of ICT

within supply chains operating in the construction sector. Moreover, the study seeks to formulate an extensive test blueprint for the proposed model. To fulfil these objectives, a survey instrument was devised to gather pertinent data and insights from participants.

## Measurement Scale

The survey questionnaire incorporated a five-point Likert scale to elicit participant responses, ranging from "Not at all" to "To a great extent." Participants utilized this continuum to evaluate their level of agreement with various statements concerning the utilization of ICT within supply chains in the construction sector. This methodological approach offers a systematic and standardized means of assessing attitudes, perceptions, and perspectives. The study aimed to gauge the degree of alignment or disparity with statements, underscoring the significance of employing the Likert scale. Each survey question was crafted to discern the extent to which respondents perceived specific elements to influence the implementation of ICT within construction sector supply chains. The user-friendly and easily administered nature of the Likert scale renders it suitable for large-scale surveys. Utilizing a ratio scale measuring instrument facilitates straightforward data analysis by categorizing responses into different levels of agreement or disagreement on a ratio scale (Joshi et al., 2015).

In the preliminary stage, an exhaustive inventory of technologies utilized across the supply chain is compiled. This diverse spectrum of technologies facilitates the analysis of the adoption and utilization of different ICT tools, including information systems, data management software, supply chain planning, and barcode technologies. These tools hold promise for enhancing efficiency and fostering collaboration within the supply chain, thereby offering potential benefits to management.

The proposed framework integrated numerous survey questions tailored to each latent variable. Consequently, the items were crafted to evaluate each concept and its hypothesized linkage. To ascertain organizational size, a survey question inquired about the number of employees within each respective organization. The assessment of decentralized decision-making levels followed the methodology proposed by Williams et al. (1998) to scrutinize organizational structure. The evaluation of supply chain strategy integration into broader business strategy utilized the measure of supply chain strategy incorporation outlined in the methodology proposed by Kohn et al. (2011). To assess the level of supply chain technology adoption among the mentioned organizations, a technology adoption score was established for each company. This score was derived by computing the average of results obtained from various functional technologies. The survey encompassed a wide array of technologies, including Customer Relationship Management (CRM), Quality Control (QC), Data Management, Inventory Management Systems, Coding Systems, E-commerce, and Supply Chain Event Management Software. The use of an extensive survey method facilitated a comprehensive understanding of ICT adoption within the construction supply chain. Furthermore, this approach provided valuable insights into the interrelated relationships between organizational attributes and technology integration within the supply chain.

## Sample Techniques and Size

A random sampling method has been utilized to select a representative sample of Iraqi construction enterprises that effectively mirrors the population. To ensure adequate representation and statistical power, the sample size has been determined using appropriate

statistical methodologies. Equation (1) presents the formula for calculating the sample size.

$$n = Z^2 p(1-p)/E^2 \quad (1)$$

Where:

- The required sample size is denoted by n.
- Z represents the Z-score associated with the selected confidence level (e.g., a Z-score of approximately 1.96 signifies a 95% confidence level).
- p denotes the estimated percentage of the population (e.g., the proportion of businesses exhibiting a high ICT adoption rate derived from previous research) showcasing the trait of interest.
- The estimated proportion is influenced by the required margin of error, symbolized as d, which signifies the intended level of precision. The determination of the Z-score depends on the designated confidence level. A greater Z-score corresponds to a heightened level of confidence, like 95%, resulting in a larger sample size requirement and consequently producing a more accurate estimation.

Likewise, the estimated proportion, drawn from published research or pilot studies, provides the most precise approximation of the percentage of organizations that have achieved significant ICT adoption. Employing a conservative estimate of 0.5, or 50%, is a common practice in situations where the proportion is uncertain, as it yields the largest sample size. The margin of error delineates the range within which the true proportion is anticipated to lie and is deemed acceptable. A smaller margin of error signifies greater precision; nevertheless, larger sample sizes are necessitated to achieve this precision. Based on the computation conducted, the projected sample size is determined to be 385. A total of 385 questionnaires were distributed to employees across various construction enterprises situated in Baghdad. With regards to the received completed questionnaires, which are available for data analysis, it can be confidently asserted that the response rate reached 87%.

## RESULTS AND DISCUSSION

In this study, a structural equation model (SEM) has been utilized to examine the association depicted in the conceptual framework. Confirmatory factor analysis (CFA) and path analysis are statistical techniques encompassed within the framework of structural equation modelling (SEM). The application of this methodology is frequently employed to scrutinize intricate relationships among variables and to establish and validate theoretical frameworks (Kohn et al., 2011).

### Reliability and Validity of Instrument

Cronbach's alpha, a widely used measure for evaluating internal consistency, is frequently employed to assess the reliability of scales or constructs in research studies. A high Cronbach's alpha coefficient indicates strong inter-item correlation within a construct, indicating favourable reliability. Table 1 displays Cronbach's alpha coefficients for each construct, demonstrating strong reliability characterized by their elevated alpha values. This observation implies that the elements within each construct consistently measure the same underlying concept.

**Table 1: Reliability of Scale.**

| Sr. # | Construct | α | Status |
|---|---|---|---|
| 1 | OS | 0.80 | Good |
| 2 | OF | 0.78 | Good |
| 3 | SI | 0.84 | Good |
| 4 | ADP | 0.81 | Good |

In the context of the study, OS denotes organizational structure, OF represents Organizational Factors, SI is delineated as Supply Chain Integration, and ADP signifies ICT adoption.

The assessment of scale internal consistency is validated through the examination of average variance extracted (AVE) and composite reliability (CR). It is anticipated that the AVE should surpass 0.5, while a Coefficient of Reliability (CR) exceeding 0.7 is deemed suitable. Table 2 showcases the CR and AVE values of the constructs, thereby demonstrating the constructs' robust convergent validity.

**Table 2: Convergent Validity of Scale.**

| Sr. # | Construct | AVE | CR |
|---|---|---|---|
| 1 | OS | 0.87 | 0.88 |
| 2 | OF | 0.93 | 0.94 |
| 3 | SI | 0.80 | 0.82 |
| 4 | ADP | 0.85 | 0.88 |

Within the framework of the measurement model, an assessment of the discriminant validity of the constructs is also carried out. Correlations among the various variables were analysed in Table 3. In this table, the diagonal values indicate discriminant validity, while the non-diagonal values indicate the square roots.

**Table 3: Discriminant Validity of Scale.**

| Construct | ADP | OS | OF | SI |
|---|---|---|---|---|
| ADP | **0.846334** | | | |
| OS | 0.911152 | **0.896853** | | |
| OF | 0.710517 | 0.808448 | **0.905016** | |
| SI | 0.759596 | 0.923326 | 0.796892 | **0.77917** |

## Structural Model

SEM stands as a robust statistical approach allowing researchers to explore intricate relationships among multiple variables concurrently. This study entails the construction of a structural model employing SEM techniques. Furthermore, a bootstrapping methodology was employed to scrutinize the proposed assumptions. The SEM results provide various fit indices and statistical tests, facilitating the assessment of model goodness-of-fit. This research delves into the application of SEM for hypothesis testing, emphasizing its significance and potential implications for future inquiries. The outcomes of SEM regarding path analysis are depicted in Table 4, accompanied by additional analysis and scrutiny pertaining to each hypothesis statement.

**Table 4: Structural Equation Modelling (Path Analysis).**

| Sr. # | Relationship | β | t-value | Remarks |
|---|---|---|---|---|
| 1 | **OS → ADP** | 0.353 | 4.72 | Accepted |
| 2 | **OF → ADP** | 0.423 | 3.89 | Accepted |
| 3 | **SI → ADP** | 0.426 | 4.421 | Accepted |

**H1:** *Adoption of technology in the construction supply chain is more likely for large organizations.*

In this paper, we explore variables influencing supply chain technology adoption, focusing on organizational size. Our hypothesis suggests larger organizations are more prone to using IT solutions to enhance efficiency and cost savings due to operational complexities and information management demands. Integrating IT within supply chains enables seamless data exchange, fosters collaboration, and facilitates informed decision-making across the value chain. Supply chain technology includes ERP systems, CRM software, inventory management systems, and EDI platforms.

The findings strongly support the proposition that larger organizations exhibit a higher capability in employing supply chain technologies. Implementing supply chain technology is essential for enhancing operational efficiency, reducing lead times, minimizing errors, and gaining a competitive edge. Businesses integrating technology into their supply chain operations typically experience increased productivity, enhanced transparency, and improved customer responsiveness.

According to our hypothesis, the adoption of supply chain technology is significantly influenced by the organization's size. Larger organizations typically exhibit characteristics such as higher transaction volumes, geographically dispersed operations, numerous supply chain partners, and the management of extensive information. Consequently, they face increasingly intricate operational challenges that can be effectively managed through technology utilization.

**H2:** *The decentralized organizational structure facilitates the adoption of technology in the construction supply chain.*

We support the perspective advanced by Grover and Goslar (1993), affirming that a decentralized organizational structure fosters border scanning, heightens awareness of commercial opportunities, and ultimately leads to heightened levels of technology adoption. This research aims to elucidate the potential advantages linked with the integration of a decentralized decision-making structure within an organization. Specifically, it endeavours to investigate the relationship between decentralization and technology adoption. Our study's results indicate that organizations characterized by decentralized architectures are more inclined to adopt technological advancements within their supply chain operations.

A decentralized organizational structure fosters the nurturing of diverse ideas and encourages input from a broad spectrum of stakeholders. This transparency enhances individuals' understanding and appreciation of potential business opportunities, including the integration of cutting-edge innovations. The adoption of decentralized decision-making enables swift responses to emerging technological advancements and dynamic market conditions.

Decentralization empowers staff members to articulate their viewpoints and introduce novel ideas.

The organization fosters an atmosphere conducive to experimentation and innovation, actively encouraging employees to suggest and explore innovative technical solutions to enhance workflows and performance. Given the frequent technological advancements in rapidly evolving markets, decentralized organizations demonstrate agility in adapting to changes due to their multi-layered decision-making capacity. The company's agility and embrace of new technologies confer a competitive edge, enabling it to maintain a prominent position in the market.

**H3:** *Firms with more integrated supply chain strategies are more inclined to adopt supply chain technologies.*

The incorporation of supply chain planning has emerged as a pivotal driver for technology adoption within organizations navigating dynamic commercial environments. According to Bowersox and Daugherty (1995), organizations with a comprehensive understanding of the benefits of efficient supply chain operations are more inclined to integrate supply chain strategy into their overarching corporate strategy. This integration offers an opportunity for increased technological adoption and electronic integration, unlocking the full potential of the supply chain to capture a larger market share. This study examines the importance of integrating supply chain strategy in facilitating technology adoption and its subsequent impact on the use of information technology in supply chain operations. The study's findings offer empirical evidence that integrated supply chain implementation positively influences technology adoption within the supply chain.

Efficient implementation of supply chain management strategies has demonstrated reductions in costs, heightened customer satisfaction, and increased responsiveness to market demands. Recognizing these benefits prompts enterprises to allocate financial resources towards technological interventions aimed at improving supply chain operations. The growing emphasis on technology adoption is underscored by the central role of supply chain strategy in organizational planning. Effective technology utilization facilitates data exchange, automation, and communication among supply chain collaborators, thus streamlining and enhancing productivity in supply chain activities. As supply chain strategy becomes more integrated into organizational strategy, the importance of supply chain operations grows, prompting a greater focus on information technology utilization in supply chain operations. This evolution fosters the objective of electronic integration, facilitating seamless exchange of data and information through the incorporation of supply chain methodologies.

## CONCLUSION

Our study underscores the growing significance of integrating advanced technology into supply chain operations as a critical determinant of competitiveness across industries. The research findings affirm that aligning supply chain management with technology deployment enhances organizational success and sustains market position. Our model postulates that larger organizations, with their expanded operations and resource base, are more inclined to adopt technology to improve information management and operational efficiency. Decentralized organizational structures facilitate increased border scanning and awareness of commercial opportunities, thus fostering technology adoption.

Our study underscores the importance of integrating supply chain planning. Organizations that grasp the advantages of efficient supply chain operations and incorporate supply chain strategy

into their overall business strategy are more likely to adopt information technology. The managerial implications of our approach are considerable. By utilizing this method, managers can deepen their understanding of the factors influencing technology adoption and make informed decisions regarding supply chain technologies. While our analysis offers a strong basis, further exploration of emerging supply chain technologies is necessary to conduct thorough investigations into technology adoption in supply networks.

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