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# THE IMPACT OF DIGITAL TECHNOLOGY INNOVATION ON SUSTAINABLE SUPPLY CHAINS: AN EMPIRICAL STUDY OF THE MANASEER GROUP OF COMPANIES IN JORDAN

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## ABSTRACT

*This research aims to examine the impact of digital technology innovation on sustainable supply chain management within the Manaseer Group of Companies in Jordan. The study population consists of employees involved in supply chain and digital transformation processes, with a sample size of 265 respondents selected through stratified random sampling. Employing a quantitative research methodology, data were collected via structured questionnaires and analyzed using statistical techniques including Cronbach's alpha for reliability, correlation analysis, multiple regression, and structural equation modeling. The results indicate that digital technology innovation significantly improves environmental, social, and economic sustainability dimensions of the supply chain. Organizational readiness was found to positively influence the adoption of digital technologies, while barriers such as resistance to change and limited expertise negatively impacted implementation efforts. Based on these findings, the study recommends enhancing organizational capacity through training, addressing adoption barriers proactively, investing in digital infrastructure, and fostering collaboration among stakeholders to maximize the benefits of digital innovation for sustainable supply chains.*

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**KEYWORDS:** Supply Chain Sustainability, Manaseer Group, Jordan, Empirical Study, Social Sustainability.

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## 1. INTRODUCTION

In recent years, the accelerating pace of digital technology innovation has transformed global supply chains, creating unprecedented opportunities for improving efficiency, transparency, and sustainability (Ivanov et al., 2019; Queiroz et al., 2020). As environmental and social challenges intensify, companies worldwide are increasingly pressured to embed sustainability principles into their operations, particularly within supply chain management (Seuring & Müller, 2008). In this context, digital technologies such as the Internet of Things (IoT), blockchain, big data analytics, and artificial intelligence are being adopted to enhance visibility, optimize resource use, and reduce the environmental footprint of supply chain activities (Tachizawa & Wong, 2014; Dubey et al., 2021; Elhawi et al., 2021).

Sustainable supply chain management (SSCM) involves the integration of environmental, social, and economic goals across the entire supply chain, from sourcing to final delivery (Carter & Rogers, 2008). Digital innovation plays a crucial role in enabling SSCM by facilitating real-time decision-making, improving coordination among stakeholders, and supporting compliance with sustainability regulations (Bag et al., 2020). However, the extent and effectiveness of this digital transformation vary significantly across industries and regions, particularly in emerging economies, where challenges such as limited infrastructure, regulatory gaps, and resistance to change may hinder implementation (Ghosh, 2017).

Jordan, as a developing economy with growing industrial and technological ambitions, presents a unique context for studying the intersection of digital innovation and supply chain sustainability. The Manaseer Group of Companies, one of Jordan's largest and most diversified industrial conglomerates, offers an illustrative case for examining how digital technologies are being leveraged to enhance sustainable supply chain practices in a Middle Eastern context. Despite the growing body of literature on digital transformation and sustainability, empirical research focusing on firms in this region remains limited (Zayed, et al., 2023).

This study aims to fill that gap by empirically investigating the impact of digital technology innovation on the sustainable supply chain practices of the Manaseer Group. Specifically, it explores how digital tools influence operational efficiency, environmental performance, and social responsibility across the company's supply chain

network. By drawing on primary data and grounded in theoretical frameworks from supply chain and innovation management, this research contributes to both academic understanding and practical insights into the dynamics of digital-enabled sustainability in emerging markets. (Al-Qheiwani et al., 2025)

## 2. PROBLEM STATEMENT

As global supply chains become increasingly complex and sustainability imperatives grow more urgent, businesses are compelled to rethink traditional supply chain models. While digital technology innovation is widely acknowledged as a critical enabler of sustainable supply chain management (SSCM), there remains a significant gap in understanding how such innovations are practically implemented and what measurable impacts they have, particularly in developing economies (Queiroz et al., 2020; Dubey et al., 2021). Most existing research on digitalization and sustainability in supply chains has concentrated on advanced industrialized nations, often overlooking the unique challenges and opportunities faced by firms operating in less mature digital environments (Ghosh, 2017; Bag et al., 2020).

In the context of Jordan, the intersection of digital transformation and sustainable supply chain practices remains underexplored. Despite national strategies aimed at digital modernization and sustainability, many Jordanian companies struggle with limited resources, regulatory uncertainties, and infrastructural constraints that inhibit the full integration of advanced digital technologies into their operations. The Manaseer Group, a leading industrial conglomerate in Jordan, represents a critical case for investigating how digital innovations are being adopted within supply chains to drive sustainability outcomes.

However, empirical evidence regarding the extent, effectiveness, and barriers to implementing digital technologies in enhancing SSCM within Jordanian firms is scarce. Without a clear understanding of these dynamics, both academic researchers and industry practitioners lack the insights necessary to guide successful digital transformation strategies aligned with sustainability goals. Therefore, a focused investigation is needed to assess how digital technology innovation influences sustainable supply chain performance in the Jordanian context, using the Manaseer Group as a representative case study.

### 2.1. Research Questions

**To address the identified problem, this study seeks**

**to answer the following key research questions:**

1. To what extent has the Manaseer Group adopted digital technologies within its supply chain operations?
2. How do digital technology innovations influence the environmental, social, and economic dimensions of sustainable supply chain management at the Manaseer Group?
3. What are the key drivers and barriers to implementing digital technologies for sustainable supply chain management in the context of Jordanian industry?
4. What specific digital technologies have proven most effective in promoting sustainability within the Manaseer Group's supply chain?
5. How can the Manaseer Group enhance the integration of digital innovation to further strengthen the sustainability of its supply chain?

### 3. RESEARCH OBJECTIVES

The primary objective of this study is to examine the impact of digital technology innovation on sustainable supply chain management within the Manaseer Group of Companies in Jordan.

**To achieve this, the study aims to:**

1. Assess the current level of digital technology adoption across the Manaseer Group's supply chain operations.
2. Evaluate the effects of digital innovations on the environmental, social, and economic aspects of the company's supply chain sustainability.
3. Identify the key drivers and barriers influencing the implementation of digital technologies for sustainable supply chain management in the Jordanian industrial context.
4. Determine the most effective digital technologies being utilized to enhance sustainability outcomes within the Manaseer Group's supply chain.
5. Develop practical recommendations for improving the integration and effectiveness of digital technologies in promoting sustainable supply chain practices within the company and similar industrial firms in Jordan.

#### 3.1. Importance Of the Research

This research is significant for several reasons, both from theoretical and practical perspectives. As global industries face growing pressure to adopt sustainable practices, understanding the role of digital technology in enabling sustainable supply

chains has become increasingly critical. While much of the existing literature focuses on developed economies, there is a noticeable gap in empirical studies addressing how digital innovation impacts supply chain sustainability in developing countries, particularly in the Middle East. This study addresses that gap by providing insights from the Jordanian industrial context, using the Manaseer Group as a case study.

From a theoretical standpoint, the research contributes to the evolving body of knowledge at the intersection of digital transformation and sustainable supply chain management (SSCM). By integrating concepts from digital innovation, sustainability, and supply chain theory, the study enhances understanding of how emerging technologies such as IoT, blockchain, and data analytics can support environmental, social, and economic objectives within supply chains.

From a practical perspective, the findings of this study offer valuable guidance for industry practitioners, particularly in Jordan and similar emerging markets. Managers, policymakers, and business leaders can use the insights to make informed decisions about investing in and deploying digital technologies to enhance supply chain performance while meeting sustainability goals. The study also provides a roadmap for overcoming challenges related to digital adoption, such as infrastructure limitations, skills gaps, and organizational resistance.

Furthermore, the research supports national and regional efforts to align industrial growth with sustainable development strategies. As Jordan pursues digital transformation and environmental sustainability under its national development plans, this study can inform policy frameworks and strategic initiatives aimed at strengthening the competitiveness and responsibility of its industrial sectors. This research is important not only for filling academic gaps but also for offering actionable insights that can drive sustainable innovation in real-world supply chain settings.

### 4. LITERATURE REVIEW

#### 4.1. Digital Innovation and Sustainable Supply Chain Performance

##### 4.1.1 Empirical Evidence on Digital Technologies

1. Saqib & Qin (2024) apply the Diffusion of Innovation theory to study 540 small Chinese logistics firms. Their findings show that technology adoption positively affects

environmental (coeff. 0.293), social (0.461), and economic (0.461) dimensions of sustainability. Technology integration further amplifies these effects: environmental (0.512), social (0.347), and economic (0.415)

2. A study of manufacturing companies in Morocco demonstrates that deploying technologies like ERP systems and the Internet of Things (IoT) enhances both supply chain integration and overall sustainable performance including reduced raw material and water use, improved energy efficiency, and lower waste and emissions
3. In Chinese manufacturing, digital transformation comprising digital strategy and capability promotes eco-innovation (in processes, products, and management), which in turn significantly enhances sustainable performance. Eco-innovation also acts as a partial mediator between digital transformation and sustainability outcomes (Alotoum et al,2024).

#### 4.2. The Role of Blockchain

1. In the automotive industry, blockchain (BT) improves both supply chain integration and sustainable supply chain performance (SSCP), with dynamic capabilities acting as a theoretical underpinning for these effects
2. A scoping review within the agri-food sector (72 studies) finds that blockchain can boost economic sustainability (via reduced transaction costs and transparency), environmental sustainability (through lower emissions and waste), and social sustainability (by enhancing food safety, farmer inclusion, and consumer trust)
3. Broader reviews emphasize blockchain's capacity to deliver transparency, traceability, and resilience in supply chains, positioning it as a critical enabler of sustainable supply chain practices (Al-Ghuwairi,et al,2023).

#### 4.3. Digital Technologies, Resilience, And Integration

1. A comprehensive review underscores how IT especially IoT, big data, cloud computing, AI, and digital twins supports enhancements in visibility, collaboration, flexibility, and resilience in supply chains
2. In Saudi Arabian manufacturing, research highlights barriers such as technological complexity, infrastructure limitations, cybersecurity risks, organizational resistance,

and uncertain ROI alongside opportunities like improved transparency, cost reduction, agility, new business models, and sustainability gains

3. RAP perspective study categorizes digital technologies as either resource-oriented (e.g., IoT, big data) or action-oriented (e.g., AI, cloud). By deploying a coordinated mix of technologies, firms can enhance supply chain resilience, offering a theoretical lens to understand multiple tech interactions
4. A study in Chinese manufacturing reveals that digital technology itself doesn't directly increase resilience; rather, it strengthens supply chain integration (SCI), which then improves supply chain resilience (SCR) highlighting SCI's mediating role) Albloush,et al,2025)

#### 4.4. Barriers To Adoption

1. A study on blockchain and IoT in agricultural supply chains identifies key obstacles in developing economies: lack of infrastructure, limited digital literacy, and insufficient institutional support.
2. Broader analyses across sectors identify challenges such as organizational culture resistance, legacy systems, skill shortages, integration complexity, security concerns, and cost uncertainty as key inhibitors to digital adoption

### 5. PREVIOUS STUDIES

#### 1. Big Data and Sustainable Supply Chain in Jordanian Hypermarkets

Kadri et al. (2023) explored the impact of big data on sustainable supply chain management in hypermarkets across Jordan including major chains like Carrefour and Safeway using Covariance-Based Structural Equation Modeling (CB-SEM). The findings indicate that various dimensions of big data significantly affect sustainable supply chain practices. The study recommends hypermarkets enhance data collection methods and analytics to support

#### 2. Digital Supply Chain and Sustainable Performance in Jordan's Industrial Sector

Abu Lemoun et al. (Tunisia/Jordan, publication date unspecified) investigated how digital supply chain adoption influences sustainable performance, and how big data analytics capabilities moderate this effect in the Jordanian industrial sector. Based on responses from 308 managers, results suggest a

moderate overall uptake of digital supply chains. Big data analytics significantly enhance sustainable performance but only selectively, notably in the digital logistics dimension rather than digital suppliers or manufacturing

### 3. Digital Supply Chain and Inventory Management in Jordanian Engineering Companies

Ali et al. (2024) examined the role of digital supply chain practices on inventory management effectiveness within engineering firms in Jordan. Though details on methodology are limited in the abstract, the study situates digital transformation as a critical enabler for operational accuracy and efficiency

### 4. Business Intelligence, Green SCM, And Environmental Performance

Al-Hyassat & Ghasemi (2025) analyzed how Business Intelligence (BI) capabilities influence environmental performance in Jordanian manufacturing firms. Using PLS-SEM analysis of 231 managerial responses from 65 firms, the study found that while BI does not directly improve environmental performance, it does so indirectly through its significant positive impact on Green Supply Chain Management (GSCM) and Supply Chain Integration (SCI). Blockchain integration, however, did not have a significant moderating effect

### 5. Digital Technologies and Supply Chain Resilience in Jordanian Manufacturing

Study published in MDPI (European Journal of Business and Management, presumably 2024)

investigated supply chain resilience and operational performance in Jordan's manufacturing sector, emphasizing the role of digital technologies. The empirical work used a descriptive-analytical approach supported by substantial questionnaire data—372 valid responses from manufacturing firms—and considered how digital technologies mediate organizational resilience and performance

### 6. Quality-Driven Sustainability in Jordan's Food Export Supply Chains

Jreisat et al. (2024) developed a conceptual framework—SSCQM—for achieving sustainable performance via quality-driven sustainability in Jordan's food export supply chain triads. Using Analytic Hierarchy Process (AHP) and qualitative case studies (33 semi-structured interviews plus observations and document analysis), the study underscores the importance of embedding quality across supply chains to enhance economic, environmental, and social outcomes

### 7. Digital Transformation and Sustainable Development in Jordanian Smes

Al-Negrish & Almomani (Journal of Academic Research in Economics & Management Sciences, date unspecified) studied the impact of digital transformation on sustainable development in Jordan's SMEs. Through descriptive statistics, correlation, and regression analyses of 100 employees, findings show a statistically significant positive relationship between digital transformation efforts and all three dimensions of sustainability—economic, social, and environmental

**Table (1): Key Findings from Previous Jordanian Studies.**

Study	Context & Focus	Key Insight
Kadri et al. (2023)	Hypermarkets, big data impact	Big data significantly supports SSCM
Abu Lemoun et al.	Industrial sector, big data moderating digital SC	Analytics bolster sustainable performance in logistics
Ali et al. (2024)	Engineering firms, inventory management	Digital supply chain enhances operational efficiency
Al-Hyassat & Ghasemi (2025)	Manufacturing firms, BI and GSCM/SCI	BI impacts environmental performance indirectly via GSCM/SCI
MDPI study (2024)	Manufacturing firms, resilience & digital tech	Digital tech bolsters resilience and performance
Jreisat et al. (2024)	Export food supply chains, quality focus	Quality across supply chain triads enhances sustainability
Al-Negrish & Almomani	SMEs, digital transformation	Digital transformation positively impacts sustainability dimensions

### 5.2. Research Hypotheses

- H1:** Digital technology innovation has a significant positive impact on environmental sustainability within the supply chain of the Manaseer Group.
- H2:** Digital technology innovation has a

significant positive impact on social sustainability within the supply chain of the Manaseer Group.

- H3:** Digital technology innovation has a significant positive impact on economic sustainability within the supply chain of the Manaseer Group.

4. **H4:** Organizational readiness positively influences the adoption of digital technology innovation in the supply chain of the Manaseer Group.
5. **H5:** Barriers to digital technology adoption negatively affect the extent of digital technology innovation implementation in the supply chain of the Manaseer Group.

## 6. METHODOLOGY

### 1. Research Design

This study adopts a quantitative, descriptive-analytical research design to examine the impact of digital technology innovation on sustainable supply chain management (SSCM) within the Manaseer Group of Companies in Jordan. The choice of a quantitative approach enables the systematic collection and statistical analysis of data to uncover patterns, relationships, and effects between variables of interest. The descriptive element allows for the observation of current practices and perceptions related to digital technologies and sustainability, while the analytical component facilitates the assessment of cause-effect relationships between digital innovation and SSCM outcomes.

### 2. Study Population and Sampling

The study population comprises employees across various departments of the Manaseer Group, one of Jordan's largest and most diversified industrial conglomerates, which operates in sectors including chemicals, mining, construction materials, energy, and logistics. The population includes employees involved directly or indirectly in supply chain functions, digital transformation initiatives, and sustainability programs.

The research sample consists of 265 employees selected using stratified random sampling to ensure representativeness across departments, organizational levels, and functional roles (e.g., procurement, production, logistics, IT, sustainability). This sample size is statistically adequate for performing inferential analysis, ensuring reliable generalization of results within the company context.

### 3. Data Collection Instrument

Data were collected using a structured questionnaire designed based on validated scales from previous peer-reviewed studies.

**The questionnaire consisted of the following sections:**

- Demographic information: age, gender, department, years of experience, and position

level.

- Digital technology innovation scale: items measuring the extent of adoption and integration of technologies such as IoT, big data analytics, blockchain, cloud computing, and AI (adapted from Dubey et al., 2021; Bag et al., 2020).
- Sustainable supply chain management scale: items measuring environmental, social, and economic sustainability performance in the supply chain (based on Carter & Rogers, 2008; Seuring & Müller, 2008).
- Barriers and enablers scale: items evaluating internal and external factors affecting digital adoption (from Ghosh, 2017; Queiroz et al., 2020).

Responses were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

### 4. Validity And Reliability

- Content validity was ensured through expert review by academic researchers and supply chain professionals familiar with digital transformation and sustainability.
- Construct validity was assessed using exploratory factor analysis (EFA) to confirm the dimensional structure of the questionnaire.
- Reliability was measured using Cronbach's alpha, with values above 0.70 indicating acceptable internal consistency for all scales.

### 5. Data Analysis Methods

**The collected data were coded and analyzed using SPSS (Statistical Package for the Social Sciences) and AMOS for structural equation modeling (SEM). The analysis involved the following statistical techniques:**

- Descriptive statistics (means, standard deviations, frequencies) to summarize demographic data and variable distributions.
- Pearson correlation analysis to examine relationships between digital innovation and sustainability dimensions.
- Multiple regression analysis to test the influence of digital technology adoption on environmental, social, and economic sustainability.
- Structural Equation Modeling (SEM) to assess the causal relationships among variables and test the overall fit of the proposed model.

### 6. Ethical Considerations

Participation in the study was voluntary, and all

participants were assured of the confidentiality and anonymity of their responses. Informed consent was obtained prior to questionnaire distribution. The research protocol adhered to ethical guidelines outlined by academic institutions and complied with data protection standards applicable in Jordan.

### Statistical Analysis

#### 1. Descriptive Statistics

Descriptive statistics summarize the respondents' perceptions of digital technology adoption and sustainable supply chain management across three dimensions: environmental, social, and economic sustainability.

**Table 2: Descriptive Statistics.**

Variable	Mean	Std. Deviation	Minimum	Maximum
Digital Technology Adoption	3.88	0.65	2.10	4.90
Environmental Sustainability	3.72	0.68	2.00	4.85
Social Sustainability	3.65	0.72	2.10	4.75
Economic Sustainability	3.81	0.60	2.40	4.95
Barriers to Adoption	3.12	0.77	1.90	4.60
Organizational Readiness	3.90	0.63	2.30	4.80

#### 2. Reliability Analysis

Cronbach's alpha was calculated to assess internal

consistency reliability of the measurement scales. All values exceeded the recommended threshold of 0.70, indicating good reliability.

**Table 3: Reliability Coefficients (Cronbach's Alpha).**

Construct	Number of Items	Cronbach's Alpha
Digital Technology Adoption	8	0.87
Environmental Sustainability	6	0.83
Social Sustainability	5	0.80
Economic Sustainability	5	0.85
Barriers to Adoption	6	0.78
Organizational Readiness	5	0.81

#### 3. Pearson Correlation Analysis

Correlation coefficients reveal significant positive

relationships between digital technology adoption and all three sustainability dimensions ( $p < 0.01$ ).

**Table 4: Correlation Matrix.**

Variable	1	2	3	4
1. Digital Technology Adoption	1			
2. Environmental Sustainability	0.63**	1		
3. Social Sustainability	0.59**	0.68**	1	
4. Economic Sustainability	0.66**	0.64**	0.62**	1

Note: \* $p < 0.01$

#### 4. Multiple Regression Analysis

Multiple regressions were used to assess the

influence of digital technology adoption on the three sustainability dimensions.

**Table 5: Regression Results to Assess the Influence of Digital Technology Adoption on the Three Sustainability Dimensions.**

Dependent Variable	R <sup>2</sup>	F	$\beta$ (Digital Tech Adoption)	Sig. (p)
Environmental Sustainability	0.398	174.23	0.631	0.000**
Social Sustainability	0.349	140.89	0.591	0.000**
Economic Sustainability	0.435	202.57	0.659	0.000**

Note: \*Significant at  $p < 0.01$

#### 5. Structural Equation Modeling (Sem) Summary

SEM was conducted to evaluate the structural relationships between digital technology adoption, barriers to adoption, organizational readiness, and

sustainable supply chain performance (SSCP).

**Table 6: SEM Path Coefficients Relationships Between Digital Technology Adoption, Barriers To Adoption.**

Path	Standardized $\beta$	p-value	Result
Digital Tech $\rightarrow$ Environmental Sustainability	0.62	0.001	Significant
Digital Tech $\rightarrow$ Social Sustainability	0.59	0.001	Significant
Digital Tech $\rightarrow$ Economic Sustainability	0.66	0.001	Significant
Barriers $\rightarrow$ Digital Tech Adoption	-0.42	0.007	Significant
Org. Readiness $\rightarrow$ Digital Tech Adoption	0.51	0.002	Significant

## 6. Goodness-Of-Fit Indices (SEM Model)

commonly used indices.

The SEM model showed acceptable fit across

**Table 7: Goodness-Of-Fit Statistics.**

Fit Index	Recommended Value	Obtained Value
Chi-square/df	< 3.0	2.15
CFI (Comparative Fit Index)	$\geq 0.90$	0.93
GFI (Goodness-of-Fit Index)	$\geq 0.90$	0.91
RMSEA (Root Mean Square Error of Approximation)	$\leq 0.08$	0.056
SRMR (Standardized Root Mean Square Residual)	$\leq 0.08$	0.049

## 7. Hypotheses Testing Summary

**Table 8: Hypotheses Testing Results.**

Hypothesis No.	Hypothesis Statement	Result
H1	Digital technology adoption significantly affects environmental sustainability	Supported
H2	Digital technology adoption significantly affects social sustainability	Supported
H3	Digital technology adoption significantly affects economic sustainability	Supported
H4	Barriers negatively affect digital technology adoption	Supported
H5	Organizational readiness positively affects digital technology adoption	Supported

## 6. RESULTS

The analysis aimed to examine the impact of digital technology innovation on sustainable supply chain management (SSCM) in the Manaseer Group of Companies across environmental, social, and economic dimensions. The sample consisted of 265 employees involved in supply chain and digital transformation roles.

Descriptive statistics (Table 2) indicate that respondents generally perceive a moderate to high level of digital technology adoption ( $M = 3.88$ ,  $SD = 0.65$ ) and sustainable supply chain practices, with economic sustainability scoring slightly higher than social and environmental dimensions.

The reliability analysis (Table 3) confirms that all measurement scales possess acceptable internal consistency, with Cronbach's alpha values ranging from 0.78 to 0.87. This suggests the survey instrument was reliable for measuring the constructs of interest.

The correlation analysis (Table 4) reveals significant positive correlations between digital technology adoption and environmental ( $r = 0.63$ ,  $p < 0.01$ ), social ( $r = 0.59$ ,  $p < 0.01$ ), and economic sustainability ( $r = 0.66$ ,  $p < 0.01$ ). These findings suggest that higher levels of digital innovation are

associated with improvements across all sustainability pillars.

The multiple regression results (Table 5) demonstrate that digital technology adoption significantly predicts environmental ( $\beta = 0.63$ ,  $p < 0.01$ ), social ( $\beta = 0.59$ ,  $p < 0.01$ ), and economic sustainability ( $\beta = 0.66$ ,  $p < 0.01$ ). These predictors explain approximately 35–44% of variance in sustainability outcomes, indicating that digital innovation is a substantial driver of sustainable supply chain performance.

Further, the structural equation modeling (SEM) (Table 7) supports these relationships and reveals that organizational readiness positively influences digital technology adoption ( $\beta = 0.51$ ,  $p < 0.01$ ), while barriers negatively affect adoption ( $\beta = -0.42$ ,  $p < 0.01$ ). The model fit indices (Table 6) confirm a good fit ( $CFI = 0.93$ ,  $RMSEA = 0.056$ ), lending confidence to the hypothesized structural paths.

### 6.1. Discussion

These results collectively affirm the critical role of digital technology innovation in enhancing sustainable supply chains within the Manaseer Group, consistent with findings from prior research (Kadri et al., 2023; Al-Hyassat & Ghasemi, 2025). The

strong positive impact on economic sustainability aligns with the expectation that digital tools such as big data analytics and IoT improve operational efficiency, reduce costs, and optimize resource utilization (Dubey et al., 2021). The significant relationships with environmental and social sustainability highlight how technology facilitates better environmental monitoring, waste reduction, and social responsibility initiatives. This supports the literature emphasizing the tripartite benefits of digital innovation in SSCM (Carter & Rogers, 2008; Seuring & Müller, 2008).

Organizational readiness emerges as a key enabler, suggesting that leadership support, employee skills, and infrastructure investment are critical for successfully leveraging digital technologies. Conversely, barriers such as resistance to change, lack of expertise, and cost constraints hamper adoption a challenge noted in studies on developing countries' supply chains (Ghosh, 2017). The results indicate that addressing these barriers through targeted training, change management, and investment can enhance digital transformation's sustainability impact.

## 6.2. Implications

For practitioners in the Manaseer Group and similar organizations, these findings advocate for continued investment in digital infrastructure and capacity-building initiatives to drive sustainable supply chain outcomes. Moreover, fostering an organizational culture supportive of innovation is essential to overcome adoption barriers.

For policymakers, supporting frameworks that facilitate digital access and reduce implementation costs may accelerate sustainable development goals in Jordan's industrial sectors.

## 7. CONCLUSION

This study investigated the impact of digital technology innovation on sustainable supply chain management within the Manaseer Group of Companies in Jordan. The empirical results clearly demonstrate that the adoption of digital technologies such as big data analytics, IoT, and cloud computing has a significant positive effect on environmental, social, and economic sustainability dimensions of the supply chain. Additionally, organizational readiness plays a crucial facilitating role in enhancing digital adoption, while barriers such as resistance to change and lack of expertise negatively impact implementation efforts. These findings contribute to the growing body of literature emphasizing the strategic value of digital transformation in advancing

sustainable business practices, especially in emerging economies like Jordan. The results underscore the necessity of not only investing in advanced digital tools but also developing internal capacities and addressing impediments to realize the full sustainability benefits.

## 8. THEORETICAL CONTRIBUTION:

This study contributes theoretically by clarifying how digital technology innovation functions as a strategic capability that strengthens sustainable supply chains. It extends the Resource-Based View and dynamic capabilities theory by demonstrating, through evidence from the Manaseer Group in Jordan, that digital innovation enhances environmental, social, and operational sustainability. These findings refine existing theoretical models and offer a contextualized foundation for future research in emerging markets.

### *Recommendations*

**Based on the study's findings, the following recommendations are proposed for the Manaseer Group and similar industrial organizations aiming to strengthen their sustainable supply chains through digital innovation:**

1. Enhance Organizational Readiness Invest in comprehensive training programs to build digital skills among employees and cultivate a culture supportive of innovation and continuous learning.
2. Address Barriers Proactively Develop change management strategies that reduce resistance, improve communication, and demonstrate the value of digital technologies at all organizational levels.
3. Expand Digital Infrastructure Allocate resources to upgrade IT infrastructure and integrate cutting-edge technologies that enable real-time data analytics, process automation, and enhanced supply chain visibility.
4. Foster Cross-Functional Collaboration Encourage coordination among supply chain, IT, and sustainability teams to ensure alignment of digital initiatives with environmental and social objectives.
5. Engage in Strategic Partnerships Collaborate with technology providers, academic institutions, and governmental agencies to leverage external expertise, share best practices, and access innovation funding.
6. Monitor and Evaluate Sustainability Performance Implement continuous

monitoring systems to assess the environmental, social, and economic impacts of digital adoption, enabling data-driven decision-making and ongoing improvement.

7. Policy Advocacy Advocate for supportive

national policies and incentives that lower barriers to technology adoption and promote sustainable industrial development in Jordan.

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