



Assessing The Role of E-Commerce in Transforming Supply Chain Management in China

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Abstract:

The explosive expansion of e-commerce is forcing supply chain management to change fundamentally everywhere. This is particularly true in China, where consumer behaviour and the expansion of digital innovation are driving these developments to hitherto unheard-of degrees. This study intends to investigate, within the context of China's supply chain management, the relationship between e-commerce and the optimization of logistics, the control of inventory, the demand forecasting, and the customer satisfaction. By adding current technologies such artificial intelligence (AI), cloud computing, and big data analytics into their e-commerce platforms, Chinese enterprises have been able to raise supply chain agility, cut operational costs, and provide more accurate real-time judgments. The proliferation of mobile commerce applications and online marketplaces is forcing businesses under pressure to put more efficient and flexible supply chains into use. This is so resulting from the growing competition these developments generate. The paper stresses how e-commerce fosters the growth of small and medium-sized firms (SMEs), helps to decentralize supply networks, and allows direct-to- consumer delivery approaches to lower value chains. It also examines the challenges preventing the realization of the best potential of the supply chain change brought about by e-commerce. These findings provide significant insight on the computed adjustments Chinese businesses are making to match the expanding digital environment. It takes advantage of approaches for qualitative and quantitative research. Apart from providing us a better grasp of the repercussions of online purchase on the efficiency and performance of supply networks, the conclusions should also have practical importance for legislators, researchers, and businesses seeking to manage the complex digital supply chains already in use.

1. Introduction

The rise of China as a worldwide leader in e-commerce and logistics innovation has caused a sea change in traditional wisdom about supply chain management. China's growing importance in

particular has brought about this change. The growth of e-commerce and digital platforms in China over the last ten years has been remarkable due to the nation's progressively broad access to the internet, great use of mobile devices, and government encouragement of these developments. Part of this is

the government's encouragement of certain patterns. The expansion has fundamentally changed supply chains' management, operation, and design as well as their influence. The fact that e-commerce have changed consumer expectations forces companies to change their supply chains to make them more quick, flexible, and responsive. Artificial intelligence, big data analytics, blockchain technology, and cloud computing among other technologies have revolutionized supply chain operations including inventory control, order fulfillment, last-mile delivery, and customer support[3]. The entrance of e-commerce into supply chains has resulted in intelligent warehouses, distributed networks scattered, and decision-making depending more on real-time data. These allusions have occurred concurrently. These developments have helped companies to expand their clientele and enjoy speedier development. These developments have also helped business operations to become more efficient. This shift has also brought to light many additional problems, including but not limited to worries about data privacy, shipment delays, cybersecurity dangers, and trouble in offering regulatory compliance. Companies must know how e-commerce is changing supply chain management if they want to keep their competitive advantage in China's fast growing digital economy. By means of an analysis of the positive and negative effects that e-commerce has had on supply chain management practices in China, this paper aims to clarify the strategic issues that businesses must address to fit this dynamic market[16].

2. Background of the Study

Not one country has where the impact of e-commerce on supply chain management is more evident than it is in China. China, as the biggest e-commerce industry globally, has revolutionized consumer engagement, digital commerce, and logistics. The emergence of e-commerce platforms has had a major influence on the supply chain architecture and administration of companies, therefore altering their buying patterns. Growing digital platforms like Pinduoduo, Alibaba, and JD.com have made supply chain operations even more dependent on data-driven procedures, real-time analytics, and many models of fast delivery. Companies must adapt to the additional efficiencies brought about by this development and concurrently overcome the obstacles it presents if they are to remain current with the always shifting industry. The advent of e-commerce into China's conventional supply chains has resulted in notable changes in logistics, procurement, distribution, and customer service among other sectors. Modern technologies

such cloud computing, artificial intelligence, big data, and blockchain enable intelligent supply chains to be realized. The always growing need for speed, adaptability, and precision in supply chain management drove the development of these technologies[4].

Official actions in China's logistics industry have hastened the digitalization of supply chain management by encouraging innovation and digitalization. Initiatives like the Digital Silk Road, investments in smart logistics parks, and the spread of 5G networks help China to better position itself to accommodate major supply chains powered by e-business. China's unique topography and large customer base have led to the construction of decentralized supply networks capable of meeting the needs of many different places. E-commerce systems have made this possible with their end-to-end logistics solutions, digital payment systems, and integrated warehouses capabilities. They have accomplished this by tying manufacturers in urban and rural areas to customers. By means of consumer data collecting and analysis, route optimization, inventory management in real time, these technologies enable the supply chain to gain greater agility and responsiveness.

This research was motivated by the need to investigate how e-commerce has affected supply chain management in China. For a range of Chinese businesses, the study will look at the factors both encouraging and discouraging this change. This study aims to provide some insight on the ways in which digital platforms and technology influence supply chain performance, the necessary changes to strategy, and the ways in which companies could acquire a competitive advantage by means of e-commerce. By means of the analysis of the relationship between digital innovation and logistical practices, the aim of this study is to provide light on how companies may enhance their supply chain operations in a market where online transactions are progressively taking front stage. Apart from this, it aims to add to the already body of knowledge on digital transformation, logistical advances, and Chinese e-commerce development. China's pivotal importance in the ecology of global supply chains means that the findings of this study might help local and foreign companies that deal with or within China[14].

3. The Purpose of the Research

The major goal of this study is to gain knowledge of the ways in which China's supply chain management techniques have evolved in response to the advent of online shopping and their explosive growth. Thanks to the venues China has created for online retail

sales, it has recently become the top country in digital commerce worldwide. These platforms have fundamentally changed operations in the supply chain—that is, transportation, procurement, distribution, and consumer contact. The main goal of this study is to grasp the ways in which internet purchasing has improved supply chain operations' responsiveness, efficiency, and flexibility. Investigating the manner in which Chinese businesses are using digital technology to keep a competitive edge over their competitors and fit the always changing needs of an online market is the second goal. Apart from this, the research will look at the difficulties companies have including infrastructure, data management, and sustainability when trying to include e-commerce into their supply chains. This study is being carried out in order to help companies, legislators, and academics interested in the link between digital innovation and supply chain strategy to have a better knowledge of the advantages and disadvantages related with supply chain transformation motivated by e-commerce. Seeing operational patterns transformed by digital commerce marks one of the most dynamic economic settings in the world; at the end of this, perhaps the researcher was highlighted this phenomena.

4. Literature Review

Countries such as China, who are in the process of rapidly developing their technical infrastructure, have seen a significant transformation in their supply chain management as a result of the growing digitalization of global commerce. The increasing focus on e-commerce has resulted in the transformation of traditional supply chains, which has led to the implementation of new levels of speed and transparency, as well as processes that are focused on the pleasure of customers. The integration of digital technology into supply chain systems is being pushed by Chinese businesses in an effort to improve the operational efficiency and responsiveness of their operations. Applications such as blockchain, artificial intelligence, big data analytics, and cloud computing are examples of the technologies that fall under this category[9]. E-commerce platforms based in China, such as Pinduoduo, Alibaba, and JD.com, have had a significant impact on the development of a supply chain ecosystem that is more data-driven via increased flexibility. The proliferation of online marketplaces has made it possible for suppliers and manufacturers to reduce the expenses associated with their inventory and take advantage of just-in-time delivery strategies. This has been accomplished by eliminating the need for intermediaries and

adopting a straightforward approach to dealing with clients. In addition, the use of digital payment systems and integrated smart logistics technology has resulted in the simplification of the procurement and delivery processes in both urban and rural environments. Research reveals that the use of online shopping in China enhances visibility across the supply chain, contributes to the management of inventories in real time, and allows the generation of demand predictions in a more expedient manner. Because of this enhancement, the management of risks has been improved, and the flexibility of the supply chain has also been increased. In addition, digital marketing strategies, the incorporation of social media, and mobile commerce all have a significant impact on the participation of customers and the logistics of fulfillment. The research has shown that there are a great deal of issues connected to the transition of supply chains. An example of this would be the need for continuous training of staff members. Another example would be the dangers associated with cybersecurity and the unequal access to digital infrastructure that is seen in rural regions[2]. To speak more generally, the e-commerce industry in China is a big driver of supply chain innovation in the country. In order for businesses to maintain their competitive advantage in this market, they need to embrace digital technologies and increase the amount of time they spend using them. In light of China's continued efforts to establish regulations that are conducive to the digital economy and international e-commerce, it is anticipated that supply chain systems would experience increased integration, intelligence, and sustainability. Companies are experiencing a cultural revolution as well as a technological revolution because they are adapting their organizational strategies and systems to accommodate the age of digital technology. This is happening concurrently with the phenomenon of the technological revolution[7].

5. Research Question

What is the role of digital payment systems in enhancing transparency within supply chain processes in China?

6. Methodology

6.1 Research Design:

The researcher employed SPSS version 25 for the quantitative data analysis. The odds ratio and the 95% confidence interval, when utilised in conjunction, may provide further insights into the attributes and progression of this statistical

association. The p-value was established at a statistically significant threshold of less than 0.05. A comprehensive understanding of its fundamental characteristics was attained by descriptive data analysis. A quantitative method employs mathematical, arithmetic, or statistical analysis to objectively assess replies to surveys, polls, or questionnaires, and it also depends on computational skills for data processing.

6.2 Sampling:

This study employed a random sampling methodology. Data for the study were collected via questionnaires. A sample of 1670 individuals was determined using the Rao-soft algorithm. A total of 1800 surveys were distributed; 1745 were returned, with 25 excluded due to incomplete responses. The conclusive count for the investigation comprised 1720 questionnaires.

6.3 Data and Measurement:

A questionnaire survey functioned as the primary data collection instrument for the investigation. The survey comprised two sections: (A) General demographic information and (B) Responses on online and offline channel factors measured on a 5-point Likert scale. Secondary data was collected from several sources, primarily focussing on online databases.

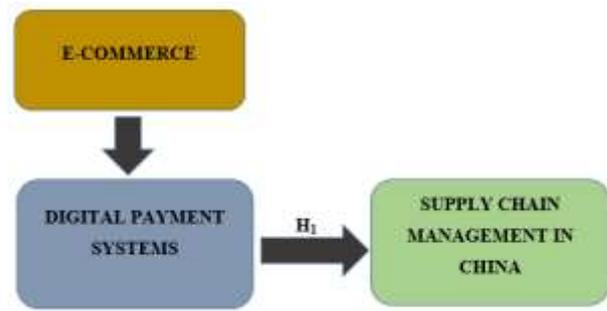
6.4 Statistical Software:

Statistical analyses were conducted with SPSS 25 and Microsoft Excel.

6.5 Statistical Tools:

Descriptive analysis was employed to understand the essential nature of the data. The researcher employed ANOVA for data analysis.

7. Conceptual Framework



8. Result

Factor Analysis

One typical use of Factor Analysis (FA) is to verify the existence of latent components in observable data. When there are not easily observable visual or diagnostic markers, it is common practice to utilise regression coefficients to produce ratings. In FA, models are essential for success. Finding mistakes, intrusions, and obvious connections are the aims of modelling. One way to assess datasets produced by multiple regression studies is with the use of the Kaiser-Meyer-Olkin (KMO) Test. They] verify that the model and sample variables are representative. According to the numbers, there is data duplication. When the proportions are less, the data is easier to understand. For KMO, the output is a number between zero and one. If the KMO value is between 0.8 and 1, then the sample size should be enough. These are the permissible boundaries, according to Kaiser: The following are the acceptance criteria set by Kaiser:

A pitiful 0.050 to 0.059, below average 0.60 to 0.69 Middle grades often fall within the range of 0.70-0.79.

With a quality point score ranging from 0.80 to 0.89. They marvel at the range of 0.90 to 1.00.

Table1: KMO and Bartlett's Test

Testing for KMO and Bartlett's Sampling Adequacy Measured by Kaiser-Meyer-Olkin .960

The results of Bartlett's test of sphericity are as follows: approx. chi-square

df=190

sig.=.000

Table 1: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.910
Bartlett's Test of Sphericity	Approx. Chi-Square	3252.968
	df	190
	Sig.	.000

This substantiates that assertions on the execution of a sample are valid. Researchers used Bartlett's Test of Sphericity to evaluate the importance of the correlation matrices. The Kaiser-Meyer-Olkin metric deems the sample satisfactory when the value is 0.910. The p-value obtained from Bartlett's sphericity test is 0.00. The statistically significant findings of Bartlett's sphericity test indicate that the correlation matrix differs from an identity matrix.

Independent Variable

E-Commerce:

Sometimes referred to as "e-commerce," electronic commerce is the practice of using electronic means—that is, the internet—to conduct commercial transactions including data transfers, financial transactions, and products and service exchange. Digital platforms may help to allow many kinds of company models. Among these models are consumer-to--business (C2B), business-to--consumer (B2C), and company-to--business (B2B). E-commerce makes advantage of several technical developments such cloud computing, data analytics, artificial intelligence, mobile apps, and digital payment systems in order to simplify corporate processes, improve the quality of the consumer experience, and enhance decision-making. The simplicity with which cellphones may connect to the internet and their general availability have greatly sped the expansion of e-commerce[8]. Thanks to the explosion of cellphones, consumers may now buy online wherever and whenever they want. Moreover, e-commerce systems help to lower running costs and boost market reach by means of real-time data on consumer preferences and behaviour, thus addressing issues. Modern e-commerce systems include inventory monitoring, automated order processing, and logistical solutions along with supply chain management tools incorporated within the platform helping to deliver them. Companies utilize complex algorithms and recommendation systems to increase sales and provide more choices for services customizing ability. Online shopping is currently becoming more and more important of a component of digital transformation plans in a broad range of various sectors due to its great impact on changing consumer behaviour and the way retail environments all over the world are built[12].

Factor

Digital Payment Systems:

The automated methods of cash transfer that are known as digital payment systems are those that do not involve the use of paper-based things such as checks or actual money. By using digital platforms such as mobile apps, online banking portals, payment gateways, and contactless card technology, these systems make it possible for individuals, corporations, and governments to send and receive monetary transactions in a manner that is both secure and efficient. A few examples of digital payment methods that are often used include credit and debit cards, mobile wallets, internet banking, QR codes, and other forms of cryptocurrencies. The use of online banking is yet another option[13]. Because of their adaptability, speed, and compatibility with a large range of transactions that may be undertaken on numerous platforms and devices, digital payment systems are highly vital for the current economy. Additionally, they demonstrate their commitment to the advancement of financial inclusion by providing mobile banking services to regions that have not been banked up to this point. In addition, the use of digital payment systems results in an increase in transparency and a reduction in the likelihood of theft and fraud instances. These systems incorporate a number of different technologies, such as tokenization, encryption, and multi-factor authentication, in order to safeguard user information and transactions. There are a number of variables that have contributed to the widespread adoption of digital payment systems all over the globe. One example of this is the proliferation of cellphones, another is the growth of online commerce, and still another is the transparency of government policies. The process of transitioning away from economies that are based on cash is dependent on digital payment systems since these systems promote the expansion of businesses, simplify the process of conducting financial transactions, and enhance economies in both urban and rural areas[5].

Dependent Variable

Supply Chain Management in China:

Supply chain management is the strategic alignment and integration of all corporate processes linked to sourcing, procurement, production, transportation, and distribution. This is done within the framework of China's evolving economic situation. China's complex and worldwide integrated supply chains connect with markets all over. China is a big actor in the global manufacturing and export sectors; its supply chain is complicated. Often referred to as management of the supply chain in China, supply chain management is the organization and following

of processes to ensure continuous transfer of goods, knowledge, and money from producers to consumers. Maximizing production is the aim; simultaneously, overhead costs should be reduced and a competitive advantage maintained in home as well as overseas markets[6]. China's supply chains increasingly find use for digital technologies like blockchain, the Internet of Things (IoT), AI, and big data analytics. These technologies aim to increase responsiveness, traceability, and openness all the way down the value chain hence boosting efficiency. Moreover having significant influence on supply chain network management and administration are the Belt and Road Initiative and the expansion of internet business. In response to environmental restrictions and disruptions like the COVID-19 epidemic, resilience, environmentally friendly techniques, and green logistics have increasingly gained increased attention. Good application of supply chain management in China not only increases corporate efficiency but also encourages innovation, trade competitiveness, and global supply network integration, thus boosting business performance. These components put together enable the nation to be quite prosperous economically[15].

Relationship Between Digital Payment Systems and Supply Chain Management in China

Given China's economy and e-commerce platforms are still undergoing fast digitalization, it is hard to exaggerate the relevance of digital payment systems in supply chain management. Usually, when people talk about digital payment systems, they are talking to the great usage of online banking, mobile payment apps, and third-party platforms as Alipay, WeChat Pay, and UnionPay. The way in which transactions are conducted has been drastically changed because these technologies have made it feasible to provide quicker, more safe, traceable supply chain payment options. Thanks to digital payment systems, producers, distributors, and stores in China's vast and often shifting supply chains may seamlessly transmit money among one another[1]. This guarantees dependability and timeliness of completion of business transactions. Integration of digital payments helps to reduce human mistake, fraud risk, and delay likelihood. One does this by moving away from cash-based or manual approaches. Consequently, operations are more transparent, relationships with suppliers are closer, and cash flow results are more under control. If companies could pay their bills in real time, they may be able to improve their decision-making, streamline their inventory control, and react faster to demand swings or supply interruptions. Among the many players in China's supply chain network that

would most gain from digital payment systems are SMEs. Their potential advantages are substantial. These businesses streamline their financial processes, have improved access to financial resources, and extend their clientele. Thanks to digital wallets and QR code-based transactions, small-scale and rural producers now have the chance to join national and global supply chains. Thanks to these developments, even the most remote sites all across the globe may be digitally recorded. Since digital payment systems help to impose taxes, formalize and monitor business activity, and promote a society devoid of cash payments, their broad usage benefits the economy as a whole[10]. Together with technologies like the IoT and blockchain, digital payments might help to make supply chains more obvious and traceable. This is ideal for meeting consumer expectations on responsibility as well as for following legal rules. Finally of importance is the adoption of digital payment methods, which motivates Chinese supply chain managers to enhance their practices. Apart from improving operational efficiency, financial inclusion, and visibility throughout the supply chain, they also raise the safety of financial transactions and the speed of completion of them. As digital infrastructure develops, it is expected that the link between digital payments and supply chain management will become more solid. This would thus help China's supply chain ecosystem to remain globally resilient and competitive[11].

On the basis of the above discussion, the researcher formulated the following hypothesis, which was analysed the relationship between Digital Payment Systems and Supply Chain Management in China.

“H₀: There is no significant relationship between Digital Payment Systems and Supply Chain Management in China.”

“H₁: There is a significant relationship between Digital Payment Systems and Supply Chain Management in China.”

Table 2: H₁ ANOVA Test

ANOVA					
Sum	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	39588.620	699	5655.376	1097.492	.000
Within Groups	492.770	1020	5.153		
Total	40081.390	1719			

This investigation yields remarkable results. The F value is 1097.492, attaining significance with a p-value of .000, which is below the .05 alpha threshold. This signifies the “H₁: There is a significant relationship between Digital Payment Systems and

Supply Chain Management in China” is accepted and the null hypothesis is rejected.”

9. Discussion

E-commerce has been able to significantly contribute to the development of supply chain management in China thanks to the widespread use of digital payment systems, which has been an essential enabler. E-commerce has also played a significant role in bringing about a paradigm shift in the traditional beliefs that have been associated with supply chain operations. A number of factors have contributed to the occurrence of this transformation, including the quickening of transactions, the expansion of market access, and the exchange of data in real time between purchasers and vendors. China, a country that is well-known for its enormous consumer base and rapid adoption of technology, has experienced changes in the sourcing, storage, shipping, and delivery of products as a result of the emergence of e-commerce websites such as Pinduoduo, Alibaba, and JD.com. Companies have the ability to automate demand forecasting tools and process automation via the use of e-commerce, which in turn makes it easier for them to conduct procurement operations, reduces overhead expenditures, and fosters tighter ties between manufacturers and their customers. E-commerce is an independent element that is driving the digital transformation that is occurring in supply chains. By fostering innovation, flexibility, and a reaction that is centred on the requirements of the consumer, it accomplishes this. An ecosystem that is driven by data, customer-centric, and technologically enabled framework is currently the dependent variable in China's supply chain management. Previously, the ecosystem was fragmented and focused on logistics. The increasing number of options available for making payments online is one of the most significant factors contributing to this expansion. The fact that digital payments ensure that all parties in the supply chain are paid in a transparent and timely way, reduce the amount of human participation that is required in the processing of payments, and provide the foundation for financial transactions that are both secure and rapid. As a consequence of this integration, participants in the supply chain are more inclined to trust one another, which in turn makes it easier for operations to expand. Additionally contributing to the expansion of financial inclusion are the many ways of digital payment. It is for this reason that SMEs that are dispersed throughout remote places are able to get access to supply chains on a national and international scale. Due to the speed and dependability of digital transactions, the risks and

delays that are associated with the handling of money and the processing times of banks are significantly reduced. E-commerce websites that use digital payment systems are in a good position to better monitor supply chain flows, respond quickly to market fluctuations, and retain real-time financial data. All of these things are vital for planning and analytics, and they are also essential from a business perspective. The convergence of electronic payment systems and online shopping is very consistent with China's objectives for the development and innovation of its technological sector. The Chinese government's policies are designed to facilitate the expansion of the digital economy; hence, the growth of online commerce and electronic payment systems is a direct consequence of the legislation that encourage the development of such systems. Blockchain technology, artificial intelligence, and big data are all contributing to the development of digital payment systems that are increasingly advanced and interconnected. Enhanced supply chain performance is achieved by the use of these systems, which include automated compliance, fraud detection, and predictive analytics. Automated compliance is another feature offered by these systems.

10. Conclusion

Ultimately, the research on how e-commerce has changed supply chain management in China shows that companies are now giving enhancing their efficiency, speed, and digital integration much more top priority. The e-commerce explosion has made the supply chain ecosystem more flexible and sensitive. This is so because e-commerce has streamlined consumer contact, inventory control, distribution, and procurement's related tasks. The extensive usage of e-commerce platforms has fundamentally changed the way supply chains are managed in China, therefore affecting the dependent variable. Its evolution has made it possible to fit digitalization, automation, and real-time data interchange. Since they enable open, quick, secure financial transactions at every level of the supply chain, the development of digital payment systems has been a necessary component of this change. These solutions are especially successful in China's high-volume market because of their reduction of operational friction, enhancement of cash flow, and building of confidence among stakeholders. The e-commerce and digital payment systems have helped China's digital economy's general objectives to be in line with the better supply chain capabilities, greater involvement of small and medium-sized firms, and harmony of aims. It is expected that as technology develops they will transform supply chain

operations, boost competitive advantages, and help the region's overall sustainable economic development to be realized.

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
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