

Sustainable Digital Exports from China to Africa Based on Innovation and Predictive Analytic to Improve Supply Chain Efficiency

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Abstract

Digital transformation to improve supply chain management systems in e-commerce is exciting and emerging. Digital transformation offers a reshaping of traditional business models, especially digital-based exports between different regions of the world that are constrained by the need for an adequate regulatory framework. This research explores supply chain optimization processes from China to Africa through digital innovation and predictive analytic. Modern digital technologies integrating supply chain management systems have proven important factors for business objectives, especially for digital exports from China to Africa. These technologies have increased work efficiency, reduced costs, and enhanced decision-making capabilities for running e-commerce. Digital innovation adopted with a mean of 1.58 and a standard deviation of 0.62, indicates that China and Africa's digital connectivity is at an early stage in supply chain performance. The early stage means that digital infrastructure such as high-speed internet and interoperable platforms are not yet fully developed and the adoption of advanced technologies such as AI and blockchain, is limited. Additionally, challenges such as variations in policies, low levels of trust and poor collaboration hinder full integration into digital-based commerce. The results on obstacles, with a mean of 1.87 and a standard deviation of 0.74, indicated that infrastructure, skills, and technology challenges are critical to improving digital transformation in supply chain management systems. Forecasting analytic positively impacts demand forecasting with a mean of 1.18 and a standard deviation of 0.39. Inventory management reduces overstock, evidenced by 1.55 mean values and 0.55 standard deviation. Regression analysis shows that predictive analytic needs further refinement, as a p -value greater than 0.05 suggests. Supply chain transparency, with a mean value of 1.44 and a standard deviation of 0.67, and supply chain flexibility, with

a mean value of 1.28 and a standard deviation of 0.57, are significant contributors to the operational performance that necessitates digital-based growth. Various correlation analyses show a weak relationship between digital innovation and supply chain-based outcomes, indicating the need to coordinate strategies that enhance connectivity between China and Africa. This research study identifies and presents an effective platform for digital exports from China to Africa through digital innovation and predictive analytic. The study also identified strategies to improve supply chain efficiency and technology to make digital exports efficient, further boosting e-commerce between China and Africa.

Keywords

Digital Export, Digital Innovation, E-Commerce, Supply Chain Management, Predictive Analytic

1. Introduction

Supply chain management (SCM) is a critical component of modern business operations, and the integration of predictive analytic has emerged as a transformative force in enhancing efficiency, decision-making, and performance for digital exports from different countries worldwide, especially from China to Africa. In the hyper-connected and dynamic global marketplace, the efficiency and resilience of supply chains are paramount for organizations seeking to maintain a competitive edge. As such, there is an increasing emphasis on implementing strategies and innovations to enhance efficiency and resilience within supply chain operations (AL-Khatib, 2024). Digital transformation in supply chain optimization refers to the strategic integration of digital technologies and processes to enhance the efficiency, agility, and resilience of supply chain operations (Tahiduzzaman et al., 2017). It encompasses the adoption of advanced technologies such as artificial intelligence (AI), machine learning, big data analytic, block-chain, Internet of Things (IoT), and cloud computing to streamline the flow of goods, information, and finances across the entire supply chain network (Adama et al., 2024). At its core, digital transformation aims to digitize, automate, and optimize key supply chain processes, including procurement, production, inventory management, logistics, and distribution. By leveraging real-time data and insights, organizations can make informed decisions, anticipate demand fluctuations, minimize disruptions, and deliver superior customer experiences (Kunkel et al., 2022; Odimarha et al., 2024). The transformative impact of digital technologies extends beyond traditional supply chain boundaries, fostering collaboration, visibility, and traceability among suppliers, manufacturers, distributors, retailers, and customers. Through interconnected digital ecosystems, supply chain stakeholders can achieve greater synchronization, synchronization, and synchronization, driving value creation and competitive advantage in today's rapidly evolving business landscape (Wang et al., 2024). A digital supply chain has techniques that monitor

real-time inventory levels, customer interactions with items, provider locations, and equipment and use this information to assist in planning and executing at increased levels of overall performance (Oyewole et al., 2024; Tsai et al., 2021). Digital supply chain technologies are supporting some companies in obtaining a step change in performance in more complicated areas (Belhadi et al., 2022). Amazon, Alibaba, Ali Express, and Temu, for example, offer the Dash Button, an internet-enabled gadget that customers press—while not having to log on to an account—to reorder laundry detergent, diapers, and other essential grocery items (Kunkel & Matthes 2020; Wang et al., 2024).

An effective supply chain management system is useful for digital exports, especially from China to Africa. Resilience is considered to be an important factor in supply chain management which is increasing day by day due to global natural disasters, geographically based conflicts and pandemics, etc. (Lee & Shen, 2020). Flexibility not only helps to recover from unexpected disruptions but also maintains continuity of operations to increase digital exports that are linked to e-commerce. Today's digitally oriented organizations enable consulting technologies that overcome the uncertainties caused by traditional business resources and technology (Ruvoletto, 2023). The development of new technology tools improves the level of accuracy of digital commerce, expands the supplier network, and reduces risks in a digital-based environment (Xu et al., 2023). Several steps have been taken to create resilience such as near-edge, warehousing and vertical integration. This flexibility improves the supply chain management system due to the consistency of goods and products. It creates new opportunities for digital exports from China to Africa, promoting digital innovation and predictive analytic (Waqas et al., 2021). Organizations based on resilience are better positioned to deal with disruptive markets, and meet customer demands that are linked to sustainable development (Nowak et al., 2022).

Predictive Analytic (PA) includes statistical analysis, algorithms, and techniques used to forecast trends related to e-commerce and digital exports. Supply chain management (SCM) benefits include demand forecasting, optimization of inventory management, and efficient decision-making processes (Anitha & Patil, 2018; Maheshwari et al., 2021). PA provides critical strategies to enhance business dynamics in e-commerce and address challenges such as fluctuating demand levels, supply chain disruptions and proper inventory management in the global digital marketplace (Pradhan et al., 2022). PA allows firms to proactively control risk and improve operations associated with supply chain management systems. PA is also helpful in digital decision-making for any organization's goods and services. Its practical use increases trust and effectively eliminates both processes in e-commerce (Lee et al., 2022; Pham et al., 2020). The study underscores the importance of developing skills in data science and predictive analytic for SCM professionals, pointing towards a future where data-driven strategies will be paramount. Moreover, the role of predictive analytic extends beyond operational optimization to building resilience in supply chains (Huisman, 2015). The study emphasizes the

impact of big data and predictive analytic on supply chain resilience and how these technologies aid in risk control and mitigation. It illustrates that predictive analytic can significantly contribute to developing risk control capabilities through its capacity to analyze vast amounts of data, thereby enhancing supply chain resilience against disruptions (Klimberg, 2023).

The objective of this research article is to explore supply chain management system optimization that influences digital transformation in terms of supplier focus and customer focus through digital innovation and predictive analytic (Agrawal & Narain, 2018; Barbosa et al., 2018). Digital-based export optimization through supply chain management systems is critical in digital markets. Supply chain management has a direct impact, indirect impact and total impact to describe digital investment (Nowicka, 2019; Rozados & Tjahjono, 2014). Digitalization is seen as a positive factor for increasing e-commerce particles for digital exports from China to Africa. However, existing studies need this technique, which negatively impacts digital transformation (Nag et al., 2023). Digital innovation is a transformative force to improve the supply chain to overcome the problem related to traditional techniques for digital-based exports from China to Africa (Lai et al., 2023). Digital innovation and predictive analytic offer new efficiencies to reshape e-commerce in which goods are exchanged digitally. Digital transformation allows manufacturers to collect, share, and analyze supply chain data at every stage including demand planning, asset management, warehouse management, transportation and logistics management, procurement, and order fulfillment, including getting real-time exposure (Tavana et al., 2022). Supply chain digitization is about ensuring that different supply chain tools work together to improve process integration. This includes bringing together accurate data and processes under a unified platform to provide end-to-end visibility (Iftikhar et al., 2024). Digital-based technologies such as predictive analytic provide the highest level of accuracy. These technologies offer real-time decision-making, improve inventory management, and increase supply chain optimization through digital innovation and predictive analytic for digital exports from China to Africa (Iftikhar et al., 2024).

Various analyses were done in the context of digital export. Data was analyzed to assess barriers to digital innovation and supply chain performance. Regression analysis determined that changes in different variables were associated with changes in each other (Chupanova et al., 2021). Correlation analysis shows how different variables change in the same direction, opposite direction, and no relationship. Factor analysis is performed to note the differences. The structural equation model shows the relationship between different variables based on the structural model. ANOVA analysis is used to test the statistical significance between the dependent and independent variables. Mediation analysis was used which describes the effects which consist of direct effect, indirect effect and total effect. Moderation analysis describes the relationship between the dependent and independent variables as a function of a moderator that acts as a third variable (Rehman Khan

et al., 2022).

2. Conceptual Model and Hypotheses Development

The literature review represents the framework for the conceptual model. The correlation between the variables that the hypotheses provide is shown in **Figure 1**.

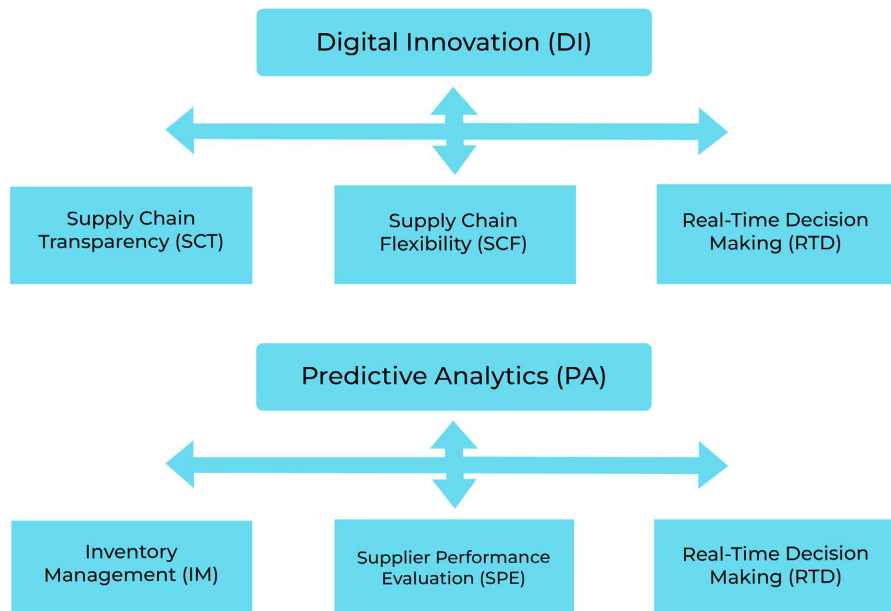


Figure 1. Conceptual model.

2.1. Digital Innovation Leverages Advanced Technologies and Block-Chain to Improve Supply Chain Transparency

Digital innovation (DI) is a type of supply chain transfer operation that enhances transparency with the help of advanced technology and involves a reshaping process that defines how a company handles supply chain management and leadership. Many digital innovation technologies exist, such as the Internet of Things, Artificial Intelligence, Block-chain, etc. (Rejeb et al., 2019). These technologies are beneficial in providing real-time visibility into supply chain activities. Its advantages are 1) Through DI technologies, the company traces various products from the point of origin to the end 2) Companies get critical data about the items at every stage 3) It helps to identify bottlenecks in industrial products (Saeed et al., 2022). Therefore, transparency is essential for the globalized supply chain network. A lack of it leads to delays and inefficiencies. The Internet of Things is a very important DI technology used in the product tracing process. This technology allows environmental conditions to be controlled and monitored, the handling of goods in transit, and the status of products in companies' supply chain networks (Kolasani, 2023). Blockchain is another DI technology that recodes each transaction's data, allowing all supply chain stakeholders to access verified information. Its advantageous offering reduces end-to-end feedback, reducing information compatibility between the manufacturer, supplier, and retailer, who

collaborate for forecasting purposes (Rejeb et al., 2021). Artificial intelligence is also an essential and quick response technology for supply chain forecasting with the help of historical data patterns, including real-time data. This forecast is handy in increasing efficiency on an operational basis, making appropriate decisions, and reacting to the markets. This technology is helpful in transparency and critical to meeting the needs and conditions of the business environment. Because of this, DI is considered very useful for SCT in helping to build trust, compliance, and operational excellence (Ebinger & Omondi, 2020; Manda, 2021).

H1: Digital innovation (DI) strengthens supply chain transparency (SCT).

2.2. Predictive Analytics Improves Supply Chain Inventory Management Enhancing Demand Responsiveness through Real-Time Information

Predictive analytics (PA) is a revolutionary baseline inventory management within the supply chain that uses more accurate forecasting to reduce excess inventory, increasing responsiveness to demand fluctuations (Aljohani, 2023). PA uses machine learning algorithms, historical information data and real-time information to provide insights into more accurately forecasting inventory needs. These techniques are very important in optimizing inventory levels, minimizing stock-out which helps against overstocking (Pawar, 2024). Overstocking wastes resources and incurs expensive holding costs. Demand forecasting is an effective way to improve inventory management through PA. After analyzing past sales trends, PA forecasts future demand by looking at both consumer and market behavior and seasonal demand (Adeniran et al., 2024). This analysis provides information on how to adjust inventory levels to future requirements to meet customer demand in the market without wasting unnecessary capital. It is also useful in preventing overstocking which causes obsolescence after a certain season (Xu & Bo, 2024). PA predicts demand in advance which leads to data expediting processes. For example, a replenishment algorithm provides trigger recovery when forecast demand exceeds available supply (Adewusi et al., 2024). PA identifies inventory that is moving slowly and is very useful in taking proactive measures like discounts etc. for overstocking. Other benefits are: It provides a strategic fit that lowers costs to improve service levels, customer statistics and supply chain efficiency. It offers a smart inventory decision that contributes towards a flexible supply chain in expanding the potential dynamic market scenario (Seyedan & Mafakheri, 2020).

H2: Predictive analytic (PA) improves inventory management (IM) in the supply chain.

2.3. Digital Innovation, Utilizing Advanced Technologies, Improves Supply Chain Flexibility and Decision-Making

Digital innovation (DI) is considered an important tool for achieving supply chain flexibility. It is equipped with the type of business that deals with changing market conditions, reducing consumer demand and unintentional disruption. Companies

increase supply chain flexibility by incorporating advanced foundational technologies such as artificial intelligence, data analytics and Internet of Things, etc. (Zhu et al., 2024). These technologies allow responsive decision-making to adapt to real-time adjustments (Kache & Seuring, 2017). Maintaining the effectiveness of supply chain operations through new technologies is critical to meet global market demand. DI support increases supply chain flexibility, and real-time visibility through DI tools. For example, the Internet of Things is useful in monitoring inventory for sudden responses (Büyükoğuzkan & Göçer, 2018). These technologies are useful in responding to changes in inventory, and transportation conditions. The Internet of Things is about dealing with raw material shortages and transportation delays. These technologies determine alternative sources of supply to meet inventory shortages and reduce delay losses (Sharma & Joshi, 2023). DI helps predict changes in supply chain flexibility by analyzing demand, inventory management, fulfillment quality and operational decisions that affect lead times and coordination between companies (Ivanov et al., 2019). DI technologies such as blockchain are very effective in analyzing large amounts of data that are interconnected with supply chain flexibility, transparency and traceability mechanisms. It can be concluded that DI tools are a very important approach to achieve sustainability in business operations and to meet customer demand with the variability of companies (Olutimehin et al., 2024).

H3: Digital innovation (DI) positively influences supply chain flexibility (SCF).

2.4. Predictive Analytic Improves Supplier Performance Evaluation by Providing Accurate Assessments

Predictive analytic (PA) delivers a transformative role for supplier performance-based evaluation. Its advantages include: PA deals with an accurate assessment of the performance of supplier-side companies. It determines supplier evaluation based on retrospective and periodic basis evaluation which is limited in anticipating issues (Gunasekaran et al., 2017). Various PA tools are used for different purposes like Tableau, SPSS (Statistical Package for Social Science), SAP (Systems, Applications and Products in Data Processing), Rapid Minor, and Oracle Analytic Cloud etc. In addition, the PA tool performs various functions for supplier evaluation which are as follows.

- 1) It increases visibility efficiency through early detection capability and informed decision making.
- 2) It helps to uncover, and remove waste and cost drivers for sustainable procurement.
- 3) This approach is used in the customer and business supplier alignment exercise.
- 4) PA tools use different algorithms to set data and minimize risk.
- 5) It increases visibility efficiency through leveraged supply.

Further, the PA approach offers levitation criteria that incorporate indicator factors to meet supplier and industry standards. PA techniques help to provide bench-marking for inter-operable improvement in which suppliers are well-

informed to assess competitive objectives and dynamics to increase productivity (Mafini & Muposhi, 2017).

H4: Predictive analytic (PA) enhances supplier performance evaluation (SPE).

2.5. Digital Innovation Improves Supply Chain Decision-Making by Providing Real-Time Tracking, Inventory Control, and Production Schedule Adjustments

Digital innovation (DI) is a helpful tool that includes real-time decision-making beyond the scope of supply chain changes. It leads to advanced techniques for securing data, which allows for flexible responses to inventory challenges, management, customer demand, and marketing needs. Digital innovation (DI) facilitates real-time decision-making (RTD) tracking within the supply chain (Unhelkar et al., 2022). Below are points that illustrate the importance of digital innovation (DI) that facilitates real-time decision making within the supply chain.

1) Digital innovation allows customers to track products, control and monitor inventory, and provide visibility to suppliers in line with market demand.

2) It solves functional problems by basic detection of potential data without measuring reactance.

3) DI helps adjust inventory levels and production schedules against rapidly fluctuating demand to meet varying customer needs.

4) Real-time decision making (RTD) within the supply chain is useful in improving inventory management, including tracking inventory, reducing overstocking situations, and it offers better inventory costs (Kunath & Winkler, 2018).

5) Real-time decision making not only reduces delays but also saves costs throughout the supply chain.

6) Digital innovation tools also enhance collaboration between suppliers, retailers and distributors.

Additionally, digital innovation integrating machine learning algorithms is effective in providing transparency security, enhancing real-time decisions among stakeholders, reducing response time and offering better collaboration. All these can be achieved through the use of DI tools such as blockchain and artificial intelligence (Sharma & Joshi, 2023).

H5: Digital innovation (DI) facilitates real-time decision-making (RTD) within the supply chain.

3. Materials and Methods

3.1. Methods of Data Collection

The main objective of this research study is to improve supply chain performance through digital innovation and predictive analytics for digital exports from China to Africa. In pursuit of this goal, a mixed methodology was used that combines both quantitative and qualitative analysis of the data. This research work consists of both primary data and secondary data to calculate the outcomes that determine the implementation of digital-based technologies in digital exports from China to

Africa. Primary data were collected through surveys and interviews with supply chain professionals and exporters who engage in e-commerce specifically between China and Africa (Hofmann et al., 2019). Qualitative data were collected through semi-structured interviews in which policymakers, managers of companies gain insight into operational challenges and opportunities in the development of digital technologies for supply chain management system processes. Additionally, a special questionnaire was developed to assess digital export considering variables such as Digital Innovation (DI), Supply Chain Transparency (SCT), Inventory Management (IM), Predictive analytics (PA), Supply Chain Flexibility (SCF), supplier performance evaluation (SPE) and Real-Time Decision-Making (RTDs) and operational efficiency, etc. Secondary data were collected from previous literature reviews, industry-based reports and case studies on e-commerce enabling China's digital exports to Africa. This type of data is used to understand digital innovation and predictive analytics based techniques to explore supply chain performance to increase digitally driven exports from China to Africa (Núñez-Merino et al., 2020).

Surveys and interviews were conducted with a sample of 300. 250 participants were supply chain professionals and the remaining 50 were exporters oriented from China to Africa. Selection criteria include at least 4 years of industrial sector experience with exposure to digital operations advanced digital-based tools and familiarity with predictive analytics. Participants were selected based on random sampling to ensure balanced representation across sectors, company sizes and locations based on geography. The distribution of the population was such that 60% of the participants came from China, 40% from Africa. Industry ranged from 35% consumer goods to 25% technology, 20% manufacturing and 20% logistics section. This type of sampling ensured that the results were captured in a holistic approach that addresses the challenges of improving digital exports from China to Africa.

3.2. Analytics Tools and Techniques Used for Data Analysis

1) In this research work, different innovative tools were used to perform different data functions. Statistical analysis was performed on a descriptive basis to calculate the mean and standard deviation. To explore the effectiveness of digital exports from China to Africa, the mean and standard deviation were used to assess the level of digital innovation, barriers and supply chain performance outcomes.

2) Regression analysis was performed to evaluate supply chain management system outcomes such as inventory management evaluation and predictive analytics for demand forecasting.

3) Correlation analysis was used to examine digital innovation, supply chain transparency and supply chain flexibility and their relationships to identify potential strategies to improve the supply chain.

4) A factor analysis was presented to identify suitable strategies to mitigate the challenges faced in improving supply chain performance through digital innovation and predictive analytics.

5) A structural equation modeling analysis was conducted to assess the

relationship between several variables that offer insights for improving supply chains through digital-based technologies.

6) ANOVA analysis was used to compare means and standard deviations between different variable groups that were correlated. It also ensures a significant level of results.

7) Mediation analysis was performed to describe the relationship between the dependent variable and the independent variable through a mediator.

8) Moderation analysis was performed to determine whether the direction explaining the relationship between two variables depended on the moderator.

3.3. Validation

To confirm the reliability of the findings of this study, quantitative and qualitative data were validated. Previous research studies on supply chain optimization were used as benchmarks. Factor analysis was used to validate the result through factor loading, factor loading confirms that each variable is well correlated with respect to the construct. SEM (Structural Equation Modeling) was used to validate the hypothesis in explaining the relationship between the variables. Model fit was used to evaluate goodness-of-fit indices. The analysis consisted of ANOVA, mediation and moderation was used to test and validate the results using different dependent variables. Additionally, data were collected from various stakeholders to confirm the generalizability of the findings on Africa Digital Exports to China (Ivanov et al., 2019; Li & Li, 2017).

The survey scale ranges from 1 to 3 for mean and standard deviation indicating the level of digital tool adoption. Where

- 1 indicates low or minimal adoption.
- 2 indicates moderate adoption.
- 3 indicates high and advanced adoption.

A value of 1.58 indicates a low to moderate stage for digital innovation that is consistent with early stage characteristics. A small standard deviation of 0.63 indicates a consistent perception among respondents. A larger value of standard deviation suggests diverse viewpoints. This threshold is very useful for ranking the level of adoption that reflects the specific area where improvement is needed. A low value of mean and variance indicates limited use adoption for digital tools. It provides a framework for addressing gaps that further enhance supply chain efficiency.

4. Results and Discussion

The results and discussion of considering improving supply chain performance through digital innovation and predictive analytics are described in the following subsection.

4.1. Descriptive Statistics Analysis on Digital Tool Usage, Supply Chain, Adoption and Challenge-Based Performance Insights

A variety of data-driven analysis reveals key insights into digital export and supply

chain challenges, adoption and results-driven performance through advanced digital technologies. The statistical data describes various aspects such as the level of inventor management, supply chain transparency, level of innovation and predictive analysis to strengthen the level of digital exports from China to Africa. **Table 1** represents the value of different outcomes, first is the outcomes based on digital innovation with a mean value of 1.58 and a standard deviation value of 0.63. Digital tool use in second place shows 1.52 mean values and 0.56 standard deviation (Agarwal et al., 2024). These results indicate a moderate adoption level across firms with a bias toward consistent use. Low variability value showed that many respondents are in favor of using digital tools even though these digital export tools are under developing conditions. The third result is the results based on digital barriers with a mean value of 1.87 and a standard deviation value of 0.74. Findings on digital barriers show that challenges still exist due to lack of infrastructure and skills, barriers to adoption of innovative technologies that are conducive to innovation (Stek et al., 2024).

Considering supply chain management, supply chain transparency shows a mean value of 1.45 and a standard deviation value of 0.68. Supply chain flexibility shows a mean value of 1.29 and a standard deviation of 0.57 indicating that low values of means indicate limited transparency and adaptability in supply chain processes. High values of skewness and kurtosis for supply chain transparency and supply chain flexibility indicate variability among respondents. This shows that some organizations perform better than others. These results also showed that some firms are interested in improving supply chain management systems. Others face fundamental challenges in supply chain management (Hange, 2024).

Predictive analytics (PA) play an important role in data-driven decision making. Forecast Analytics stock forecasts show a mean of 2.26 and a standard deviation of 0.90. Based on management forecast records, it shows a mean of 2.28 and a standard deviation of 0.92. Both results indicate a high value of the mean indicating that the inventory optimization reproduces the predictive models (Hu & Chen, 2023). The mean of the forecasted demand forecast is 1.18 and the standard deviation is 0.39. The mean value of Forecast Analytics Overstock Reduction is 1.55 and the standard deviation is 0.56. PA demand forecasting and PA overstock reduction reflect differences in the use of analytics in performing specific tasks such as inventory control and demand forecasting. The standard deviation value shows inconsistent adoption which further shows that some firms use analytics effectively while other organizations are still lacking (Dayar & Mwendapole, 2024).

Real Time Decision Making (RTD) results have a mean value of 1.50 and a standard deviation of 0.50. The mean value of supplier performance evaluation is 1.46 and the standard deviation is 0.55. Both of these findings suggest that RTD and SPE are in the process of merging in many firms. A lower average value reflects the need for real-time integration into the overall supply chain vortex flow. The low value of the standard deviation suggests a consistent global effort to highlight the need for targeted interventions to enhance real-time capability and supplier evaluation processes (Vilalta-Perdomo et al., 2022).

Table 1. Data-driven results for digital innovation, supply chain, adoption and predictive analytics performance across firms.

Variables	Mean	S.D	Skew	Kurtosis	S.E
Digital innovation	1.57971	0.627924	0.581189	-0.65805	0.075593
Digital innovation enhancement	1.623188	0.54507	0.047407	-0.99755	0.065619
Predictive analytics	1.405797	0.494643	0.375372	-1.8858	0.059548
Supply chain transparency	1.449275	0.675979	1.166525	0.045463	0.081378
Inventory management	1.942029	0.683504	0.06982	-0.89401	0.082284
Supply chain flexibility	1.289855	0.571413	1.787596	2.116676	0.06879
Real-time decision making	1.507246	0.50361	-0.02836	-2.02796	0.060628
Supplier performance evaluation	1.463768	0.557824	0.64109	-0.71612	0.067154

The results in **Table 1** show that the adoption and expansion of digital-based innovation are at an early stage with mean values of 1.58 and 1.62. This also shows that there is a significant gap to improve infrastructure through proper training on digital tools. 1.40 mean of PA (Predictive Analytics) indicates that PA is under-utilizing but promising to improve and increase forecasting and management of inventory levels. A mean of 1.44 for transparency and a mean of 1.28 for flexibility suggests that digital technologies such as blockchain and cloud computing can address inefficiencies. A mean of 1.50 for real-time decision-making and a mean of 1.46 for supplier performance evaluation suggest that real-time decision-making and supplier performance evaluation are emerging opportunities to increase realism and responsiveness.

4.2. An Analysis of the Correlation between Key Variables of Digital Innovation, Supply Chain and Performance

Table 2 indicates that Digital Innovation (DI), Supply Chain Transparency (SCT), Inventory Management (IM), Predictive Analytics (PA), Supply Chain Flexibility (SCF), Sustainable Performance Enhancement (SPE) and Real Time Decision Making (RTDs) is considered to describe correlation analysis. These results determine whether the correlation is weak or strong which makes recommendations that warrant a mathematical explanation of the research phenomena that is quantitative analysis (Li et al., 2024).

Supply chain flexibility shows a positive correlation of 0.218 with the search for digital innovation. The positive correlation suggests that digital innovation has made a small contribution to increasing supply chain flexibility. IM shows a correlation value of -0.256, which suggests that there are challenges in setting up digital practices using innovation-based management processes. The misalignment reflects the need for strategic planning efforts and initiatives to drive innovation and adaptation in supply chain management. Similarly, PA shows a positive weak correlation with a DI value of 0.060 and an IM value of 0.037. Supply Chain Transparency (SCT) has a negative correlation with a value of -0.254.

Table 2. An analysis of the correlation between digital innovation, predictive analytics, and supply chain transparency.

Variables	Digital_ innovation	PA	SCT	IM1	SCF	RTD	SPE
Digital_ innovation	1	0.060405074	-0.109228458	-0.256063692	0.217836203	-0.02766389	0.041139088
PA	0.060405074	1	-0.254155149	0.037407338	0.012315517	-0.112461263	-0.023671872
SCT	-0.109228458	-0.254155149	1	-0.243924433	-0.063926517	-0.00966259	0.166445089
IM	-0.256063692	0.037407338	-0.243924433	1	0.153382433	-0.117148102	-0.054225268
SCF	0.217836203	0.012315517	-0.063926517	0.153382433	1	-0.109159412	0.033798023
RTD	-0.02766389	-0.112461263	-0.00966259	-0.117148102	-0.109159412	1	0.326978033
SPE	0.041139088	-0.023671872	0.166445089	-0.054225268	0.033798023	0.326978033	1

These weak positive and negative correlations show that PA does not directly support digital-based change and innovation. Its findings reveal a contradiction in efforts to increase supply chain transparency due to regulatory and misleading barriers (Ali et al., 2022).

Supply chain transparency (SCT) shows -0.254 predictive analytics (PA) and -0.244 Inventory management (IM). These results indicate a trade-off between resource allocation and transparency efforts. But, supply chain transparency (SCT) 0.166 Supplier performance evaluation (SPE) value shows its importance and promote sustainability. A positive value of SPE indicates that transparent supply chain operations play a good role in promoting sustainability initiatives. IM shows 0.153 value of Supply chain flexibility (SCF), -0.256 value of DI and -0.244 value of SCT. These findings reveal complex interactions for innovation-based management that positively influence flexibility but challenges in aligning efforts for transversal management systems (Wang & Teng, 2022).

Supply chain flexibility (SCF) shows a positive correlation with digital innovation (DI) of 0.218 and inventory management (IM) of 0.153. This reflects the important role of using digital tools as an innovative strategy to enhance adaptation. RTDs are -0.109 which shows that flexibility for research-based innovation through supply chain operations is ineffective. Research and technology development shows SPE with a value of 0.327. This positive correlation indicates that progress towards a sustainable approach played a significant role in managing innovation to highlight the importance of investment in achieving sustainability goals. The weak reform shows that there is a great need for reforms in multilateral techniques, with a focus on policy-making to address the interdependencies between digital innovations, transparency efforts and various commitments (Ahmed et al., 2022).

Large circles indicate strong correlations; blue indicates positive and negative correlations are shown in red color and seen in Figure 2. There is a moderate positive relationship between RTDs and SPE. There is a negative relationship between digital innovation and inventory management. A positive correlation

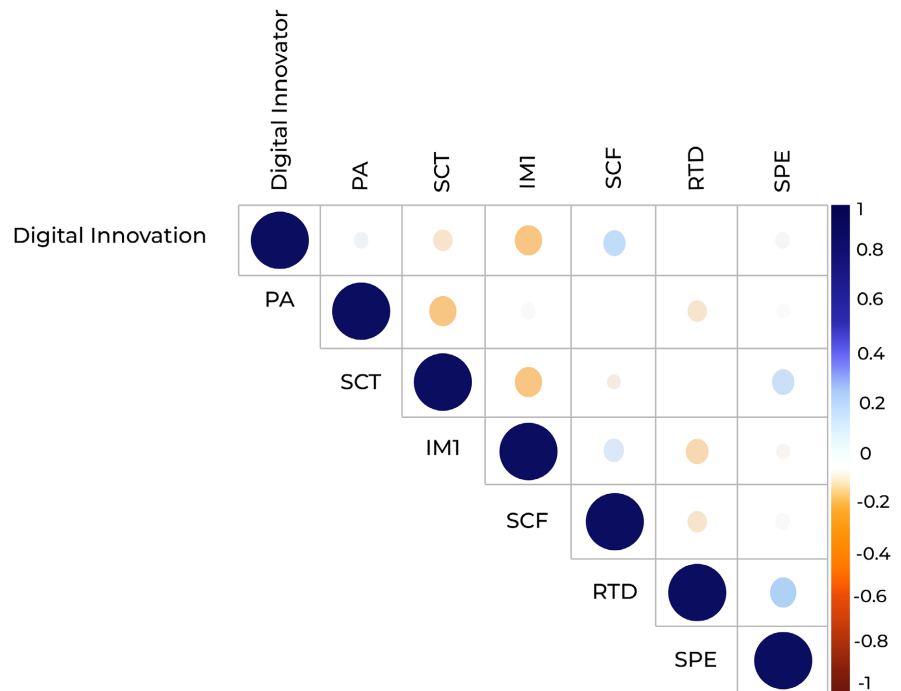


Figure 2. Shows a correlation matrix showing the strength and direction of the relationship between variables by circle size and color.

between RTDs and SPE indicates that the organization favors prioritizing resources for initiatives that demonstrate mutually beneficial, overall performance improvement. The negative relationship between IM and DI shows that strategies for improvement need to be refined (Liu et al., 2022).

The analysis in **Table 2** indicates weak and inconsistent correlations between different variables. For example, there is a weak relationship between DI (Digital Innovation) and -0.109 SCT (Supply Chain Transparency). Alignment is limited to PA (Predictive Analytics) and 0.012 Supply Chain Flexibility (SCF). These findings focus on opportunities rather than limitations. Furthermore, these findings have significant potential to enhance real-time decision-making and responsiveness to markets' decisions through the evaluation of supplier performance with a coefficient of 0.326 to widen gaps in supply chain performance. These analyzes show that the digital tools in favor of supporting digital trade through infrastructure, training and collaboration between suppliers and customers unlock the efficiency of digital transformation from China to Africa.

4.3. Supply Chain Performance Using Regression Analysis

Table 3 states that regression analysis is important in finding the factors that specifically affect supply chain systems, predictive analytics, digital innovation and other components related to supply chains from China to Africa. It focuses on digital-based exports from Africa to China. 2.1987 intercept number shows the baseline for supply chain performance when all predictors are zero. DI (Digital Innovation) and PA (Predictive Analytics) are -0.1347 and -0.2127 respectively

(Sukati et al., 2012). This value indicates that supply chain performance is not significantly affected with DI and PA as their p values are 0.3417 and 0.2105 which are more than 0.05 which is the critical limit reference value. It also shows that DI and PA do not have a good impact on performance which further suggests that supply chain management needs further investigation on the role of optimization. 0.0673 is the positive value for technology adoption stage and 0.5705 is its p value (Mumtaz et al., 2018). Both these values show that the technology adoption stage is not actively participated in. The level of inventory management shows a negative estimated value of -0.2278 and a p value of 0.0797. These values are of borderline significance. This indicates that improved inventory level management is associated with lower performance, but these findings require further validation. -0.0161 supply chain flexibility, -0.0603 real-time decision making. 0.1355 is supplier performance evaluation, all have p value above 0.3. These results indicate that there is no significant effect in terms of supply chain performance (Shobayo, 2017).

Figure 3 shows that the SCT (Supply Chain Transparency) regression line in

Table 3. Regression analysis results for supply chain performance.

Term	Estimate	Std_Error	t_value	p_value
(Intercept)	2.198687151	0.572600806	3.839825458	0.0002953
Digital_innovation	-0.134719773	0.140575294	-0.95834602	0.3416714
Predictive_analytics	-0.212678188	0.168046732	-1.265589553	0.210472774
Technology_adoption_stage	0.067324144	0.118017882	0.570457145	0.570463091
Inventory_management	-0.227810563	0.127840518	-1.781990309	0.079728124
Supply_chain_flexibility	-0.016053985	0.14749199	-0.108846487	0.913681517
Real_time_decision_making	-0.060327016	0.170670967	-0.353469701	0.724955051
Supplier_performance_evaluation	0.135525094	0.154758377	0.875720566	0.384617345

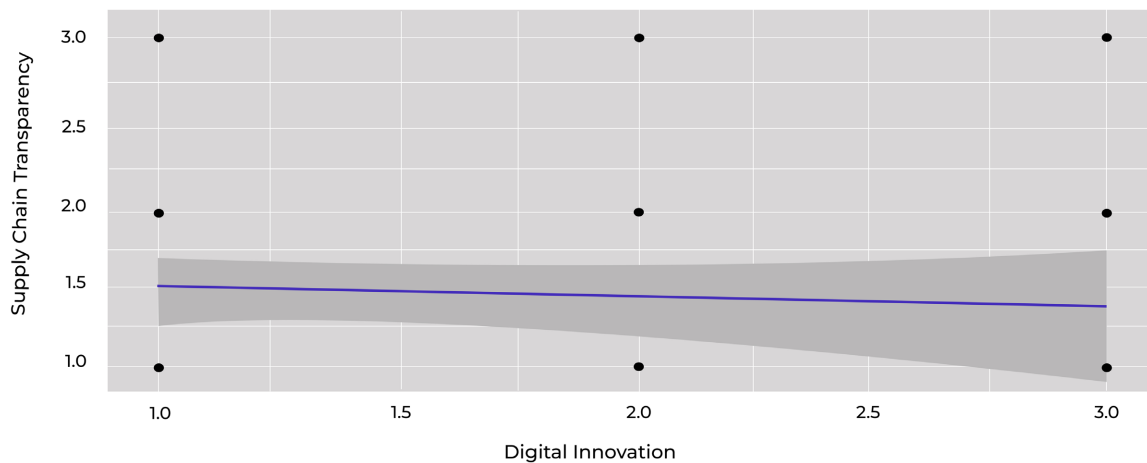


Figure 3. The regression of supply chain transparency on digital innovation.

digital innovation shows the relationship of supply chain performance specifically with digital exports from China to Africa and vice versa. Regression lines are represented by the blue line, the shaded gray region shows the confidence interval that characterizes the level of uncertainty for the predictions (Lee, Kwon, & Severance, 2007).

The flat line of regression shows that there is a negligible relationship between DI (Digital Innovation) and SCT (Supply Chain Transparency). This trend shows that the increase in DI (Digital Innovation) does not actively affect the level of supply chain transparency. Narrow confidence intervals indicate that a weak association exists. It also indicates that little variation of SCT (Supply Chain Transparency) limits the extent of digital innovation. These image-based findings show that supply chain transparency on DI (digital innovation) is limited for a number of reasons. Many reasons such as inadequate implementation strategies leverage digital solutions to increase visibility into supply chains (Cook et al., 2011).

The analysis in **Table 3** and **Figure 3** shows that DI (Digital Innovation) and SCT (Supply Chain Transparency) show an almost flat trend using regression analysis. This weak relationship shows that DI (digital innovation) exists but does not actively increase transparency in supply chain flows from China to Africa. These findings suggest that digital tools have the potential to optimize supply chain operations, but are not being used effectively to address the transparency challenge. Therefore, DI (Digital Innovation) needs to be paired with strong data sharing processes, appropriate frameworks and appropriate training to achieve better visibility and coordination in digital exports from China to Africa. By overcoming these challenges, exporters can improve supply chain operations through better control over supply chain failures.

4.4. Results Based on ANOVA for Supply Chain Performance

Table 4 shows the ANOVA results for supply chain performance. F and *p* values indicate statistical significance. *p* values of 0.5783, 0.2093 and 0.9148 above 0.05 indicate that supply chain performance is not evident. This suggests that the explanatory power of the factors *p* and *f* values in this model is limited, indicating that improvement needs to be aligned with performance-based improvement objectives. 3.2476 is F value and 0.0765 is *p* value which shows borderline significance. These findings suggest how this variable interacts with other factors such as digital innovation and predictive analytics to improve supply chain performance. The greatest mean of sum of squares (28.3022) shows that it has no correlation with F and *p* value which limits the interpretation. It represents the composite variables in the model (Abdallah, Obeidat, & Aqqad, 2014).

Digital tools play a transformative role in ensuring sustainable export from China to Africa through DI (Digital Innovation) and PA (Predictive Analytics) to improve supply chain performance. The results in **Table 4** illustrate in practice that digital tools help quantify factors affecting digital exports such as demand variability, infrastructure reliability and operational risks. But some factors point

to a lack of potential use of digital tools to uncover bottlenecks and key trends. PA (Predictive Analytics) supports better demand forecasting that improves resource allocation and reduces waste. Furthermore, the ANOVA analysis shows that the digital tool not only supports real-time decision-making but also helps build sustainable resilience between China and Africa.

Table 4. ANOVA analysis results for supply chain performance.

Sr.No	Sum_Sq	Mean_Sq	F_value	Pr_F
1	0.144896201	0.144896201	0.312296238	0.578320365
2	0.747080239	0.747080239	1.61018955	0.209285848
3	0.005355324	0.005355324	0.011542384	0.914796082
4	1.506787263	1.506787263	3.247593737	0.076469779
5	0.001132258	0.001132258	0.002440366	0.960761875
6	0.009207386	0.009207386	0.019844772	0.888435648
7	0.355812616	0.355812616	0.766886509	0.384617345
8	28.30219248	0.463970369	-	-

4.5. Factor Analysis for Supply Chain Performance

Table 5 consists of three factors. Factor I has a strong positive loading of SCT (Supply Chain Transparency) with a value of 0.9973. This shows that SCT is an important donor towards factor 1. The minimum donor is presented with -0.0514 negative small loadings, -0.2020 IM (Inventory Management), -0.0352 SCF (Supply Chain Flexibility). This shows that SCT (Supply Chain Transparency) has a strong influence on the supply chain management system.

Table 5. Factor analysis for supply chain performance.

	Factor1	Factor2	Factor3
Digital_innovation	-0.05136	0.018109	0.996009
PA	-0.15724	-0.06864	0.029643
SCT	0.997349	0.001177	-0.01716
IM1	-0.20197	-0.08988	-0.23855
SCF	-0.03524	-0.05395	0.139165
RTD	0.010214	0.996959	-0.03113
SPE	0.101869	0.248593	-0.02243

Real time decision making is defined by factor 2 with a loading of 0.9970. This implies that this factor achieves supply chain management based on real-time capabilities. SPE which indicates 0.2486 which is medium loading. This represents a weak type of loading and also shows that the real-time dynamics mainly depend on this factor.

0.9960 Digital Innovation (DI) is affected by a factor of 3. This 0.9960 value indicates that the technologies for the supply chain management system are advanced. This factor is extremely important as it reflects the role of DI in driving better supply chain performance. 0.1392 Supply Chain Flexibility (SCF) and 0.0296 Predictive Analytics (PA) contributed little to the operation of supply chain management system (Babeshko & Orlova, 2020).

The results in **Table 5** show that by implementing DI (Digital Innovation), PA (Predictive Analytics), RTD (Real Time Data), performance supply chain between China and Africa can be improved. This sustainable approach plays an important role in enabling exports through digital tools. DI (Digital Innovation) through AI (Artificial Intelligence) and Blockchain have a positive impact on operational efficiency with an average of 0.996009 which promotes transparency and reduces inefficiencies. 0.029643 PA (Predictive Analytics) improves forecasting enhancing inventory management. While RTD (Real Time Data) offers dynamic adjustments that reduce latency and allow for responsiveness. SCT (Supply Chain Technology) significantly supports infrastructure coordination. These digital tools enable sustainable, flexible and efficient supply chains from the digital export chain to Africa.

4.6. Structural Equation Modeling (SEM) Analysis

Figure 3 shows the relationship between digital innovation), predictive analytics and their impact on supply chain performance metrics. Supplier Performance Evaluation metrics supply chain transparency, supply chain flexibility, real time decision making and supply performance evaluation. These relationships offer optimization-based insights for supply chain management considering digital from China to Africa and vice versa.

Digital Innovation (DI) is considered a key driver for 0.00 Supply Chain Transparency (SCT), -0.36 Supply Chain Flexibility (SCF), 0.10 real-time decision making, and -0.37 Supplier Performance Evaluation is affected -0.37 . The link between supply performance evaluation and supply performance evaluation could be more assertive, indicating that SPE plays the least role in supplier evaluation. DI tool, DI accuracy, and DI enhancement show values of 0.91, 0.96, and 0.65, which indicate that these elements favor supply chain system improvement. The 0.74 self-loop indicates that DI components are interdependent in improving digital capability.

Predictive Analytics (PA) 0.09 Supply Chain Flexibility (SCF), -0.19 SPE plays an important role through strong connections. Supplier Performance Evaluation (SPE), -0.77 PA association with Supply Chain Transparency (SCT) shows a moderate level of complex influence. 0.94 PA demand forecasting, 0.97 PA reduction in overstock, and 0.65 PA demand-driven pattern show their importance in improving supply chain operations. The 0.63 self-loop represents iterative feedback across the range of predictive analytics, which improves predictive ability in digital export from China to Africa (Huerta-Soto, Francis, Asís-López, & Panduro-Ramirez, 2023).

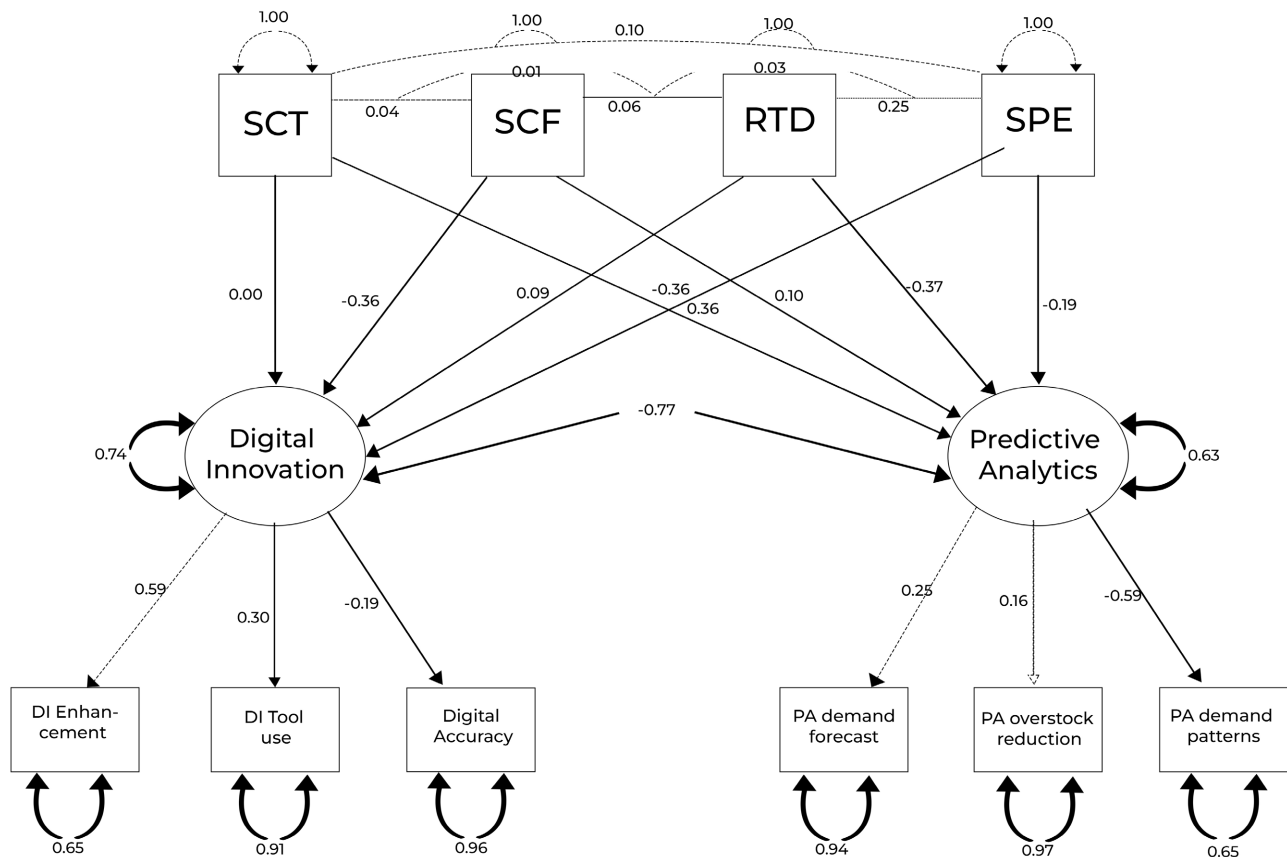


Figure 4. Structural diagram for supply chain management system.

Figure 4 clearly shows that DI (Digital Innovation) is enhanced by digital tools such as RTD (Real Time Data Analysis) and optimized SCT (Supply Chain Technologies) resources. Decisions can be made by ensuring accurate and efficient management. This tool shows a 0.96 critical digital accuracy and a 0.91 tool utilization. These findings allow for both transparency and accuracy in digital exports from China to Africa. Similarly, PA (Predictive Analytics) with digital tools improves demand forecasting by 0.94 and overstock reduction by 0.97. It reduces waste and provides alignment of supply with respect to demand. The transformative role of digital in facilitating sustainable exports between China and Africa is very useful.

4.7. A meditative Analysis for Supply Chain Performance

Table 6 shows the meditation analysis in search of DI (Digital Innovation) and PA (Predictive Analytics) to improve supply chain management system.

Several key performance indicator variables are used in this analysis. The most important dependent variables are Supply Chain Transparency (SCT), Supply Chain Flexibility (SCF), Inventory Management (IM), Real-Time Decision-Making (RTD), and Supplier Performance Evaluation (SPE). Direct effects, indirect effects, total effects, lower CI (confidence interval) and upper CI (confidence interval) are used to analyze each variable (Peng, Quan, Zhang, & Dubinsky, 2016).

Table 6. Meditation analysis for supplier performance evaluation.

Dependent _Variable	Total_ Effect	Direct_ Effect	Indirect_ Effect	Lower_ CI_Total	Upper_ CI_Total	Lower_ CI_Direct	Upper_ CI_Direct	Lower_ CI_Indirect	Upper_ CI_Indirect
SCT	-0.05513786	-0.070089794	0.014951934	-0.337622429	0.156752006	-0.348686144	0.205274143	-0.071868578	0.086909247
SCF	0.11807797	0.120047188	-0.001969218	-0.155396358	0.36005004	-0.147613557	0.379019252	-0.075617796	0.035286788
IM1	-0.298261887	-0.289518048	-0.008743839	-0.596349291	-0.033845156	-0.525312356	-0.032740106	-0.128818276	0.089992404
RTD	-0.001403362	-0.001506387	0.000103025	-0.183326189	0.169538128	-0.196182591	0.184984258	-0.032150194	0.028082221
SPE	0.003822332	0.003771029	5.13E-05	-0.261994733	0.21089117	-0.238298954	0.206913285	-0.043047254	0.03294254

Supply Chain Transparency (SCT) represents a cumulative effect of -0.0551 which is weak, and 0.0149 represents a small indirect effect. It shows that Predictive Analytics (PA) indirectly increases transparency although its effect is very small. Wider confidence intervals are shown to reflect variability in results. Supply Chain Flexibility (SCF) showed a positive base total effect of 0.1181 which is mainly driven by a direct effect of 0.1200 . This suggests that DI (Digital Innovation) strongly enhances the flexibility of supply chain performance. 0.0019 indirect effect is minimal and it is statistically insignificant (Zampese et al., 2016). Inventory Management (IM) shows a total effect of -0.2983 , which is negative. It shows that the DI (Digital Innovation) tool has a negative impact on innovation-oriented management. -0.0087 indirect effects contribute to the minimum level. The CI (Confidence Interval), in which both the direct effect and the total effect reflect the outcomes that contributed significantly. -0.0014 and 0.0038 are the total effects shown by RTD (Real Time Decision Making) and Supplier Performance Evaluation (SPE). Indirect effects have shown that DI (digital innovation) has a minimal effect on decision-making and supplier performance in relation to digital innovation for digital export from China to Africa (Zeng & Lu, 2021). **Figure 5** shows the impact of digital-based innovation tools using different key indicators on direct and indirect supply chain performance from the perspective of digital exports from China to Africa. A large orange bar below zero indicates a negative cumulative effect on inventory management. The blue bar shows the minimum mediation to describe the indirect effect on digital innovation-based tools. Supply Chain Flexibility shows positive direct and cumulative effects reflecting a substantial increase in digital tool adaptation.

Variables like RTD (Real Time Decision Making), SCT (Supply Chain Transparency) and SPE (Supplier Performance) at the micro level show indirect and total effect. This also shows that these areas of management are limited under DI (Digital Innovation) and PA (Predictive Analytics). The error bars shown by the CI (confidence interval) magnify the variability in the results considering digital exports from China to Africa (Yang et al., 2010).

The analysis in **Figure 5** and **Table 6** shows that using a digital tool increases RTD (real-time data) that ensures dynamic decision-making and responsiveness to supply chain operations. Improvement in SCF (Supplier Chain Flexibility) refers to adapting to changes in customer demands and maintaining efficiency that is

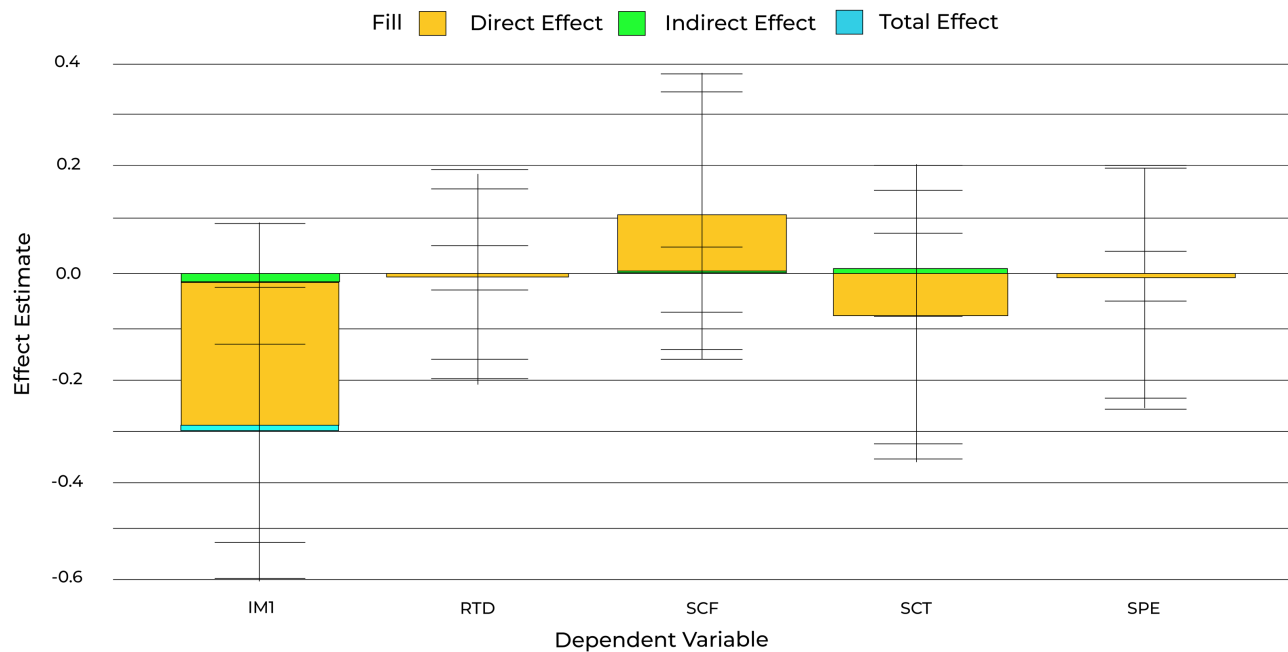


Figure 5. Meditation analysis for supply chain performance on digital innovation.

caused by unnecessary disruption. These findings suggest that digital tools have an important role in improving supply chain management that enhances digital exports from China to Africa. SCT (Supply Chain Technology) illustrates the efficiency of digital-based systems to integrate modern digital tools such as IoT (Internet of Things) and AI (Artificial Intelligence) to streamline logistics. The change in IM (Inventory Management) identifies some of the challenges to implementing digital tools that address inefficiencies in improving sustainable sourcing and supply chain management that drive digital exports from China to Africa.

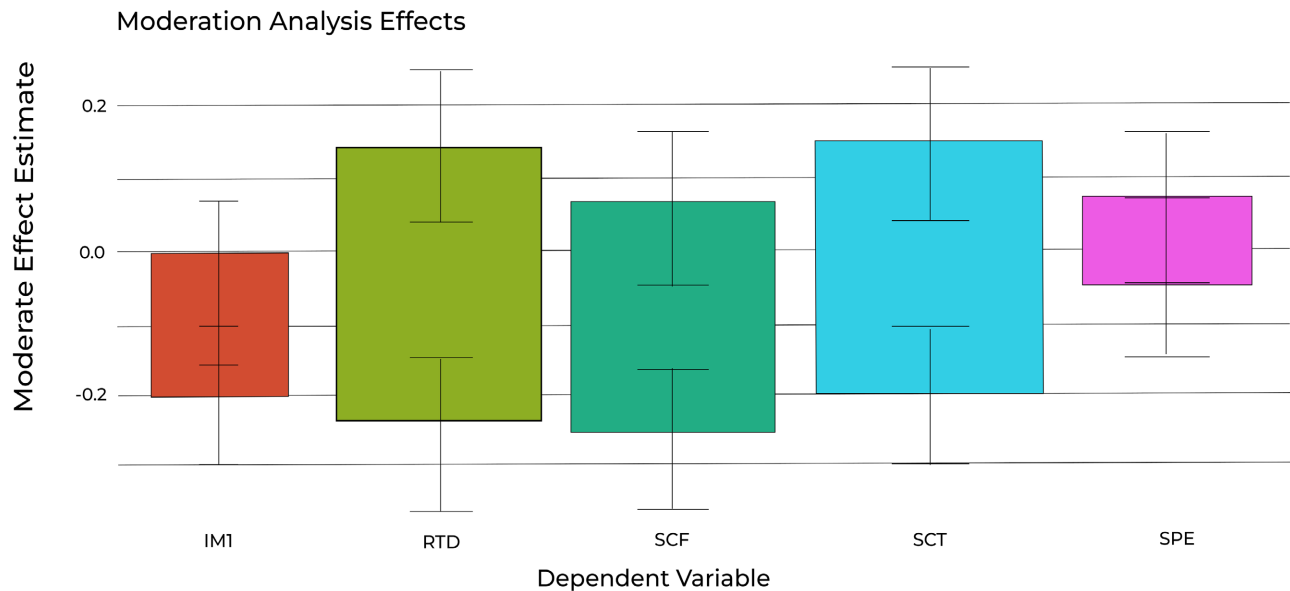
4.8. Moderation Analysis for Supply Chain Performance

Table 7 shows the results of DI (Digital Innovation) and PA (Predictive Analytics) through moderation analysis at the median level. -0.1988 , -0.3968 are DI (Digital Innovation) and PA (Predictive Analytics) effects for SCT (Supply Chain Transparency). A p -value of 0.0862 is observed which is statistically significant. 0.1366 , -0.1484 are DI (Digital Innovation) and PA (Predictive Analytics) effects for SPE (Supplier Performance Evaluation). Both are not significant. IM (Inventory Management) shows a negative effect of -0.2617 DI (Digital Innovation) and a very small effect of -0.0183 PA (Predictive Analytics). These are also non-significant for IM. A small positive DI effect of 0.0168 and -0.2534 negative PA, RTD effect is observed which is not significant. -0.0398 very small effect of DI and 0.1046 positive PA effect is noted in case of supplier performance evaluation. Both are insignificant (Lo et al., 2018).

Figure 6 shows the effects of different variables on the moderation level considering DI (Digital Innovation) and PA (Predictive Analytics). The red bar shows

Table 7. Moderation analysis for supply chain performance.

Dependent_Variable	DI_Moderator_Effect	PA_Moderator_Effect	p_Value_DI_Moderator	p_Value_PA_Moderator
SCT	-0.198823158	-0.396762351	0.283690126	0.086236208
SCF	0.136623492	-0.148443917	0.394840352	0.454931568
IM1	-0.26170223	-0.018284311	0.157406576	0.935898202
RTD	0.061783416	-0.253393733	0.661497878	0.149990225
SPE	-0.039766849	0.104575425	0.800627779	0.592013576

**Figure 6.** Moderation for supply chain performance considering digital innovation and PA (Predictive Analytics) effect.

a moderate negative effect for IM (Inventory Management) from DI (Digital Innovation) and PA (Predictive Analytics). The yellow bar indicates a mixed effect for RTD (Real Time Decision Making) with a small positive DI (Digital Innovation) effect and a negative PA (Predictive Analytics) effect. Pink represents SPE (Supplier Performance Evaluation), Green represents SCF (Supply Chain Flexibility) and Blue represents SCT (Supply Chain Transparency). SCF (Supply Chain Flexibility) and SCT (Supply Chain Transparency) show conflicting results. The variance is a significant variance (as indicated by the large error bars) but the overall effect is very small (Salam & Bajaba, 2023).

Table 7 and **Figure 6** show that the effects of DI (Digital Innovation) and PA (Predictive Analytics) are moderated. These vary significantly in supply chain indicators. For SCT (Supply Chain Transparency), PA (Predictive Analytics) shows that supply chain-based transparency needs improvement. Moreover, the non-significant level of results warrants further investigation. This shows that there is a great need for improvement in supply chain management optimization taking into account DI (Digital Innovation) and PA (Predictive Analytics) (Xu & Zhao, 2022).

Table 7 shows that DI (Digital Innovation) has a positive effect of 0.1366 on SCF (Supply Chain Flexibility) and 0.0618 on RTD (Real Time Data). While PA (Predictive Analytics) shows -0.3968 negative impact on SCT (Supply Chain Technology) and -0.2534 RTD (Real Time Data) as well as -0.1484 on SCF (Supply Chain Flexibility). A P value of 0.0862 for SCT (Supply Chain Technology) indicates scope for improving the supply chain. DI (Digital Innovation) shows a positive effect and PA (Predictive Analytics) shows an overall negative effect suggesting that the use of digital tools can enhance supply chain performance but still significantly lacking in predictive analytics applications. PA (Predictive Analytics) requires more focus and attention in better integration of supply chain systems.

5. Conclusion

Digitally driven exports between China and Africa offer significant potential to improve supply chain management systems in both countries, expand economies of scale and support robust e-commerce. The results of this study indicate that digital tools and PA (Predictive Analytics) are less developed with digital innovation (1.58 and SD 0.62). Regression analysis shows p -values (>0.05), which specifies that supply chain management system optimization is still at an early stage due to infrastructure and skill constraints. Reduction in overstock (mean 1.55 and SD 0.55), better demand forecasting (mean 1.18 and SD 0.39), supply chain transparency (mean 1.44 and SD 0.67) and flexibility (1.28 and SD 0.57) shows weak correlations with DI (Digital). These results focus on the need for further development of digital tools. Operational performance depends on supply chain transparency (1.44 mean and 0.67 standard deviation) and supply chain flexibility (1.28 mean and 0.57 standard deviation). Supply chain transparency and supply chain flexibility are proved to be a factor in analyzing operational performance. These findings suggest the need for technology development that improves the benefits of digital exports from China to Africa. Digital innovation and supply chain outcomes consist of SCT (Supply Chain Transparency) and SPE (Supplier Performance Evaluation) that reveal weak relationships through correlation analysis. This recommends that integrated strategies are in developing phase to strengthen digital connectivity for digital export. This research study proposes that digital exports between China and Africa can improve supply chain performance through digital technologies but still lacking due to both under-developed digital tools and infrastructure. Supply chain optimization covers digital innovations and advanced technologies such as predictive analytics activities and artificial intelligence that a supplier undertakes to improve the efficiency and cost-effectiveness of goods between China and Africa. Factors such as inadequate digital infrastructure, insufficient expertise in technical methods and integration challenges hinder the adoption of digital technology. The positive effects of better demand forecasting and reduction of overstocks indicate the need to improve strategies and investments using digital technologies to overcome the challenges of digital exports from China to Africa.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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