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Digital Supply Chain Transformation and Business Performance of Manufacturing Firms in the Democratic Republic of Congo During COVID-19

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Abstract- — The COVID-19 pandemic led to disruptions in global supply chains, exposing vulnerabilities in organizations that were not adequately prepared for digital operations. This study investigates how digital transformation in supply chain management has influenced the business performance of manufacturing companies in the Democratic Republic of Congo amid the pandemic. Utilizing organizational information processing theory and the dynamic capabilities perspective, a conceptual framework was created to connect the digital environment, digital capabilities, digital supply chain transformation, and business performance. Data were collected through a structured survey of 233 senior logistics managers and the model was tested using partial least squares structural equation modeling (PLS-SEM). Measurement validation confirmed reliability and discriminant validity of the constructs. The results reveal that both digital environment ($\beta = 0.271$, $p = 0.005$) and digital capabilities ($\beta = 0.304$, $p = 0.003$) significantly drive digital supply chain transformation, which in turn exerts a strong positive effect on business performance ($\beta = 0.597$, $p < 0.001$). Mediation analysis further shows that digital supply chain transformation significantly mediates the effects of digital environment on business performance. These findings emphasize the importance of developing robust internal digital capabilities alongside an enabling external digital environment to enhance supply-chain agility in turbulent contexts.

Keywords: Digital capabilities, Business performance, COVID-19, Congo, PLS-SEM, Dynamic capabilities.

I. INTRODUCTION

The worldwide disruption brought about by COVID-19 has solidified digital transformation (DT) as a critical need for enterprises. DT encompasses much more than just a basic technological enhancement ; It represents a significant strategic reconfiguration that provides organizations with a fresh operational framework, inclusive of innovative tools, workflows, and organizational designs. As a result, companies must now regard DT not merely as a technical initiative, but as a fundamental strategic challenge. By transcending conventional operations, DT reveals extraordinary prospects for rapid growth, enhanced operational resilience, and lasting competitive edge. (Albinkhalil & Razzaque, 2021). Today, companies are interested in the digital strategies to be developed to deal with these new constraints, behaviours, and expectations (Soto-Acosta, 2020) and also to take advantage of them (Heinonen & Strandvik, 2020). Big data, artificial intelligence, cloud computing, social networks, and the Internet of Things are just a few examples of digital transformation technologies that provide fresh applications with a consumer-centric orientation. For businesses of all sizes, in all industries, and from all nations, the usage of these technologies has emerged as a critical problem (Büyüközkan & Göçer, 2018; Queiroz et al., 2019; Raut et al., 2018). In an increasingly competitive environment, the digital transformation of supply chain is today more necessary than ever. This phenomenon, which was born in 2000 years with the democratization of the Internet, has had a major impact on supply chain. The supply chain refers to the supply and delivery logistics chain. In principle, the rules of the supply chain were quite simple. Three groups of actors compose it: supplier, distributor, and customer, with a new actor to properly coordinate them and give consumers the best possible service, the logistics service provider must carefully assess the requirements, availability, and capacities of each link in the logistics and manufacturing chain. The supply chain's digital transformation is now more important than ever in a highly competitive economy. Profitability is one of the most crucial elements in the sourcing strategy, and the supply chain works up to this point were straightforward. Today, information flows are just as important as product movements, so businesses must adjust to the speed and accuracy of the data, which are crucial for achieving business goals. Thus, digital transformation and digitalization of information flow is a key element for businesses and become the keystone to being competitive in the market. (Albinkhalil & Razzaque, 2021) asserts that by employing the appropriate

method, the demands of the supply chain may be effectively met. However, executives and instructions for businesses on how to handle such drastic shifts are still lacking (Bygstad & Aanby, 2010; Chanias & Hess, 2016).

The paper aims to properly addressed the research questions below: How fundamentally does digitalization recalibrate the modern supply chain? What are the elements that affect the digital transformation of the supply chain? How does the digital supply chain affect business performance during COVID-19? Therefore, this study selects the manufacturing enterprises in Congo and explores the key factors that affect the digital transformation of the supply chain and their implications for business efficiency. By investigating a novel research facet in the context of COVID-19 in businesses, this study, therefore, contributes to theory, methodology, and practice research. The second half of the paper's structure explains the body of research on supply chain digitalization and its operational effectiveness for the business. An analysis of the digital supply chain and business performance during COVID-19 is presented in Section 3 of the theoretical framework. The PLS-SEM methods used in the investigation are described in Section 4 of the report. The study's findings and suggestions are discussed in Sections 5 and 6.

II. RELATED WORKS

Since the COVID-19 epidemic first appeared, digital transformation has become more significant in industrial businesses. The manufacturing enterprises now face some insurmountable risks as a result of COVID-19, including poor employee motivation, supply chain disruptions, detrimental effects on company prospects, import, and export, etc. (Gupta et al., 2021; Sharma et al., 2022). Multinational firms are increasingly interested in using technology to expand their reach or improve their performance, according to (Westerman, Bonnet, McAfee, 2014). The interaction with customers, internal processes, and value propositions are changing as a result of leaders in numerous sectors using developments in digital technology such as analytics, mobility, social media, and device intelligent systems as well as enhancing the usage of classic technologies such as ERP. In addition, (Stolterman & Fors, 2004), digital transformation is the change caused or affected by digital technology in all aspects of human life. Likewise (Bowersox, Drayer, 2005), digital transformation is the process of redesigning a business to automate activities and create wider supply chain connections. Reviving businesses that have effectively used the full power of technological information across the supply chain is the primary issue of the digital transformation of businesses.

III. OVERVIEW OF DIGITAL SUPPLY CHAIN FRAMEWORK

Although digital supply chain research started late, with the widespread use of digital technology, digital supply chain has gained more and more attention. (Wei, 2021) studied digital supply chain innovation driven by information technologies including AI and IOT data by integrating the supply chain industry and supply chain finance and provided an important theoretical basis for the innovation trend in procurement. The digital supply chain involves using technology to manage interactions with suppliers and customers, ultimately aiming to improve the overall capabilities and performance of the supply chain (Ehie & Ferreira, 2019; Yerpude et al., 2023). (Lee et al., 2022) further, emphasize that the digitalization doesn't just enhance supply chain performance but also contributes to overall organizational performance. In essence, adopting digital technologies in the supply chain can lead to improved efficiency and effectiveness both within the supply chain itself and for the organization as a whole (Schrauf, Berttram, 2016) pointed out that to adapt to the ever-changing environment and respond to changing customer needs, digital transformation has endowed the supply chain with massive flexibility, making its operating model much better. (Kache & Seuring, 2017) believe that digitization can not only improve supply chain agility, but also realize real-time information access and supply chain control, improve the availability of information, promote supply chain integration and collaboration, and improve supply chain availability, visibility, and transparency, optimize inter-company logistics, achieve effective management of inventory, improve operational efficiency. (Büyüközkan & Göçer, 2018) pointed out in their research that digitalization of the supply chain is the most discussed term t in the industry, and the various benefits that digitalization brings to the supply chain the more and more in practice and research.

IV. DRIVERS OF DIGITAL SUPPLY CHAIN

Digital environment

Whether a company's digital supply chain is successful depends on the environment in which it operates. The foundation upon which organizations build the supply chain's digital transformation is the digital internal environment. (Gao Shuncheng, 2013) mentioned in the research that the composition of the internal environment of the company has a great impact on the innovation capacity of companies. In addition, the firm's innovation strategy, appropriate organizational structure and business strategy, innovation culture, and ambiance are also unavoidable factors of enterprise innovation. (Accenture, 2018) considers fostering leadership,

formulating digital strategies, and creating agile organizations and a data-driven organizational culture as the most important tasks for digital transformation success.

According to (Lederer et al., 2017), digital strategy is essential in driving digital business transformation and overcoming the barriers faced by companies in the early stage of digital transformation. (Blatz F, Bulander R, Dietel M, 2018) identified four aspects of digital maturity, namely leadership.

Digital capacities

Improving companies' digital capabilities can not only help companies reduce costs, and improve productivity and competitiveness, but also digitally transform their supply chain. (Accenture, 2018) classifies an organization's digital capabilities into two categories: digital innovation and intelligent operation. The intelligent operation focuses on businesses' capacity to get practical insights from big data, which may serve as a solid foundation for strategic decision-making, continually enhance the customer experience, and support fundamental company operations. The capacity of businesses to exploit digital technology, improve the integration of business processes and digital technology, continually seek new market possibilities, and speed up product and service innovation are the main areas of focus for digital innovation. (Wamba et al., 2017) believe that not only information technology is driving supply chain digital transformation, but human capacity is also an important resource to support supply chain digital transformation.

V. RESEARCH METHODOLOGY

Survey instrument

The study used an online and offline questionnaire to survey Congo's manufacturing enterprises to evaluate the suggested research approach. The survey instrument was created to gather pertinent data from respondents on their comprehension and degree of implementation of the drivers of the supply chain's digital transformation and its influence on performance in their enterprises. features from the current studies were used to create the questionnaire. The questionnaire's first portion concentrated on gathering information about each responder individually, while the next two sections dealt with the digital environment and the scale of digital capabilities. A five-point Likert scale is utilised to collect responses for the fourth component, which asked for opinions on the performance of enterprise. By consulting with experts and implementing their suggestions, the survey instrument's content was verified.

Sample Selection and data collection

Data from manufacturing enterprises are gathered as part of the research using a sampling technique. To ensure that the data is real, senior corporate logistics managers with extensive expertise and experience in the industry have been hand-picked. The industry was chosen because it has established supply networks with knowledgeable supply chain specialists. Both online and offline approaches were used to gather the data. After removing the invalid replies, a total of 233 full responses were recorded out of a total of 250 responses.

SEM method

To validate a structural model with multiple relationships, this study employed structural equation modeling (SEM) instead of traditional statistical techniques, as recommended by (Lamba & Singh, 2018b). The analysis was conducted using Smart PLS version 3.0, which has been applied to various research problems across different industries. First, the measurement model's validity and robustness were checked, followed by the establishment of the model's goodness of fit, and finally, testing the hypothesis of the proposed structural model. While there is limited research on SEM applications in manufacturing companies, Previous studies have shown that the implementation of sustainable development practices can empower manufacturing companies (Büyüközkan & Göçer, 2018). The effect of digital capabilities on the connection between the digital environment and the digital supply chain was also underlined by (Agrawal et al., 2019). The relationship between supplier selection and collective performance for sustainable supply chains in manufacturing organizations, however, is still not supported by empirical data. Digital capabilities positively influence digital supply chain transformation, which in turn mediates the relationship between digital capabilities and business performance.

Table 1 Basic information on sample distribution

Project	Level	Frequency	Percentage
Company's operating time	3 years or less	35	15.09%
	3-5 years	68	29.31%
	5-10 years	84	36.21%
	10 years and above	45	19.40%
Total annual income	100 million below	45	19.40%
	100-500 million	106	45.69%
	500-2000 million	54	23.28%

	2000 million and above	27	11.64%
Number of employees	10 people below	11	4.74%
	10-50 people	64	27.59%
	50-300 people	98	42.24%
	300 people and above	59	25.43%
Working hours in the company	Within 1 year	31	13.36%
	1-3 years	69	29.74%
	3-5 years	87	37.50%
	5 years and above	45	19.40%
Position	Junior employees	94	40.52%
	Department manager	62	26.72%
	Middle manager	54	23.28%
	Top manager	22	9.48%

VI. METHODOLOGICAL FRAMEWORK

The methodological framework of this study was designed to systematically explore the effect of digital advancement of supply chain management on business performance during the COVID-19 pandemic. A quantitative, survey-based research design was adopted, targeting senior logistics managers in Congolese manufacturing firms, yielding 233 valid responses. The framework consisted of several sequential stages: first, research design and instrument development based on validated scales from prior literature; second, data collection through structured questionnaires administered to decision-makers with direct knowledge of supply-chain practices; third, measurement model assessment to ensure efficiency of constructs, using Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), and discriminant validity tests such as HTMT; fourth, structural model evaluation employing Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the hypothesized relationships (H1–H4), including estimation of path coefficients, R^2 values, and significance levels through bootstrapping; and finally, mediation analysis to assess the indirect effects of the digital environment and digital capabilities on business performance via digital supply chain transformation.

This structured methodological framework ensures both rigor and transparency, enabling robust testing of the theoretical model and generating credible insights into digital supply chain transformation in an underexplored African context.

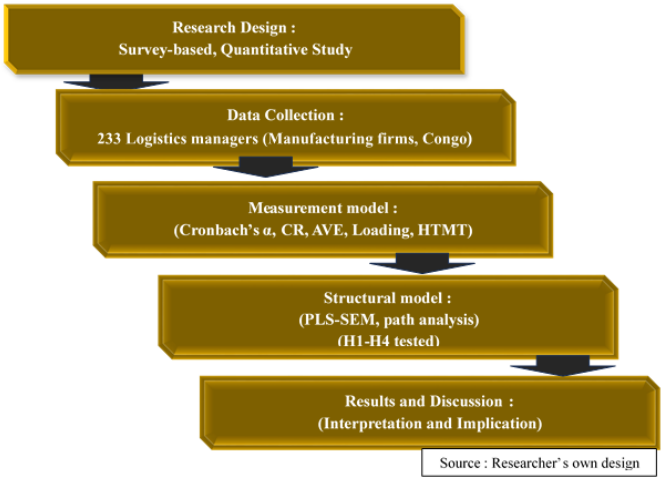

Figure 1: illustrates the methodological framework of the study

VII. RESULTS AND ANALYSIS

Relevant Indicators for Measuring Reliability

Cronbach's alpha coefficient

Reliability is used to test the consistency and stability of the results. The coefficient measures the correlation of the common factors between the variables stability. Different researchers have different standards for the interval of the α value for judging the reliability of the measurement results. A widely used standard is: when the α value is greater than 0.7, it means that the reliability is very high; when the α value is between 0.7 And 0.35 is acceptable, and less than 0.35 is low reliability.

Combination reliability

Another index to measure reliability is combined reliability, whose value is used to evaluate the internal consistency degree of a set of potential measurement indicators, that is, the combination reliability of all measurement indicators sharing corresponding constructs is high, indicating the internal consistency between measurement indicators. On the contrary, if the combination reliability is low, the internal correlation between the measurement indicators is low, and the consistency between the measurement indicators is not high. The calculation of combined reliability requires confirmatory factor analysis of the data to obtain the standard loading of each measured item. Combination reliability is generally required to be greater than 0.7

Relevant Indicators for Measuring Validity

Validity is a measure of the validity of the measurement it is paramount index to analyse the quality of the measurement. The validity of the measurement means whether the results of the measurement can certainly reflect the goals of the measurement. Construct validity is sometimes the most challenging issue to be resolved in empirical research. Validity is separated into three categories: content validity, criterion validity, and construct validity. Convergent validity and discriminant validity are the two forms of concept validity. Items within the same notion have a strong correlation with one another when there is convergent validity. Items in various ideas have little to no link with one another, which is referred to as discriminant validity.

Other methods

The root means square of the mean-variance extraction value of each component and the correlation coefficient between the factor and other factors may also be used to determine discriminant validity. When the average variance extraction value for each item's root mean square is higher than the correlation coefficient between that factor and other factors, the scale is said to have excellent discriminant validity.

Scale reliability and validity analysis

Each variable's Cronbach's coefficient is calculated in the following table, and each factor's Cronbach's coefficient is more than 0.7. The scale can be regarded as having excellent reliability based on Cronbach's value judgment interval. The table also displays the average variance extraction (AVE) and combined reliability (CR) values for each construct, with CR values greater than 0.7 indicating good composite reliability. The table also displays the standard loading of the measurement items in the relevant variables in the confirmatory factor analysis. The scale has strong convergent validity since each variable's AVE is higher than 0.5 at the same time.

Table 2 Scale basic information

	Cronbach's Alpha	Combination reliability	Average Extracted Variation (AVE)
Business performance	0.889	0.923	0.75
Digital capability	0.882	0.919	0.738
Digital environment	0.932	0.952	0.832
Digital supply chain	0.846	0.889	0.616

The AVE and Pearson correlation coefficient, whose values are displayed in the table below as well as the square root of the AVE, may also be used to compare the discriminant validity of the scale. Since its AVE square root value for business performance is 0.866, which is higher than the highest absolute value of the correlation coefficient between variables of 0.791, it has exceptional discriminant validity. Its AVE square root score of 0.859 for digital competence, which is higher than the highest absolute value of the correlation coefficient between variables of 0.795, is evidence that it has strong discriminant validity. With an AVE square root value for the digital environment of 0.912, greater than the greatest absolute value of the correlation coefficient between variables of 0.512, it has excellent discriminant validity.

Table 3 Discriminant validity scale

	Business performance	Digital capability	Digital environment	Digital supply chain
Business performance	**0.866**			
Digital capability	0.79	**0.859**		
Digital environment	0.791	0.795	**0.912**	
Digital supply chain	0.597	0.519	0.512	**0.785**

Each measuring item's loading on each factor is more than 0.7, as can be observed from the factor loading, demonstrating the variables' strong convergent and discriminant validity.

Table 3 reports the results of the discriminant validity test using the Fornell–Larcker criterion, which compares the square root of the Average Variance Extracted (AVE) for each construct

(shown on the diagonal in bold) with the correlations between that construct and all other constructs in the model. The results confirm that the measurement model meets the requirements for discriminant validity. Specifically, the square root of AVE for business performance (0.866) is higher than its correlations with digital capability (0.79), digital environment (0.791), and digital supply chain (0.597). Similarly, the square root of AVE for digital capability (0.859) is greater than its correlations with business performance (0.79), digital environment (0.795), and digital supply chain (0.519). The digital environment construct demonstrates the strongest discriminant validity, with a square root of AVE value of 0.912, which exceeds its correlations with digital capability (0.795), business performance (0.791), and digital supply chain (0.512). Finally, the digital supply chain construct also satisfies the criterion, with a square root of AVE of 0.785, which is higher than its correlations with digital capability (0.519) and digital environment (0.512).

Taken together, these results indicate that each construct shares more variance with its own measurement items than it does with the items of other constructs, thereby confirming that the constructs are conceptually and empirically distinct. This is an important outcome, as discriminant validity ensures that the constructs in the model are not only theoretically justified but also empirically separable, which is essential for avoiding multicollinearity and for supporting the structural equation modeling (SEM) analysis. In addition to discriminant validity, the model also demonstrates strong convergent validity, since all item loadings exceeded the recommended 0.70 threshold. High loadings suggest that each observed variable is a good indicator of its respective latent construct, and the AVE values are above the commonly accepted threshold of 0.50, further confirming that a substantial proportion of variance is explained by the constructs. The combination of convergent and discriminant validity provides robust evidence that the measurement model is reliable and well-specified, which strengthens confidence in the subsequent hypothesis testing.

Table 4 Factor loading information

	Business performance	Digital capability	Digital environment	Digital supply chain
business performance	**0.923**	0.725	0.755	0.55
business performance	**0.821**	0.661	0.666	0.463
business performance	**0.851**	0.684	0.644	0.487
business performance	**0.867**	0.667	0.672	0.561
digital capability	0.633	**0.817**	0.66	0.412
digital capability	0.669	**0.873**	0.668	0.401
digital capability	0.664	**0.864**	0.73	0.451
digital capability	0.739	**0.881**	0.674	0.505
digital environment	0.691	0.717	**0.905**	0.472
digital environment	0.721	0.722	**0.891**	0.426
digital environment	0.725	0.717	**0.91**	0.432
digital environment	0.749	0.744	**0.941**	0.526
digital supply chain	0.503	0.422	0.416	**0.825**
digital supply chain	0.466	0.39	0.397	**0.811**
digital supply chain	0.354	0.277	0.298	**0.732**
digital supply chain	0.455	0.368	0.37	**0.807**
digital supply chain	0.526	0.522	0.485	**0.747**

VIII. FUNDAMENTALS OF STRUCTURAL EQUATION MODELING

This research uses Smart PLS3.0 to draw the model structure diagram and run related programs, aiming to verify the research hypothesis of the model through data model analysis, calculation, and analysis of each path coefficient and

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significance coefficient. The specific model is shown in the model structure diagram below. The blue circles are latent variables, which are the main hypothetical variables for constructing the model in this paper. The small yellow rectangles are observed variables, that is, the measurement items, which constitute the main part of the questionnaire data collection.

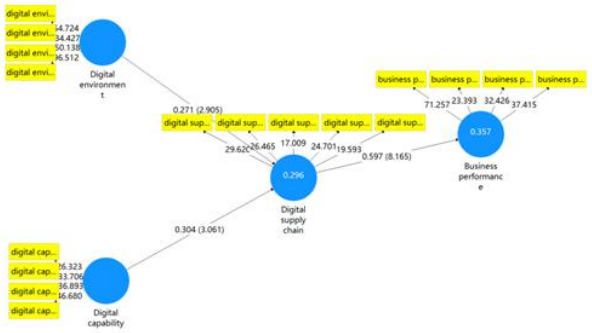

Figure 2 SEM-PLS diagram

Path Analysis and Inspection

Table 5 Path coefficient table

	Initial sample (O)	Sample mean (M)	Standard Deviation (STDEV)	T-statistic (|O/STDEV|)	P value	
Digital capability -> Digital supply chain	0.304	0.301	0.101	3.015	0.003	
Digital environment -> Digital supply chain	0.271	0.277	0.096	2.82	0.005	
Digital supply chain -> Business performance	0.597	0.599	0.074	8.086	0	

From the test results of the path coefficient, it can be seen that the initial sample from Digital capability to Digital supply chain is 0.304, the standard deviation is 0.101, and it is significant at the confidence level of 0.01. The initial sample from the digital environment to digital supply chain is 0.271, the standard deviation is 0.096, and it is significant at the 0.01 confidence level. The initial sample from digital supply chain to Business performance is 0.597, the standard deviation is 0.074 and it is significant at the 0.001 confidence level.

IX. MEDIATION EFFECT ANALYSIS

Table 6 Mediating effect test

	Initial sample (O)	Sample mean (M)	Standard Deviation (STDEV)	T-statistic (|O/STDEV|)	P value
Digital capability -> Digital supply chain -> Business performance	**0.181**	0.183	0.072	2.527	0.012
Digital environment -> Digital supply chain -> Business performance	**0.162**	0.168	0.067	2.404	0.016

From the mediation effect test in Table 6, it can be seen that the initial sample from the digital capability to business performance through the digital supply chain is 0.181, and P is less than 0.05, indicating that there is a mediating effect, and the mediating effect is significant. The initial sample from the digital environment to business performance through the digital supply chain is 0.162, and P is less than 0.05, indicating that there is a mediating effect, and the mediating effect is significant.

Table 7 Summary Results

Hypothesis	Validation results
H_1: Digital environment positively influences supply chain	Established

H_2: Digital capabilities positively influences digital supply chain	Established
H_3: Digital supply chain positively influences business performance	Established
H_4: The intersection between the digital environment and digital supply chain is positively influenced by digital capabilities	Established

X. DISCUSSION

This study examined the drivers of digital supply chain transformation and its impact on business performance in Congolese manufacturing firms. Grounded in organizational information processing theory and dynamic capabilities theory, the findings provide empirical support for the critical roles of both the digital environment and digital capabilities in enabling supply chain digitalization, which in turn enhances firm performance.

The discussion is structured around three themes: (1) drivers of digital supply chain transformation, (2) performance advantages of digitalized supply chains, and (3) theoretical contributions and innovations, followed by managerial implications.

Drivers of Digital Supply Chain Transformation

The analysis highlights that both digital environment and digital capabilities are essential enablers of supply chain digitalization.

Driver	Key Insights	Supporting Evidence
Digital Environment	Provides the infrastructure, strategic direction, and cultural support needed for transformation.	Leaders' commitment, clear digital strategy, and supportive organizational culture are prerequisites (cf. Talis Group case).
Digital Capabilities	Represent firms' internal ability to integrate digital tools into processes, enabling agility, responsiveness, and precision.	Firms can harness real-time data to forecast demand, reduce information asymmetry, and strengthen integration across partners.
Interaction Effect	Digital capabilities amplify the influence of the digital environment on supply chain transformation.	Consistent with Büyüközkan & Göçer (2018) and Wang et al. (2015), investment in digital skills and technology facilitates cross-firm communication and cooperation.

These results reinforce that digital transformation is not purely technology-driven but requires both conducive external conditions and strong internal resources.

XI. ADVANTAGES OF DIGITAL SUPPLY CHAINS

Empirical evidence from this study confirms that digital supply chain transformation significantly improves business performance. This aligns with Haddud & Khare (2020), who argue that digitalization enhances quality, flexibility, and cost control.

Key Advantages Identified:

- Improved product and service quality.
- Reduced inventory and transportation costs.
- Enhanced supply chain visibility and integration.
- Increased agility and responsiveness to changing market demands.
- Capacity to deliver personalized offerings with greater accuracy.

These outcomes demonstrate that digital supply chains outperform traditional models by embedding resilience and adaptability into operations.

Theoretical Contributions and Innovations

This study offers several contributions:

- Theoretical Integration – By combining organizational information processing theory with dynamic capabilities, the study develops a comprehensive framework explaining how environmental and capability-based factors jointly shape digital supply chain transformation.
- Methodological Contribution – The use of a questionnaire survey and PLS-SEM provides empirical rigor, validating

the proposed framework in an African manufacturing context that is underrepresented in prior research.

- Contextual Insight – The study confirms that supply chain digitalization is not merely technological adoption but involves restructuring business models, organizational structures, and processes to strengthen competitiveness and responsiveness.

Managerial Implications

The findings offer important guidance for both manufacturing firms and policymakers, emphasizing that supply chain digitalization should be treated as a long-term strategic priority supported by a clear digital vision, phased transformation roadmap, and a culture that fosters digital adoption. Simplifying organizational structures and promoting digital literacy across the workforce can accelerate this transition, while investments in employee training, digital talent, and the integration of advanced technologies into business processes are crucial for building strong digital capabilities. Such capabilities enable greater agility, real-time decision-making, and more effective collaboration with supply chain partners. Furthermore, digital supply chains provide tangible operational benefits, including more accurate demand forecasting, personalized offerings, cost reduction, improved visibility, and enhanced supply chain integration. Recognizing digital transformation as an ongoing process rather than a one-off initiative ensures that firms remain adaptive, resilient, and competitively positioned to respond to crises and rapidly evolving market dynamics.

XII. CONCLUSION

This study examined 233 Congolese manufacturing firms to explore how digital supply chain transformation influences business performance during the COVID-19 pandemic. Drawing on organizational information processing theory and the dynamic capabilities perspective, a theoretical framework was developed and tested through survey data and PLS-SEM analysis. The findings reveal that both the digital environment and digital capabilities significantly enhance digital supply chain transformation, which in turn exerts a strong positive effect on business performance. Mediation analysis further confirms that digital supply chain transformation is the mechanism through which environmental and capability factors translate into improved performance. Theoretically, this research enriches the emerging literature on supply chain digitalization by clarifying how digital transformation involves not only the adoption of technologies but also the restructuring of business models, processes, and organizational structures to foster agility and competitiveness. The framework highlights the critical role of environmental conditions—such as infrastructure, strategy, and innovation culture—in shaping transformation outcomes, thereby extending the explanatory power of dynamic capabilities theory in supply chain contexts. Practically, the study underscores the need for manufacturing firms to build robust internal digital skills while operating within supportive external environments to sustain growth in turbulent conditions. Nonetheless, several limitations remain. Data collection was constrained by pandemic disruptions, and the study did not capture the operational challenges of implementing advanced technologies such as AI, blockchain, and robotics. Moreover, the reliance on data from larger firms limits generalizability, leaving questions about the applicability of the framework to small and medium-sized enterprises. Future research should therefore adopt longitudinal and comparative approaches, explore implementation barriers, and assess the transferability of the model across firm sizes and industries.

In summary, the study demonstrates that digital supply chain transformation is not only a strategic response to crisis but also a long-term enabler of resilience and superior performance, offering both scholarly contributions and actionable guidance for managers and policymakers.

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