International Journal of Entrepreneurship, Management and Social Sciences (IJEMSS)
Volume 2, Issue 1; ISSN: 3026-9881
email: ijemss@futminna.edu.ng

# E-commerce Models and Supply Chain Management Optimization of Firms in Kwara State

Abdulazeez Alhaji Salau
Department of Business and Entrepreneurship (Marketing Unit), Faculty of Management and Social Sciences, Kwara State University
sirsalau@gmail.com

## Abstract

*The widespread adoption of the internet and information technology globally has played a significant role in catalyzing the rise and evolution of e-commerce. In Kwara State, Nigeria, while e-commerce adoption has lagged behind more developed nations, efforts have been made to bridge this gap. This study examines the impact of e-commerce models (Business-to-Business (B2B), Business-to-Consumer (B2C), and Online-to-Offline (O2O)) on optimizing supply chain management of Small and Medium Enterprises (SMEs) in Kwara State. Employing a descriptive research design and utilizing a self-administered questionnaire with a sample of 400 SMEs, the study found significant positive impacts from B2B, B2C, and O2O models. Specifically, B2B models showed a coefficient of 0.420 ($t = 21.871$, $p < 0.001$), B2C models exhibited a coefficient of 1.080 ($t = 66.494$, $p < 0.001$), and O2O models demonstrated a coefficient of 0.097 ($t = 3.210$, $p < 0.001$). The overall model demonstrated a strong fit, with an R-squared of 0.997 and an F-statistic of 46171.032 ($p < 0.001$). Based on the study's findings, the study recommend that SMEs should be provided with access to digital marketing training and tools, including workshops on social media marketing, SEO, and CRM systems, to improve B2C effectiveness.*

***Keywords:*** *E-commerce models, Supply chain management, SMEs*

## 1.0 Introduction

The global adoption of the internet and information technology has significantly revolutionized supply chain management through e-commerce. E-commerce enables the transparent, rapid, and accurate transmission of information and funds within supply chain networks, enhancing the management of information and capital flow (Min, 2021). This transformation redefines traditional procurement, production, sales, and service processes, creating complex supply networks that include manufacturers, suppliers, distributors, logistics providers, and financial institutions (Trong and Kim, 2020).

E-commerce models—Business-to-Business (B2B), Business-to-Consumer (B2C), and Online-to-Offline (O2O)—integrate businesses with supply chains to increase efficiency. The B2B model facilitates inter-business transactions, dominating markets like China (Iankova Davies & Archer, 2019). The B2C model connects businesses directly with consumers, often with intermediaries (Iankova *et al.*, 2019), while the O2O model

merges online and offline services to optimize customer experiences (Yang and Wang, 2016).

Effective supply chain management requires seamless information, capital, and logistics management. Retailers adopting e-commerce often leverage drop-shipping to eliminate supply chain overhead, ensuring speed and reliability. However, optimizing supply chains demands intelligent logistics networks and real-time data for decision-making (Min, 2021).

Despite global advancements, Nigeria faces challenges in adopting e-commerce-based supply chain practices. These include inadequate IT investment, poor communication, ineffective training, and limited stakeholder engagement. Issues such as poor logistics arrangements and insufficient quality control further impede efficiency.

This study addresses the lack of empirical evidence on the impact of e-commerce models in Nigeria by exploring how B2B, B2C, and O2O models optimize supply chain management, overcoming local challenges and enabling effective project delivery.

### 1.1 Research Hypotheses

In line with the specific objectives stated earlier, the following research hypotheses were stated in null form in order to answer the research questions and tested empirically to achieve the research objectives of the study:

i. $Ho_1$: There is no significant effect between Business to business (B2B) and optimizing supply chain management of firms in Kwara State.

ii. $Ho_2$: Business to consumer (B2C) does not have significant impact on optimizing supply chain management of firms in Kwara State.

$Ho_3$: There is no significant influence between Online to Offline (O2O) and supply chain management of firms in Kwara State.

## 2.0 Literature Review

E-commerce is the practice of conducting market transactions between two or more parties using information and communication technologies, frequently between consumers and enterprises. E-commerce model is the use of Internet technology to network scheduling product resources. For this reason, in addition to relying on information technology to realize the construction of e-commerce platform, it also needs the support of a suitable supply chain network system to adapt to the background of “Internet +” under the development needs of e-commerce platforms (Min, 2021)

E-commerce is any form of business relationship where the interaction between actors occurs through the use of internet technology (Lummus, *et al* 2013) The benefits of electronic commerce are: facilitating 24/7 shopping, convenience, time saving, no geographical limitation, in- creased efficiency, precise target marketing, and ease of initiating and administrating a company (Taher, 2021).

The B2B model mentioned in e-commerce supply chain management is the communication and cooperation between enterprises, that is, the Internet serves as a platform on which enterprises exchange products, information and services. Usually, there are two ports of supply chain and demand chain in the B2B model. Suppliers belong to the upstream, and the downstream is the customer. Therefore, the two are from different perspectives, and there are differences in the content and operation mode For those enterprises who are in the mode of the intermediate links, the size and strength of the supply chain gap is the decisive factor, between the two parties to develop B2B strategy model strategy at the same time due to the economic environment changes and the influence of market demand, the market environment has dominated by-products from into markets dominated by consumers (Li, 2012).

Compared with the previous, purchasing for inventory is changed to purchasing for order, internal purchasing management is changed to external resource management, and the general buying and selling relationship is changed to strategic cooperative partnership (Liao, *et al*. 2018). These changes are in line with the integrity principle, high-efficiency principle and information principle (Lummus *et al.*, 2013). First, such a transformation makes all the participating enterprises in the whole supply chain unify and coordinate with each other, thus effectively simplifying the smooth capital flow, information flow and logistics, promoting the joint efforts of all enterprises and improving the overall competitive advantage Secondly, the big data analysis of the Internet trading platform can make logistics more efficient and save costs at the same time. In addition, enterprises can share and obtain information through the Internet trading platform, which makes the communication between enterprises more convenient and faster without barriers Therefore, by following the three principles to improve the market response speed and sensitivity of the whole supply chain, with the lowest cost to obtain the maximum economic benefits

The B2C supply chain model is the business chain from enterprises to consumers. Driven by Internet technology, this kind of supply chain also has the mode of inserting distributor links in the middle and finally reaching the consumer port, namely B2B2C (Iankova, *et al*, 2019)

Service to consumers is the starting point of supply chain management, through the establishment of a lean management system, to improve customer service quality and customer satisfaction. The core of lean management lies in consumer experience and fast response (Yao, 2015). On the one hand, facing the current market environment dominated by consumers, consumer satisfaction and consumer experience are the key, which is not only reflected in product price, delivery time and service attitude but more importantly, whether the products and services provided to consumers can truly meet consumer needs. On the other hand, the fierce competition environment requires the whole supply chain to have the ability to respond quickly, to flexibly allocate resources (Yao, 2015)

O2O is a kind of online and offline connection e-commerce model that emerged in the development of the Internet, and the O2O supply chain management model is a new cooperative supply chain system under the O2O e-commerce model. The essence of this supply chain management mode lies in "joint service". Enterprises under the cooperative

system aim at efficiency and cost reduction and effectively integrate the service supply chain to provide comprehensive online and offline services to customers (Yang, & Wang 2016). In other words, in the whole process of consumers' consumption, online platforms are equipped with information integration functions such as consumption guide, product information, payment method and sharing platform, while offline stores are dedicated to providing services for consumers. In addition, compared with B2C, the O2O supply chain management model is more suitable for traditional industries, such as furniture, real estate, cars and other commodities without certain standards and with high prices, or fresh products. The consumption demand of such customers requires extreme consumption experience (Govindan and Malomfalean, 2019).

**2.1 Supply Chain Management**

Supply chain management was proposed by Michael E. Porter in 1985. Supply chain management is an effective combination of suppliers, manufacturers, sellers, and logistics to produce goods. It aims to meet the service level while at the same time. A set of management methods that minimizes the cost of the supply chain, getting the right amount of product to the right place at the right time, and minimizing the total cost of production and distribution)e characteristics of supply chain management can be summarized in three aspects (Trong & Kim, 2020)

First, optimize the logistics chain within the enterprise and extend it to external partners. then, obtain the flexibility of product supply and service provision when demand fluctuates. Finally, improve the transparency of the value chain stage. When a company adopts supply chain management, it ultimately wants to achieve the following three goals: first, improving the maximum satisfaction of customers by improving the flexibility and reliability of delivery; second, using supply chain management to reduce inventory and reduce production and distribution costs to achieve the goal of reducing company costs; third, eliminating error costs and abnormal events, which optimizes the overall process quality of the enterprise

Flöthmann et al (2018) defined SCM as “all the series of processes that involves planning and managing procurement sources, materials conversion, and all logistics management actions, including alliance with suppliers, middlemen, third-party service providers, and customers”. SCM is the design, planning, execution, control, and monitoring of supply chain activities with the goal of creating net value, constructing a competitive infrastructure, utilizing worldwide logistics, coordinating supply with demand, and assessing global performance

SCM practices are an organization's initiatives to promote supply chain management (Li, *et al*, 2016). Best supply chain procedures affect the full chain, its parts, or critical processes (Cuthbertson and Piotrowicz, 2018)

Latest evolution of SCM practices includes supplier partnership, outsourcing, continuous process flow, information technology sharing and purchasing, quality, and customer relations. SCM practises focus on core competencies, use inter-organizational systems such as electronic data interchange (EDI), and elimination of excess inventory by postponing customization to the end of the supply chain (Zhao and Lee, 2019)

## 2.2 Theoretical Review

### Resource-Based View (RBV) theory

This study conceptually explores the intricate relationship between e-commerce models—specifically B2B, B2C, and O2O—and the optimization of supply chain management and performance. Theoretically, the research is primarily grounded in the Resource-Based View (RBV) theory. This theory underscores the critical importance of examining a company's internal environment to identify sources of competitive advantage. It posits that a firm's ability to achieve superior organizational performance and effectively compete hinges on possessing resources and capabilities that surpass those of its rivals.

However, RBV is not the sole theoretical lens through which this study is viewed. Complementary theories, such as Transaction Cost Economics (TCE), Network Theory, and the Diffusion of Innovation Theory, also offer valuable insights. TCE helps explain the rationale behind firms' choices of e-commerce models and supply chain relationships by focusing on minimizing transaction costs. Network Theory elucidates the significance of network relationships and collaborations, particularly relevant for B2B and O2O models. The Diffusion of Innovation Theory sheds light on the adoption rates of e-commerce models by SMEs in Kwara State.

Despite its strengths, the RBV theory is not without limitations. Critics point to its static nature, the difficulty in accurately measuring VRIO (valuable, rare, inimitable, and organized) resources, and its potential neglect of external factors. The theory assumes resource heterogeneity and immobility, and it emphasizes that resources must be VRIO to confer a sustainable competitive advantage.

RBV provides a framework for understanding how SMEs in Kwara State can leverage their internal resources to effectively implement e-commerce models and optimize their supply chain management. It highlights the importance of identifying and developing unique resources and capabilities that can provide a competitive edge in the e-commerce landscape. By applying RBV, the study aims to determine which internal resources within SMEs are facilitating or hindering the adoption and optimization of these e-commerce models, ultimately contributing to a sustainable competitive advantage.

## 2.3 Empirical Review

Iguang, *et al* (2023) investigated the impacts of e-commerce supply chain finance (SCF) on small and medium enterprises' (SMEs) financing performance in China. Using the 423 observations panel dataset of Chinese technology-based SMEs for the period from 2011 to 2020, the descriptive, correlation statistics and regression analysis are conducted. The findings indicate that e-commerce SCF platforms facilitate SME financing by increasing the coverage breadth and usage depth. Particularly, The study found that comparing to e-commerce SCF usage depth; the coverage breadth has more positive impacts on SMEs' financing performance. In addition, this research also reveals the positive moderating effects of green innovation on this relation

Sakas, *et al* (2023) investigated leading logistics firms' re-engineering through the optimization of the customer's social media and website activity in Malaysia; Collecting behavioral big data from the logistics companies' social media and websites was the first step. Next, regression and correlation analyses were conducted, together with the creation

of a fuzzy cognitive map simulation in order to produce optimization scenarios. The results revealed that re-engineering marketing strategies and customer behavioral big

data can successfully affect important digital marketing performance metrics. Additionally, social media big data can affect change management and re-engineering processes by reducing operational costs and investing more in social media visibility and less in social media interactivity

Min (2021) examined Optimization of E-Commerce Supply Chain Management Process in Japan. Based on Internet of Things Technology) rough the application of the Internet of wings technology, small- and medium-sized enterprises can optimize the workflow and circulation links of the e-commerce supply chain management, enhance the matching level of product value and information transmission, improve the supply chain operation mechanism, and increase economic benefits.

From the empirical literature reviewed, it was observed that few studies have been done on the impact of E-commerce models on optimizing supply chain management of firms of countries in developed and developing countries (Iguang *et al*, 2023; Sakas, *et al* 202; Lee, 2021; Kilay, *et al,* 2022; Josephine and Samuel, 2019). Given this gaps identified in from the extant studies, this study differs in some way from existing ones by examining B2B models, B2C models, O2O models, Also this study focuses specifically focused on small scale business in Kwara State.

## 3.0 Methodology

The study utilized a descriptive research design. Descriptive research design purposes to establish a relationship between the variables. This design was suitable for the study since it is flexible in establishing the relationship existing between the study variables. The population of this study consists of all SME's in Kwara State. According to National Bureau of Statistics (2020) the total number of SME's categorized by small scale enterprise in Kwara state is 717,909. The sample size for the study was determined using the Yamane (1967) formula for sample determination. Based on the result, the sample size used for this study is 400 which was distributed to SME's staff in small and medium scale enterprise

The study employed the use of primary data through self-administered questionnaire to receive elicit response from the targeted respondents.

The study utilized primary data to achieve research objectives. Data was collected via well-structured questionnaires to be issued to owners of SMEs. The data that was collected was sorted and coded using the Social Sciences Statistical System (SPSS). Upon the completion of cleaning and sorting of data that comprised of sorting of errors which had occurred amid the process of data entry every quantitative factor as well as the table layouts, descriptive statistics like standard deviation, percentages, mean scores, frequencies were approximated. The inferential statistics that will be used include the multiple linear regressions. This was done to describe the relationships between the independent variables of the study with the dependent variable of the study.

## 4.0 Data Presentation and Analysis of Results

**Table 1: Demographic Features of Respondents**

| Characteristics | Category | Frequency | Percent |
|---|---|---|---|
| Legal Status | Enterprise | 15 | 75 |
| | Limited | 5 | 25 |
| | Total | 20 | 100.00 |
| Number of employees | 1 – 5 | 5 | 25 |
| | 6 – 10 | 10 | 50 |
| | >10 | 5 | 25 |
| | Total | 20 | 100.00 |
| Date of Commencement | Before 2000 | 2 | 10 |
| | 2000 – 2005 | 1 | 5 |
| | 2006 – 2010 | 5 | 25 |
| | 2011 – 2015 | 6 | 30 |
| | 2016 – 2020 | 3 | 15 |
| | 2021 till date | 3 | 15 |
| | Total | 20 | 100 |

*Source: Researcher's Output (2024) Using SPSS*

There are three demographics in the data analysis in Table 1 namely: number of employees, legal status, and date of commencement of the business. With regards to legal status, majority 75% of the small businesses are enterprise and 25% are limited businesses. With regards number of employees in the business, a total of 25% has between 1 – 5 employees, 50 % has 6 – 10 number of employees in the small business and 25% businesses have number of employees >10. With regards to date of commencement of the business, 15% of the small businesses commenced in 2021 till date. Followed by 30% that commenced between 2011 – 2015. 15% of the small businesses commenced operations between year 2016- 2020. 13% small business commenced operations between 2006-2010 whereas 5% small businesses commenced operations between 2000 to 2005 and 10% begin before year 2000.

4.1 Presentation of Estimated Models

A regression analysis was conducted to analysis the impact of E-commerce models on SME development in Kwara State.

Table 2: Impact of E-commerce models on SME Development

| Variables | Coefficients | S.E. | T | Sig. |
|---|---|---|---|---|
| B2B | 0.420 | 0.019 | 21.871 | 0.000 |
| B2C | 1.080 | 0.018 | 66.494 | 0.000 |
| O20 | 0.097 | 0.030 | 3.210 | 0.001 |
| Constant | -2.534 | 0.096 | -26.502 | 0.000 |
| Model Diagnostic | | | | |
| F-stat: | 46171.032 | | | |
| F-prob | 0.000 | | | |
| R-square: | 0.997 | | | |

*Dependent Variable:* Supply Chain Management Efficiency (Delivery time and service quality)

*Source: Researcher's Output (2024) Using SPSS*

Table 2 show model summary. It shows the coefficient of determination ($R^2$) is 0.997 which implies that Business to business (B2B), Business to consumer (B2C) and Online to offline (O2O)explains about 99.7% of the variability in Supply chain management efficiency in Kwara state while the remaining % is explain by other variables not captured in the model. In addition, the F-value was 46171.032 with p-value of .000 which show that the independent variables were jointly significant. On the other hand, it implies that there is a statistically significant relationship between E-commerce models and Supply chain management efficiency in Kwara state with significant value of 0.000 which is less than 0.005 or 5% significant level.

The above result reveals that B2C has a coefficient of approximately 0.42 which implies that a one unit increase in Business to consumer (B2C) will increase the level of Supply chain management efficiency by about 0.42unit and its probability value of 0.000 is less than 1 percent significance level, hence the relation is statistically significant.

Similarly, O2O has a positive relationship with Supply chain management efficiency given its coefficient of 1.080 signifying that a one unit increase in Online to Offline (O2O) will the level of Supply chain management efficiency by approximately 1.08unit in Kwara state. Its probability value of 0.000 implies that its impact is statistically

significantly at 1 percent level of significance; hence it has a significant impact on Supply chain management efficiency

Lastly, O2O coefficient value of about 0.097 implies that a one unit increase in Business to business (B2B) will increase the level of Supply chain management efficiency by about 0.097 and its probability value of 0.001 is less than 5 percent significance level, hence Business to business (B2B) has significant impact on Supply chain management efficiency in Kwara state.

**4.2 Discussion and Economic Implication of the Results**

The regression analysis results in Table 2 highlight the significant impact of E-commerce models on optimizing supply chain management (SCM) in Kwara State. The high R-squared value of 0.997 indicates that B2B, B2C, and O2O models collectively explain about 99.7% of the variability in SCM efficiency.

Among the models, B2C had the highest impact with a coefficient of 1.080 (p-value = 0.000), suggesting that increased B2C adoption significantly improves SCM efficiency. This aligns with Iguang et al. (2023), who emphasized how E-commerce SCF platforms enhance SMEs' operational performance by improving access and efficiency.

The O2O model also had a positive and significant impact (coefficient = 0.420, p-value = 0.000), supporting Sakas et al. (2023), who highlighted the role of digital platforms in enhancing marketing performance and operational efficiency.

The B2B model had a positive impact (coefficient = 0.097, p-value = 0.001), in line with Min (2021), who demonstrated that IoT-driven supply chain optimization enhances workflow and product value matching.

5.0 Conclusion and Recommendations

5.1 Conclusion

This study examined the impact of e-commerce models (B2B, B2C, and O2O) on the supply chain management of firms in Kwara State. The findings reveal a strong positive relationship between e-commerce adoption and supply chain optimization, as evidenced by the high R-squared value (0.997). Specifically, B2B, B2C, and O2O models significantly contribute to improved supply chain efficiency. B2C models, in particular, demonstrate a substantial positive impact, indicating that enhancing B2C strategies is crucial for SME growth.

5.2 Recommendations

Based on the study's findings, the following recommendations are made:

Establish and support e-commerce platforms that facilitate partnerships, bulk purchasing, and resource sharing among SMEs.

Provide SMEs with access to digital marketing training and tools, including workshops on social media marketing, SEO, and CRM systems, to improve B2C effectiveness.

Develop and implement integrated O2O e-commerce platforms that seamlessly connect online and offline sales channels, supporting features like online ordering with in-store pickup, real-time inventory tracking, and unified customer data management.

## Reference

Cuthbertson, R., & Piotrowicz, W. (2018). Supply chain best practices: Identification and categorization of measures and benefits. International Journal of Productivity and Performance Management, 57(5), 389-404.

Flöthmann, C., Hoberg, K., & Gammelgaard, B. (2018). Disentangling supply chain management competencies and their impact on performance: a knowledge-based view. *International Journal of Physical Distribution & Logistics Management*, *48*(6), 630-655.

Govindan, K. and Malomfalean, A.(2019). A framework for evaluation of supply chain coordination by contracts under O2O environment. Science direct. Retrieved fromhttps://doi.org/10.1016/j.ijpe.2018.08.00

Hull, G., & Schultz, K. (2001). Literacy and learning out of school: A review of theory andresearch. Review of educational research, 71(4), 575-611

Iankova, S., Davies, I., Archer-Brown, C., Marder, B., & Yau, A. (2019). A comparison of social media marketing between B2B, B2C and mixed business models. Industrial Marketing Management, 81, 169-179. Retrieved fromhttps://doi.org/10.1016/j.indmarman.2018.01.001

Iguang G., Fu J., Fangxu Y. & Lujie C. (2023) E-commerce supply chain finance for SMEs: the role of green innovation, International Journal of Logistics Research and Applications, DOI: 10.1080/13675567.2023.2167959

Josephine, M., N., & Samuel M., M. (2019) Influence of Supply Chain Integration Practices on the Performance of Manufacturing Firms in Kenya a Case of Kenya Breweries Limited; International Journal of Business and Social Research 10 (01) 35-57

Kilay, A.L.; Simamora, B.H. & Putra, D.P. (2022). The Influence of E-Payment and E-commerce Services on Supply Chain Performance: Implications of Open Innovation and Solutions for the Digitalization of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. J. Open Innov. Technol. Mark. Complex. 2022, 8,119. https://doi.org/ 10.3390/joitmc8030119

Lee, R. (2021). The effect of supply chain management strategy on operational and financial performance. Sustainability, 13,1-18. https://doi.org/10.3390/su13095138

Li, L. (2012). Effects of enterprise technology on supply chain collaboration: analysis of China linked supply chain. Enterprise Information Systems, 6(1), 55-77. Retrieved from https://doi.org/10.1080/17517575.2011.639904

Li, S., Ragu-Nathan, B., Ragu-Nathan, T. S., & Rao, S. S. (2016). The impact of supply chain management practices on competitive advantage and organizational performance. Journal of Information Management, 34(1), 107-124

Liao, S., Hu, D., & Shih, Y. (2018). Supply chain collaboration and innovation capability: themoderated mediating role of quality management. Total Quality Management & Amp; Business Excellence, 32(3-4), 298-316. Retrieved fromhttps://doi.org/10.1080/14783363.2018.1552515

Lummus, R. R., Duclos, L. K., &Vokurka, R. J. (2013). Supply chain flexibility: building a newmodel. *Global Journal of Flexible Systems Management*, 4(4), 1-13. Retrieved

fromhttps://www.researchgate.net/...284106538_Supply_chain_flexibility_Building_a_new__model

Min W. (2021) Optimization of E-Commerce Supply Chain Management Process Based on Internet of Things Technology; School of Economics and Management, Chongqing Youth Vocational & Technical College, Chongqing 400712, China

National Bureau of Statistics (2020). *Small and medium enterprises by States in Nigeria*. National Bureau of Statistics.

Sakas, D.P.; Reklitis, D.P.; & Terzi, M.C (2023) Leading Logistics Firms' Re-Engineering through the Optimization of the Customer's Social Media and Website Activity. Electronics 2023, 12, 2443. https:// doi.org/10.3390/electronics12112443

Taher, G.(2021) E-Commerce: Advantages and Limitations. Int. J. Acad. Res. Account. Financ.Manag. Sci. 11, 153–165

Trong, H. B., & Kim, U. B. T. (2020). Application of information and technology in supply chain management: case study of artificial intelligence–a mini review. *European Journal of Engineering and Technology Research*, *5*(12), 19-23.

Yamane, T. (1967). *Statistics: An Introductory Analysis* (2nd ed.). Harper and Row.

Yang, J., & Wang, Z. (2016). Research on the application of e-commercial modes for agro-food in mainland China: O2O and B2C. Ieeexplore.ieee.org. Retrieved fromhttps://ieeexplore.ieee.org/document/7369645/.

Yao, J. (2015). Supply chain resources integration optimisation in B2C online shopping. *International Journal Of Production Research,* 55(17), 5079-5094. Retrieved fromhttps://doi.org/10.1080/00207543.2015.1074298

Zhao, X., & Lee, T. (2019). Developments and emerging research opportunities in operations strategy and supply chain management. *International Journal of Production Economics,* (120), 1-4