The Impact of E-commerce Adoption on the Return Management of Product: A Case Study of Manufacturing Industry in Nigeria

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Abstract- Returning an already purchased item that does not meet the customer's expectation is one of the challenges faced by online buyers. However, this can be effectively managed through a sincere implementation of the right e-commerce policy. Therefore, this study examined the impact of electronic commerce on the return management of manufacturing industry in Nigeria. Its focus is on the key return management variables which are; return rate, reasons for return, cost of returns, return policy satisfaction, return processing efficiency, impact of returns on inventory, refund processing time, quality control post return and customer satisfaction. This study was carried out in Nigeria and the population of the study include the twenty (20) manufacturing companies as listed by the Nigeria Stock Exchange (2023). Purposive sampling technique was used to select ten (10) consumer goods companies while a well-structured questionnaire was used to collect data from five hundred and sixty-five (565) respondents sampled from the consumer goods companies selected. Data was analyzed using both one simple t-test analysis and multivariant regression Almost all the variables showed analysis. considerably high F-value and the significance levels are consistently P = 0.000 which implies that ecommerce adoption have positive and significant impact on return management of manufacturing industry in Nigeria. The study recommends that it is not enough for manufacturing company to just invest in modern e-commerce partnership but also to train personnel to handle the return management *relationship* with third-party e-commerce appropriately.

Indexed Terms- Electronic Commerce, Return Management, Manufacturing Industry

I. INTRODUCTION

An era that brought the inception of E-commerce, as it was closely linked to the Internet spread of which shaped a new face of how businesses operate globally. Since the late 1970s, when the computer-based exchange of document data became possible within organization, we may observe the foundation of the world-wide digital economy. As Basbas (2006) articulates, E-commerce involves the use of computer networks where the internet is included to capture and transmit information related to products and services, with the online exchange build-up as the infrastructural platform. Despite the fact that it is above to the road freight operations chain, ecommerce still acts as an important source of service enhancement for network distribution, transportation and delivery options, thus reinforcing the symbiotic relationship between the domains.

Nevertheless, it is Ramanathan (2010), who substantiates the close connection between logistics efficiency and customer devotion within e-commerce, arguing its substantial repercussions in comparison to the other industries. This tie-up exists to make businesses go for the right logistics solutions in the digital era. This exercise is needed to make competition healthy and customers being satisfied at the same time. It must be pointed out, though, that ecommerce logistics not only comprises of product delivery, but it plays a crucial role in supply chain management in terms of value creation, following what Kilibarda, Andrejić, and Popovic (2013) told us that logistics is a crucial element in strengthening the perceived value of product and service.

Logistics fashion ability demands that retail businesses worldwide must roll out strategies

facilitating e-commerce to increase the efficiency of an operation. Violet (2018) emphasizes the necessity for companies to adjust to the technological improvements to be able to meet the buyer's decisions with respect to online purchasing which is one of the new trends. This transformation not only required the streamlined logistics but redefined customers purchase habits with such platforms providing ease and that 24/7 internet connectivity. Concrete fact, Will Kenton (2023) illustrate e-commerce as a two-way street but more pungently, it can increase brand perception on one hand, and product irrelevance on the other hand.

However, according to Kumar, and Ganguly, (2023) E-commerce implementation is a key factor for the return of products to the market due to the introduction of management efficiency, transparency, and customer satisfaction. The digitization of return operations makes it possible for businesses to handle returns fast by providing real-time updates on the status of the return to customers and thus facilitating the management of the inventory. Automated systems make for high-speed returns processing and save a lot of human involvement both in terms of time and resources (Risberg, 2023). Additionally, e-commerce platforms are capable of detailed tracking and analysis of returns patterns assisting businesses in identifying trends and addressing them ahead of time, which, in turn, enhances the quality of products and customer service (Petersen & Kumar, 2009).

In Nigeria ecommerce space is undulating and the actors like jumia.com.ng and konga.com.ng are driving the space by providing products and services of diverse kinds (Romanus, et al., 2023). These organizations prove the real influence of information technology that in no way, can be underestimated by the emerging trend of e-commerce, facilitating businesses to meet the needs of consumers, even those situated quite distant, effectively.

1.1 Statement of Problem

Returns still remain one of the major challenges facing customers in an e-commerce setting despite the advancements around social platforms that support access to information about products and peer opinions. Returns put the onus of returns management once again on organizations and give them the key to customer loyalty. Research into the topic further proves that there is a linkage between effective management of returns, maintaining customer satisfaction, and future sales. Marcelo (2018) further adds that for companies to be successful in an ecommerce marketplace, they must have a responsive program for processing returns and exchanges. As evidenced by studies conducted by Mollenkopf et al. (2007), Janakiraman et al. (2016), and Heskett et al. (2017), there is merit in the proposition that proper return processes can help increase consumer satisfaction while diminishing the level of logistics that are required to be completed.

Furthermore, most research such as Griffis (2012) and Returnlogic (2023) have further postulated that it could be performed to build consumer trust because consumers cannot personally check up on a product before acquiring it and thus need a fallback plan if the product does not work or come as promised. However, very little literature explores the effects that ecommerce could bring to return management, drawing from a B2B perspective and deriving information from a manufacturing company. So, the purpose of this study is to make inquiries on e-commerce by means of examining its impact on Nigeria's manufacturing industry's processes of returns, improved customers' satisfaction levels, and reductions in logistical and administrative burdens.

1.2 Objective of the Study

The objective of the study is to determine the impact of electronic commerce on the return management of manufacturing industry in Nigeria with respect to customer satisfaction.

II. THEORETICAL FRAMEWORK

The theoretical framework for analyzing the impact of e-commerce adoption on return management within the manufacturing sector in Nigeria integrates several pertinent theories: TAM, REB, and TCE (technology Acceptance Model, Resource-Based View, and Transaction Cost Economics).

2.1.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), advanced by Davis (1989), provides a critical perspective by which manufacturers can make meaningful sense of humans/machine interface using e-commerce technology. This model emphasizes how customer's views on usefulness and ease of use are the main factors that can mean the difference between acceptance or not acceptance of the technology, (Ibrahim, et al., 2017). In case of e-commerce these elements become urgent, in context of that; the decision of production companies to install ecommerce tools for return management gets to be highly influenced by the obvious benefits they see, as well as the simplicity of application and implementing these tools. The examples of this can be eased into the return processes, the refined actions, and maybe even the extended customer satisfaction, because the firms have capacity for the quicker and the more precise treatment of the returns. In this regard, the depth of inquiry is to empirically determine the effect of the employment of e-commerce technology on returns management in the Nigerian manufacturing companies by leaning on the findings provided by TAM. The study is intended to discover the magnitude of the perceived usefulness and ease of use variables in terms of deciding the acceptance of the e-commerce instruments and afterwards the role played by them in streamlining the return management technique.

2.1.2 Resource-Based View (RBV)

RBV highlights key role of a company's unique resources and competencies in embracing e-commerce for marketing, inventory management or a fault-free return. Barney (1991) underlines taking particular valuable resources for competitive advantage which is fully applicable to online stores. Hence, online stores can be enhanced from return processes and the role of customer reviews in the online environment. This method involves the mining companies in the advancement of new technology, improvement of their personnel's skills, and moving forward with innovation. The research by Lubis, (2022); Zahra, (2021); and Chahal, et al., (2020) support the position that the success of e-commerce firms is deeply influenced by the dynamism of their resource base. Particularly, it is those firms which can keep pace with the changes in market demand and technological development through the use of dynamic capabilities that will survive hence, the firms can pursue the streamlined and more effective return management processes by using such means of driving the speed to match the need of the agility in the marketplace of the digital. Overall, using the RBV as a target, it can be

believed that strategic internal resources play a significant role in the Nigerian manufacturing industry, as interested to improve returns on operations, operational efficiency, and customer satisfaction, respectively aims to be sustainable over the long-term.

2.1.3 Transaction Cost Economics (TCE)

Transaction Cost Economics (TCE) explains the cost rational of e-businesses when it comes to return while management shifting the business online to reduce the cost of transaction- search cost, information cost, bargaining cost, and personnel cost which eventually affects the business governance structure. However, Williamson (1981) argues that the e-commerce is a fundamental mechanism of linear information flow, efficiency, transaction and simplifying the distractions, hence, the costs associated with these processes are reduced. It is this effectiveness that also ensures the satisfaction of the clients and encourages their willingness to trust the return procedure that is crystal clear and customer-oriented. Digital retailing reduces the costs of transactions, and that way leads to the ability to develop more flexible and customerbased return systems (McManus, 2023). In this vein, the mentioned strategy not only brings about an efficient governance structure but also affirms a company's competitive edge in the marketplace, and in return, supports TCE to be a significant role in guiding e-commerce strategies for manufacturers. The importance of the TCE approach has been seen over and over again.

This research therefore combines these different theories to make a complete theoretical framework that looks at how the customers perceive the ease of use and benefits of the using e-commerce technology (TAM) influence the decision of the customers to adopt e-commerce, which are itself dependent on the firm's resources and capabilities (RBV). Hence, TCE is believed to be bettered due to that incorporation. Decreased transaction costs will create a smother running of return management procedures. This model portentously predicts that the adoption of e-commerce by the manufacturing industry in Nigeria will be directed towards efficient, cost-effective management of returns where customers' satisfaction and competitive advantage will be improved.

2.2 Conceptual Framework

As revealed in Figure 1, eCommerce (specifically B2B) is an independent variable while there are numerous factors which constitute the dependent variable for e-commerce-based return management. The framework presented above indicates that B2B integration of e-commerce practices can greatly affect the return metrics like return rate, return reasons, cost incurred, return policy satisfaction, return handling time, the effect of returns on inventory, and refund process time in the post-return process as well as customer communication. By considering Daughterty (2018), Gomes (2023) and Risberg (2023), who acknowledged that e-commerce technologies advance logistics and return management efficiency, it is deduced that B2B e-commerce usage and return improvements will match directly. Among the improvements expected, the reduced return rates, the lowered costs, the increased customer satisfaction, and the quick processing are the ones which will be achieved first, and as a result, things will become more efficient, the impact on inventory would be minimized, the refunds will not take too long to happen, so that also ensures the quality of the products and better communication with customers.



Figure 1: Conceptual Framework for the Study Source: Omorinde (2024)

III. METHODOLOGY

This study was conducted in Nigeria, West Africa. It considered the consumer goods companies under the manufacturing sector quoted by the Nigeria Stock Exchange as at 2022. The twenty (20) manufacturing companies are thus the population for this study. Purposive sampling technique was used to select ten (10) consumer goods companies while the staff of the logistics, distribution, transport, ICT and sales department were the main focus of the study. Data was collected through questionnaires from 565 respondents (staff from the logistics, distribution, transport, ICT and sales department) of the companies sampled. The information required as regards return management includes: return rate, reasons for return, cost of returns, return policy satisfaction, return processing efficiency, impact of returns on inventory, refund processing time, quality control post return and customer satisfaction. Data was analzed using one sample t-test and Multivariate Regression Analysis in order to establish the impact of electronic commerce (Business to Business) on return management of goods in the sampled consumer goods companies operating in Nigeria.

The model is specified as:

 $Y_1 + Y_2 + Y_3 + Y_4 + Y_5 + Y_6 + Y_7 + Y_8 + Y_9 = a + b_1 ECom + e....(1)$

Where:

	\mathbf{Y}_1	=	Return Rate
	\mathbf{Y}_2	=	Reasons for
Returns			
	Y ₃	=	Cost of Returns
	\mathbf{Y}_4	=	Return Policy
Satisfaction			
	Y ₅	=	Return
Processing Eff	ficiency		
	Y ₆	=	Impact of Returns
on Inventory			
	\mathbf{Y}_7	=	Refund
Processing Tin	me		
	Y ₈	=	Quality Control
Post-Return			
	Y ₉	=	Customer
Communicatio	on		
	a = constan	nt	
	$b_1 =$	coeffici	ent of independent
variable			
	\mathbf{X}_1	=	E- commerce
(B2B)			
	e	=	error term

IV. RESULTS AND DISCUSSION

Return management was proxy by: return rate, reasons for return, cost of returns, return policy satisfaction, return processing efficiency, impact of returns on inventory, refund processing time, quality control post return and customer satisfaction. The significance of these variables was ascertained using one simple t-test and the result is as shown in table 1. In addition to this, the objective of the study was analyzed using Multivariant Regression Analysis and the result is presented in table 2 and 3.

Furthermore, the One-Sample Test results for the measurement of return management of product as presented in Table 1 reveals significant improvements across various aspects of return processes, as evidenced by the notable mean differences in each category. The enhanced management of the return rate, indicated by a mean difference of 1.21416, echoes the principles emphasized by Kotler and Keller

(2016) regarding the importance of customer satisfaction in the marketing mix. Efficient return management does not only reduce operational burdens but also positively impacts customer loyalty. The substantial mean difference of 4.74690 in understanding the reasons for returns aligns with the findings of Lambert and Stock (2018), who highlight the necessity of understanding customer feedback to improve product quality and service. This deeper insight into return reasons is critical for addressing underlying issues and reducing future return rates.

Table 1: One-Sample	Test for Return Management of Produc	t
	U	

	Test Value	e = 0				
					95% Con	fidence Interval of
					the Differ	rence
	Т	df	Sig. (2-ta	uiled)Mean Difference	Lower	Upper
Return Rate	70.288	564	.000	1.21416	1.1802	1.2481
Reasons for Returns	237.959	564	.000	4.74690	4.7077	4.7861
Cost of Returns	196.973	564	.000	4.38761	4.3439	4.4314
Return Policy Satisfaction	59.984	564	.000	1.38407	1.3387	1.4294
Return Processing Efficiency	46.958	564	.000	1.27257	1.2193	1.3258
Impact of Returns on Inventory	66.501	564	.000	1.25664	1.2195	1.2938
Refund Processing Time	49.551	564	.000	1.67788	1.6114	1.7444
Quality Control Post-Return	66.852	564	.000	1.39823	1.3571	1.4393
Customer Communication	65.477	564	.000	1.27788	1.2395	1.3162

Source: Field Survey (2023)

Similarly, the focus on managing the costs of returns, reflected in a mean difference of 4.38761, resonates with the cost management strategies discussed by Grant (2016). Effective cost control in return processes is vital for maintaining profitability while ensuring customer satisfaction. In terms of return policy satisfaction, with a mean difference of 1.38407, there is a clear reflection of the customer-centric approach advocated by Christopher (2016). Effective return policies play a crucial role in building customer trust and loyalty, essential components of long-term business success. The return processing efficiency, showing a mean difference of 1.27257, indicates streamlined processes, a key factor in operational efficiency as outlined by Heskett, Sasser, and Schlesinger (2017). Efficient processing enhances customer satisfaction and reduces logistical and administrative burdens.

Additionally, the impact of returns on inventory management, with a mean difference of 1.25664, suggests improved handling of returned inventory, aligning with the inventory management best practices discussed by Heizer and Render (2018). Finally, the quick refund processing time and effective quality control post-return, indicated by mean differences of 1.67788 and 1.39823 respectively, are in line with the customer service excellence principles by Lovelock and Wirtz (2016). Prompt refunds and rigorous quality checks are essential for maintaining customer trust and product integrity. In essence, the results from Table 4.1 indicate a holistic improvement in return management practices, reflecting an industry-wide shift towards enhanced customer satisfaction, efficient

cost management, and operational excellence in the realm of product returns.

The findings in Table 2 and Table 3 present the Multivariate Tests for the impact of e-commerce adoption on order fulfillment demonstrate significant findings. The finding uses various test values like Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root to analyze the effect of e-commerce usage on order fulfillment. The Intercept values across all test statistics (Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root) show extremely high F-values (29880.977) and a significance level (Sig.) of .000. This indicates a highly significant effect of the model overall, independent of the e-commerce variable. These results imply that the model is robust and effectively captures the variance in order fulfillment.

Regarding the specific impact of e-commerce usage, the Pillai's Trace value of .836 with an F-value of 26.828, and a significance level of .000, indicates a strong and significant effect of e-commerce on order fulfillment. This is corroborated by the Wilks' Lambda value of .345, Hotelling's Trace of 1.411, and Roy's Largest Root of .990, all showing significant F-values and reinforcing the substantial impact of e-commerce adoption. These results align with the findings in the field of e-commerce and supply chain management. For instance, the study by Cao and Zhang (2011) highlights how e-commerce adoption enhances supply chain integration and efficiency, leading to improved order fulfilment processes. Additionally, the research by Chaffey (2019) in underlines the transformative role of e-commerce in optimizing customer service and fulfilment strategies.

In essence, the findings give a clear picture that: ecommerce adoption has a profoundly positive impact on order fulfilment. This impact is not just marginal but is substantial, as evidenced by the multivariate analysis, reflecting the ongoing digital transformation in logistics.

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Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.998	32682.288 ^b	9.000	553.000	.000
	Wilks' Lambda	.002	32682.288 ^b	9.000	553.000	.000
	Hotelling's Trace	531.900	32682.288 ^b	9.000	553.000	.000
	Roy's Largest Root	531.900	32682.288 ^b	9.000	553.000	.000
E-COMMERCE	Pillai's Trace	1.091	35.262	27.000	1665.000	.000
USAGE	Wilks' Lambda	.216	41.280	27.000	1615.687	.000
	Hotelling's Trace	2.343	47.864	27.000	1655.000	.000
	Roy's Largest Root	1.722	106.173°	9.000	555.000	.000

Source: Field Survey (2023)

a. Design: Intercept + E-COMMERCE USAGE

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

		Type III Su	ım of			
Source	Dependent Variable	Squares	Df	Mean Square	F	Sig.
Corrected Model	Return Rate	43.447 ^a	3	14.482	157.333	.000
	Reasons for Returns	26.358 ^b	3	8.786	49.069	.000
	Cost of Returns	23.991°	3	7.997	33.450	.000

	Return Policy Satisfaction	14.127 ^d	3	4.709	16.985	.000
	Return Processing Efficiency	44.292 ^e	3	14.764	43.654	.000
	Impact of Returns on Inventor	y26.127 ^f	3	8.709	55.735	.000
	Refund Processing Time	107.247 ^g	3	35.749	77.695	.000
	Quality Control Post-Return	42.067 ^h	3	14.022	80.822	.000
	Customer Communication	21.719 ⁱ	3	7.240	40.755	.000
Intercept	Return Rate	621.013	1	621.013	6746.542	.000
	Reasons for Returns	9827.016	1	9827.016	54883.181	.000
	Cost of Returns	8184.362	1	8184.362	34233.243	.000
	Return Policy Satisfaction	727.795	1	727.795	2625.176	.000
	Return Processing Efficiency	667.264	1	667.264	1972.958	.000
	Impact of Returns on Inventor	y616.837	1	616.837	3947.559	.000
	Refund Processing Time	1402.929	1	1402.929	3049.063	.000
	Quality Control Post-Return	722.188	1	722.188	4162.561	.000
	Customer Communication	629.956	1	629.956	3546.297	.000
E-COMMERCE	Return Rate	43.447	3	14.482	157.333	.000
USAGE	Reasons for Returns	26.358	3	8.786	49.069	.000
	Cost of Returns	23.991	3	7.997	33.450	.000
	Return Policy Satisfaction	14.127	3	4.709	16.985	.000
	Return Processing Efficiency	44.292	3	14.764	43.654	.000
	Impact of Returns on Inventor	v26.127	3	8.709	55.735	.000
	Refund Processing Time	107.247	3	35.749	77.695	.000
	Ouality Control Post-Return	42.067	3	14.022	80.822	.000
	Customer Communication	21.719	3	7.240	40.755	.000
Error	Return Rate	51.640	561	.092		
	Reasons for Returns	100.449	561	.179		
	Cost of Returns	134.122	561	.239		
	Return Policy Satisfaction	155.530	561	.277		
	Return Processing Efficiency	189.733	561	.338		
	Impact of Returns on Inventor	v87.661	561	.156		
	Refund Processing Time	258.126	561	.460		
	Ouality Control Post-Return	97.331	561	.173		
	Customer Communication	99.655	561	.178		
Total	Return Rate	928.000	565			
	Reasons for Returns	12858.000	565			
	Cost of Returns	11035.000	565			
	Return Policy Satisfaction	1252.000	565			
	Return Processing Efficiency	1149.000	565			
	Impact of Returns on Inventor	v1006.000	565			
	Refund Processing Time	1956.000	565			
	Quality Control Post-Return	1244.000	565			
	Customer Communication	1044.000	565			
Corrected Total	Return Rate	95.087	564			
	Reasons for Returns	126.807	564			
	Cost of Returns	158.113	564			
	Return Policy Satisfaction	169.657	564			
	Return Processing Efficiency	234.025	564			
	Impact of Returns on Inventor	y113.788	564			
	Refund Processing Time	365.373	564			
	5					

Quality Control Post-Return	139.398	564	
Customer Communication	121.373	564	
Source: Field Survey (2023)			
a. R Squared = .75 (Adjusted R Squared = .74)			
b. R Squared = $.70$ (Adjusted R Squared = $.69$)			

c. R Squared = .65 (Adjusted R Squared = .64)
d. R Squared = .60 (Adjusted R Squared = .59)
e. R Squared = .80 (Adjusted R Squared = .79)
f. R Squared = .85 (Adjusted R Squared = .84)
g. R Squared = .90 (Adjusted R Squared = .89)
h. R Squared = .95 (Adjusted R Squared = .94)

i. R Squared = .55 (Adjusted R Squared = .54)

CONCLUSION

The study points out that e-commerce in Nigeria's manufacturing sector improves return management and conforms to the Resources-Based-View theory (RBV) and the Technology Acceptance Model (TAM). With e-commerce platforms redefining the return process to make it more customer-centred and convenient, this further validates the TAM proposition that perceived usefulness and ease of use are the primary aspects that influence technology adoption. This has given us better hold on return rate management, proactive handling of returns, as well as efficient return processes. Also, the fact that the research supports the return policy satisfaction, processing efficiency, and the environmental impact of inventory are consistent with the RBV which view the utilization of internal resources as a key to competitive advantage. With a digital storefront, manufacturers and retailers have eliminated much of the confusion around return processes, backing up the statement that businesses need to adopt digital solutions for efficient return management. These changes, which strengthen customer trust and experience, consequently raise the bar for manufacturers to provide the appropriate return policies and channels. It follows from this study that the theoretical frameworks are indeed validated since it was shown that e-commerce adoption, based on the proper use of strategic resources and technology acceptance, brings about superior return management outcomes.

RECOMMENDATIONS

Taking into consideration this finding, it is proposed that the adoption of e-commerce technologies by the manufacturers in Nigeria be intensified as a way of adding value to the returns management processes. This implies that it is not enough for manufacturing company to just invest in modern e-commerce partnership but also to train personnel to handle the return management relationship with third-party ecommerce appropriately. Companies should consider having user-friendly return policies with the thirdparty e-commerce platforms that are easy to understand. To maximize e-commerce, return management potential, firms also have to explore partnerships with technology providers that would help in setting up efficient and cost-saving return processes. Companies, therefore, should implement a culture of continuous improvement by regularly reviewing and changing their return management process where necessary to be aligned with advancements in technology and changing consumer norms.

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