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Article

The role of Chinese products demand and supply in reducing market cost and improving technological performance: Empirical evidence from South Africa, Nigeria, and Egypt

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MANAGEMENT | RESEARCH ARTICLE

The role of Chinese products demand and supply in reducing market cost and improving technological performance: Empirical evidence from South Africa, Nigeria, and Egypt

Oluwale Nurudeen Omonijo^{1*} and Zhang Yunsheng¹

Abstract: This study was conducted through an experimental study design. Our research question focuses on; (1) how Chinese products have reduced market costs in South Africa, Nigeria, and Egypt? (2) What impact do Chinese products have on the technology development process of the selected countries? (3) Which factors influence the expansion of Chinese products in the international market and how does primary research provide recommendation for using Chinese products to reduces market cost and improve technological performance. 279 responses were collected from the respondent in the selected countries to examine the performance of Chinese products. SPSS statistics software was used to analyze data using snowballing method to access the participants. Result on regression and correlation tests show that the number of Chinese products in the market positively predicted the market price. Technology performances were found to negatively impacts the



Oluwale Nurudeen Omonijo

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Oluwale Nurudeen Omonijo is a Ph.D. candidate. Currently pursuing his Ph.D. degree in the faculty of Business School where he is studying Business administration at Central South University, Changsha, China. His research direction and interest include strategic management, industrial management, Patent pool and dominant design, Technological innovation, and competition, High-tech. Oluwale has recently published a research article on INNOVATION AND GREEN DEVELOPMENT journal. This research is part of his graduation requirement by focusing on the Impact of Chinese product and technology has on the Africa nations.

Dr. Zhang, Yunsheng is a professor and supervisor at Central south university received the B. S. degree in Computer Science from Hunan University, Changsha, China, in 2001 and Ph.D. degree in Management from Hunan University, Changsha, China. His research interests include strategic management, Marketing, innovation and entrepreneurship, accounting and Finance, innovation management, and human resource management. Dr. Yunsheng has published more than 100 papers in academic journals such as Application of Engineering Theory and Method.

PUBLIC INTEREST STATEMENT

The benefits created by China and its technology in reducing market cost to developed and under-developed countries have attracted potential customers worldwide. This study focuses on how Chinese products have reduces market costs in three powerhouses in Africa country which are Nigeria, South Africa and Egypt. This study was conducted through questionnaire design because it is one of the productive ways to gather data and information. This research was designed to empirically test the role of Chinese products demand and supply in reducing Africa market costs. We used a strong approach on the validity and reliability of the study. The results show that market prices were affected by the availability of Chinese products, Chinese products tend to be cheaper due to economies of scale strategies of most manufacturers. In precise, managerial decisions and leadership policymaking can benefit by the empirical findings that are presented in this research. It could help decide on pricing strategies in terms of competing with Chinese competitors.

supply of Chinese products. Our findings make a critical contribution to the existing theories on technology innovation, performance management, and product pricing. More specifically, (1) The increasing supply of Chinese products negatively affects the performance of technology in Africa; (2) A low level of technology adoption in the African market negatively impacts technology performance and technical performance is highly correlated with the availability of Chinese products; (3) The increase in Chinese products contributed to lower market prices. Our findings further suggest the increased demand and supply of Chinese products will adversely affect technology performance. Therefore, this study recommends that African leaders empower the youth to increase their exposure to Chinese technology.

Subjects: Environment & Business; Management of IT; Information & Communication Technology; ICT; Business, Management and Accounting

Keywords: Chinese products; market costs; technological performance; Nigeria; South Africa; Egypt

1. Introduction

Chinese products are ubiquitous globally and their technology benefits the entire market. The lower cost of manufacture has helped the market attract potential customers. Chinese products are high-tech and use domestic components. As a result of low production cost, market price has reduced, and their technological performance is gradually attracting the global market. As illustrated in the graphical abstract in Fig. 1, Chinese products play a key role both in terms of market costs and technology performance.

Figure 2 shows the annual revenue of the China's e-commerce sector from 2017 to 2025. Revenue in 2021 is estimated to be USD 1368.35 billion and expected to grow to USD 1625.8 billion by 2025 (Statista, 2022a). Moreover, revenue is the highest in the electronics sector, followed by toy-related materials and DIY supplies. Therefore, the expansion of Chinese products in the global market can be visible because they are technologically advanced and always experimenting.

Figure 1. Path diagram showing the impact of Chinese products in the selected countries.

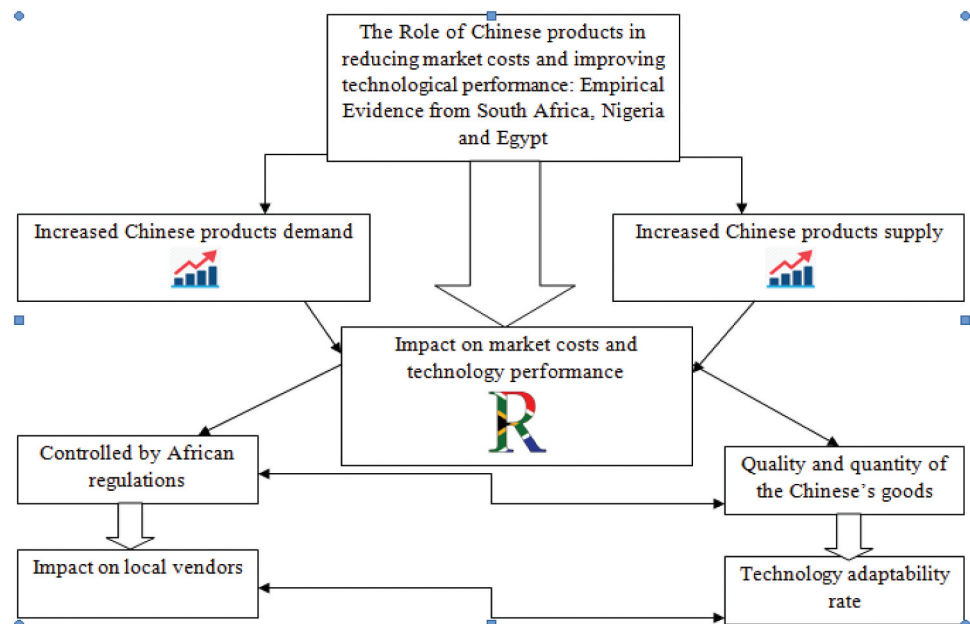
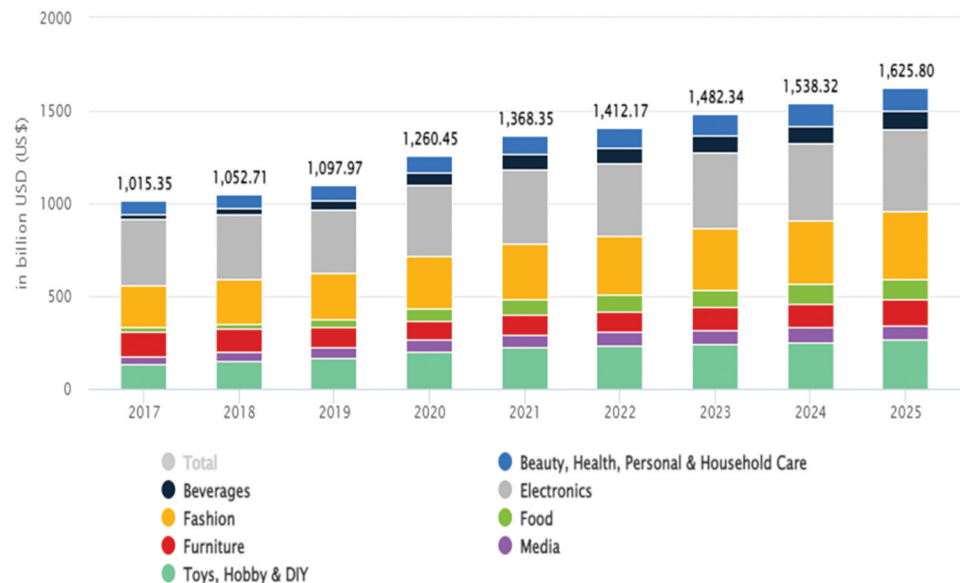


Figure 2. Revenue of China's e-commerce sector from 2017 to 2025.

(Source: Statista, 2022a)



Products imported into South Africa from China are reported to be significant priced. In this context, China imported USD 89 million worth of food in 2020 which was a decrease from USD 116 million in 2019 (Statista, 2022a). Therefore, an increase in Chinese products reduces the market growth in this region. Denis Samwel Ringo et al. (2022) Nevertheless, because importing of Chinese product has developed an interest in some of these selected countries helps the country to perform better in export market.

China supplies the Egyptian, Nigerian, and South African markets with a wide variety of products. These countries mainly trade in minerals, agricultural products, cotton, and electronics (Africa business (2022b). Cai and Li (2018) posit that there is an expansion of Chinese products in the South African market as most products are unavailable. China trades with more 25 countries in Africa, offering 190 products. These countries have also implemented zero tariff to help them grow their businesses (Africa Business, 2022a). Furthermore, China has invested 3.3624 billion yuan in Africa for business expansion and development.

2. Technology, lack of agriculture, population

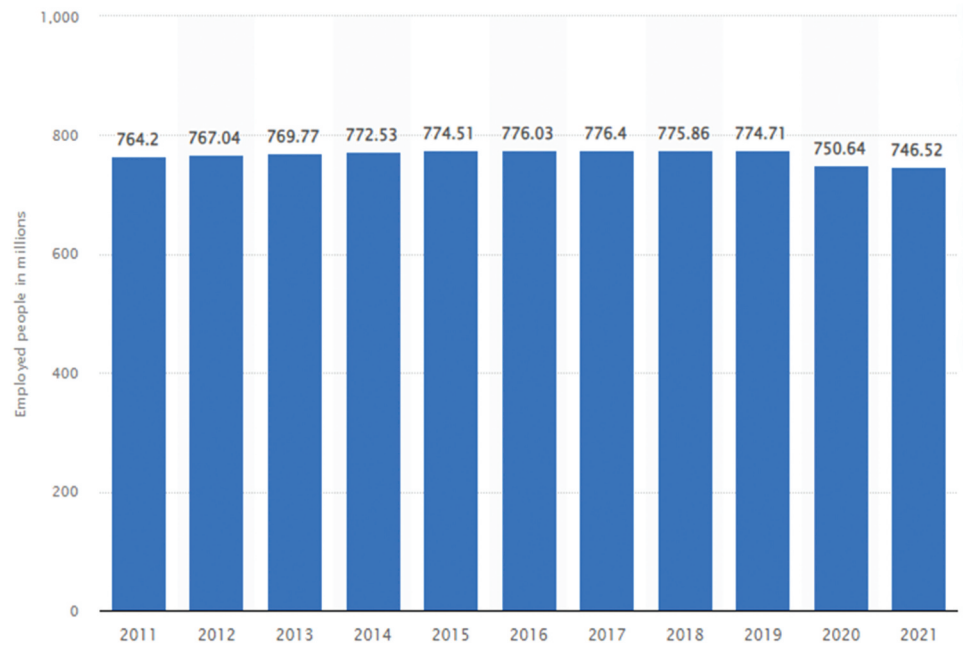
Capital investment is a major issue compelling Chinese products to penetrate the South African, Egyptian, and Nigerian markets. China is financially one of the strongest countries that are constantly improving its different business sectors as a result, a huge production is taking place to meet demands of the supply chain in other countries. A report by Xie et al. (2019) show that productivity growth should be rapid to meet product standards and demands in the international markets. In this case, the vast population in China is working for this cause. This contribution will be extensively discussed in this study.

Figure 3 shows China's total workforce population of China engaged in work from 2011 to 2021. China's workforce employed approximately 746.5 million people in 2021, which was a decline of 25 million in 2020 (Statista, 2022a). Hence, the employment rate is gradually declining, affecting the country's productivity. South Africa, Egypt, and parts of Nigeria are currently seeking ways to advance their technology to boost their supply chain. The materials and products of agriculture are also being exported to meet the shortage in these countries.

Figure 4 shows the imports China buys from Egypt in exchange for exports. China imports goods worth 11. 4427 billion yuan in 2021 (Trading Economics, 2022). Services include mineral fuels, distillates, copper, and salt (Africa business 2022b). Hence, the importance of this trade can be seen through their business methods, import and exports.

Figure 3. Employed Chinese population 2011–2021.

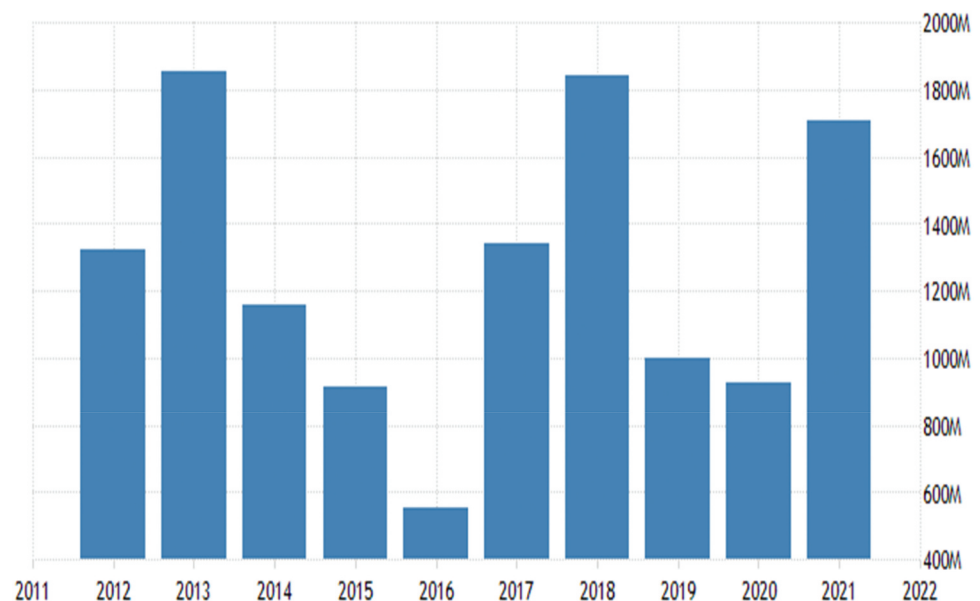
(Source: Statista, 2022a)



In this current study, our attention is to analyze how Chinese products reduce market costs and promote technological progress in the three African countries-South Africa, Nigeria, and Egypt. Based on this, we recognize that this study can help enlighten the Chinese products currently consume in Africa market, most especially in the three African power-house country (Nigeria, South Africa, and Egypt) to further understanding the negative effects of Chinese product consumption has on the Africa market. Our research ideas and goal seek to find right model to address this literature gap and provide valuable research idea. In this context, (An et al. (2020); Awan, Sroufe et al., 2022) argues that identify the knowledge gaps in previous studies is crucial to improving the efficiency of a study.

Figure 4. Importing of China from Egypt 2011–2021.

(Source: Trading Economics, 2022)



Choosing a specific goal for research is highly important to steer the research in a positive direction. The main research goal of this study is to analyze the role of Chinese products in reducing market costs in Nigeria, South Africa, and Egypt. Then, further discusses the effect of technology transfer to the three countries and outlines the determinants of expansion of Chinese products.

Therefore, from our literature review, this study set to address the following the research questions: (1) To analyze the role of Chinese products in reducing markets costs in Nigeria, South Africa, and Egypt? (2) How do Chinese products affect the market cost of South Africa, Nigeria, and Egypt? (3) What impact do Chinese products have on the technology development process of the chosen countries? (4) Which factors influence the expansion of Chinese products in the international market? And (5) How does primary research provide recommendations for using Chinese products to reduce market costs and improve technical performance?

We focus on these objectives. First, we discuss key attributes of the Chinese business sector in the selected countries. Second, we examine business expansion and annual turnover of skilled workers. Lin et al. (2018) emphasized that research should provide different insights to the reader. As a result, our research produces informative data that will aid future research on the same topic. In addition, analysis of China's economic sector in Nigeria, Egypt and South Africa also provides insight into their business practices. Ranta et al. (2018) encouraged researchers to succinctly outline the study's future implications. Therefore, this study proves effective in managing and analyzing data on business activities in China and Africa. Our study adopt descriptive research design and 279 responses were collected from the respondent in the selected countries to examine the performance of Chinese products.

Our study contributes on how Chinese products reduce market costs and improving technological performance in the selected countries by suggesting on the exposure of Chinese technology to African market. Previous research ideas only focus on the Advent of Chinese goods into African markets specifically on the Impact on firms' growth. Quentin Hounyonou (2021) stated that Chinese product is considered as a threat to the African firm. Guive Khan-Mohammad (2022) focus on Chinese Motorcycles as a case study in Burkina Faso finds that Chinese made goods are consume at low price in the Africa market. However, this current study has addressed from the perspective of reducing market costs and improving technological performance.

Our study provides its aim and objectives and making use of the previous research ideas to improve our study from a Chinese product demand and supply perspective. Bakar and Rosbi (2020), recommended that it is important to maintain the novelty of the study to gain an advance knowledge to the research method, specifically in the data and information provided in this study are authentic and will provide pathway for future research. Moreover, we also contribute to the methodology, we provide data and information for future research that we believe to be authentic and that will open up a future research pathway.

3. Theory and hypothesis

Market costs can influence Chinese products' supply and demand chain and their market expansion. The first hypothesis is going to test the relationship between these two variables, where statistical evidence will also be provided. As suggested by Purcell et al. (2018), the demand for economic goods becomes lesser with an increment in the price of the products. In this case, it can be mentioned that the buyers' demand becomes lesser when the product price increases. As a result, the production remains in excess compared to the demand for products. Hence, the supply and demand chain get disrupted, which is time-consuming to be resolved.

In this context, the law of supply states that the suppliers are eager to supply more products. As commented by Zhu et al. (2020), the interaction between supply and demand is significant in regulating market prices. Implies that, the market forces can balance the supply and demand which is essential for efficient business operations. However, Bakar and Rosbi (2020) argue that an

inverse relationship is visible between price and demand. Therefore, it is important to evaluate the demand of goods and services to understand the target market of the respective businesses.

4. Supply-side economics

This theory explains the economic growth of any market through its models. This theory suggests that the economic growth of a country can be fostered by lowering the taxes on products. As depicted by Li et al. (2019), the country can implement free trade for the business sectors to expand in the target market. Furthermore, it emphasizes that countries must develop a fiscal policy that aligns with this theory.

This theory is relevant in explaining how market costs impact demand and supply. Lu et al., (2017) demonstrate that market costs can significantly impact the supply of Chinese products. As a result, the product demand should not exceed the supply as it will negatively impact the business. In this case, this theory recommends regulating product prices to regulate the product demand.

5. Relationship among the variables

The study proposes that there is a significant relationship between the variables. Our analysis result shown that both the dependent and independent variable have a positive relationship. We consider demand and supply of Chinese products to be independent variables while market costs and technology performance are the dependent variables. According to Bakar and Rosbi (2020), the study variables should be measured and analyzed to establish their connection. Previous studies have found that fluctuation in the market cost is effective for balancing supply and demand. Technological support can also increase the efficiency of the supply chain of an organization Awan, Gölgeci et al. (2022).

6. Transaction cost theory

Transaction cost theory is associated with minimizing the overall cost of a specific product. Cuypers et al., (2020), an optimal organization is such that economic efficiency is highest through the achievement of a better level of the transaction cost. Each type of transaction is associated with monitoring, controlling, and managing the transaction. Transaction cost is broadly defined as the overall cost of running an organization. Therefore, organization efficiency is dependent on the minimization of the transaction cost. Recently, the market cost is a factor in observing organization transaction cost. Rindfleisch, (2019) argued that an increasing rate of transaction cost generally influences the increase in market cost. In terms of achieving market costs at a low level, organizations must have significant strategies for lowering transaction costs. Transaction cost is one of the primary determinants of internal production cost decisions. Therefore, an increasing rate of transaction cost influences an increasing trend in the product market cost. On the other hand, Chinese product supply and demand gets influenced by increasing transaction costs.

For example, various African countries such as Nigeria, South Africa, and Kenya have seen a significant increase in Chinese investment since 2004. One of the major factors in these countries was the population which lacked basic supplies. One of the prime instances is that many African nations have developed their telecommunication infrastructure through the help of Chinese investment and the privatization of state-owned enterprises (Africa Business, 2022a). After the increase of Chinese investment in African nations, transactions cost around Chinese and local companies got massively reduced.

As the transaction cost was reduced, the decreasing rate in telecommunication products and service market costs was observed in the last decade. Price drops lead to market cost suppression and have increased the supply and demand for Chinese products in Africa. Therefore, it is evident that the minimization of the transaction cost has influenced supply and demand. Additional cost reduction can be proven to be helpful for escalating the profit of the companies. Henceforth, based on transaction and market costs, we therefore hypothesize:

Hypothesis 1: *Market costs and Chinese product demand and supply are statistically significantly correlated.*

Technological progress predetermines supply and demand for products. For instance, the industrial revolution in China has been expedited by advancement in technology. McMaster et al. (2020) posit that technology promotes manufacturing which is fundamental for businesses. China has updated its production strategies and the results are seen by its market penetration. Moreover, they can manufacture and assemble more products at low costs.

Innovation has worked enormously influenced the production process in China. Many companies in China rely solely on technology during manufacturing process. According to Barua (2020), China has a gigantic resource that have been accumulated from various countries. Hence, expanding their businesses to other parts of the world is possible, and establishing an equilibrium between supply and demand is sustainable. Additionally, the commercial application of the resources has helped intensify the process. Dev et al. (2020) argue that the more the developing countries engage in products importation the more their profits increase.

6.1. Technology Acceptance Model (TAM)

TAM is an information system theory that explains the behavior of users who adopt technology. Cheng et al. (2019) highlighted that as new technology emerges it is important factors that would promote its acceptance. We use this theory to explain how recipient countries perceive new technology and their willingness to utilize it in manufacturing. We also examine the impact of information system on the specific country's productivity. We argue that information technology has boosted the performance and production of Chinese manufacturers thereby increasing their demand and supply. Moreover, Fan et al. (2018) highlighted the importance of understanding consumer preferences in different countries to improve available products. As a result, the demand from other countries can be fulfilled along with improvement in technological skills. Understanding how these factors integrate can have a positive impact for the development of the SCM of a business (Awan, Sroufe et al., 2022). Managers require technological knowledge and efficacy to increase productivity in their firms.

6.2. Scale economy and learning curve theory

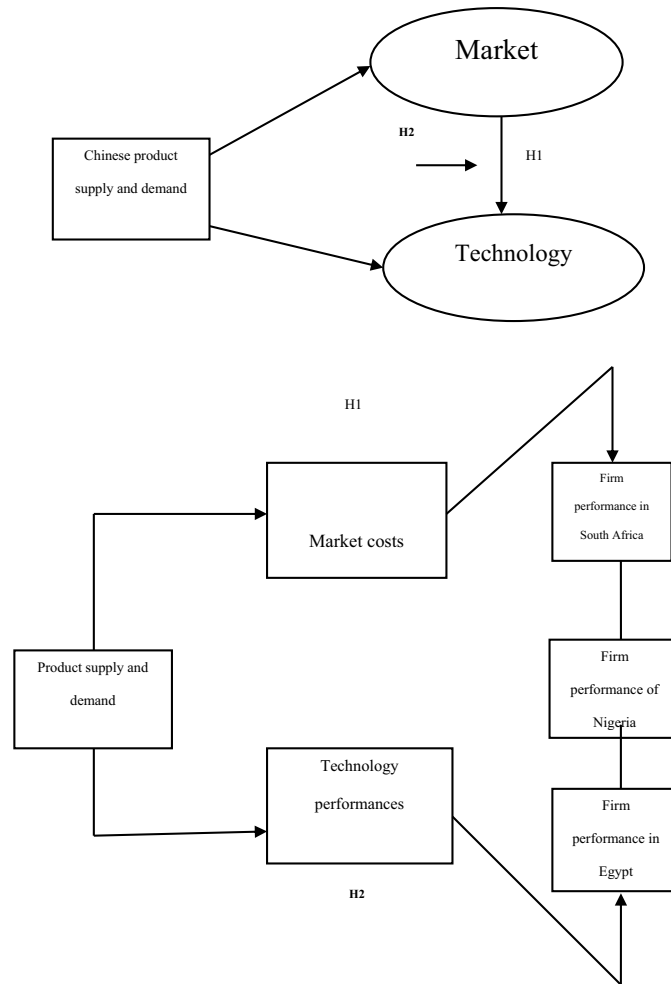
According to the economy of scale theory, when production increases the overall production cost decreases. Economies of scale are associated with increased production efficiency with the help of many productions. With the help of this theoretical insight, we can see how important it is to introduce a cost-effective approach to the production process. Thomson et al. (2018) mentioned that economies of scale are important from a profitability perspective, as it is cost effective. However, cost-effective production can only be achieved through the acceptance of more advanced technologies. Technology adoption rate and technology implementation are factors that affect production and manufacturing price points.

It should be noted that the learning curve theory suggests that there is a close relationship between employee skill and tenure. Abdelkhalek et al. (2020) found that employees become more efficient over time. Therefore, the adoption rate of technology within an organization increase, employees will inevitably become more productive. It is therefore clear that technology performance has a direct impact on employee efficiency and organizational productivity. Technology performance and workforce productivity will also help meet supply and demand for Chinese products. In this context, Hypothesis 2 was constructed under the guise of technology, power, competence, and efficiency.

Hypothesis 2: *Statistically, there is a positive relationship between technology performance, demand, and supply of Chinese products.*

Conceptual Framework

(Source: Learner)



Based on our literature review, we believe that the pointed research gaps in previous literature will be useful to address this current study. We find that previous studies do not imply graphical representations that minimize data and evidence to prove facts Awan, Gölgeci et al. (2022). Furthermore, most previous studies were not grounded in analysis, which also presented a barrier to their real contributions. Therefore, our study addresses market cost and technical support issues to explain the impact on the distribution of Chinese products in various global markets, particularly in the Africa market context.

7. Data and method

An experimental study design employing a scientific model for results and analysis was applied in this study. Saunders and Bezzina (2015) argued that experimental designs allow hypotheses to be tested by data and constituent variables. Two research hypotheses were also set and tested using statistical analysis models. Our data was collected by means of a questionnaire. For context, China's presence in African markets has increased significantly in recent decades. Several well-known Chinese companies currently operating in South Africa, Nigeria and Egypt were selected as target groups. The questionnaire design is robust and contains all the necessary elements for statistical data analysis. The questionnaire was divided into two. The first half is the demographic section which provides the profile of respondents and a statement describing how the data will be utilized. Similarly, the variables section contains Likert scale-based questions. The questionnaire design is comprehensive and robust as a quantitative measure. The Likert scale had five

measurements ranging from 1 (strongly agree) to 5 (strongly disagree). Therefore, a five-scale base response intensity measurement has supported the statistical analysis.

8. Sampling and data collection

This study was conducted using statistical approaches from the data analysis section. The Snowball sampling process also provided some advantages as the referral process could be employed by choosing this method. As Kothari (2017) noted, planning in sampling methods has the ability to simplify research methods in the snowballing method of sampling. Therefore, the analytical part was developed in a simplified way that could elucidate the hypotheses of the study. Statistical tests also provided insight into variables and measured the strength of their dependencies. 279 participants samples from the three countries responded to the questionnaire. Ninety-three responses from each country supported the goal of research homogeneity Kumar (2018). We used snowball sampling method because it is cost-effective and reliable. Furthermore, it keeps study participants' knowledge relevant to industry standards. In this study, we chose a sample size of 279 respondents because it provides a wider range of data to conduct the survey. Which will help, the analytical approach to be strengthened, and the research could gain different perspectives on the research problem.

A descriptive study design was chosen to conduct the study to contribute to the scientific approach. A description of the study configuration is also given by this design choice. According to Saunders (2012), primary data collection processes are considered effective because they can collect reliable information and analytical processes are also suitable for improving the quality of results. Questionnaires were distributed by email to selected respondents after obtaining consent to continue the study. Compared to secondary methods, this is time consuming and somewhat cumbersome. However, we believe that data collection can yield more accurate results.

Table 1 shows that the data has a Cronbach alpha value of 0.937. This Cronbach alpha value indicates a high degree of confidence in the sample size. We also show that the data are ready and efficient enough to be tested in further statistical analyses. Data analysis was supported by a primary quantitative data analysis structure. Data collected and processed in MS Excel were analyzed with SPSS V20. Flick (2020) argued that the SPSS data analysis software is reliable and capable of multiple statistical relationship analyses. However, descriptive, regression, and correlation analyzes are presented for hypotheses 1 and 2. Kothari (2017) states that predictor variables must be correlated to dependent variables. Therefore, we expect a correlation between market costs, technology performance, and demand (supply) of Chinese products. For context, the R^2 change—which is the key measurement parameter for testing H1 and H2, was significant. Pearson correlation values suggest interdependence between predictor and dependent variables.

9. Independent variables

Chinese products supply and demand increasing in the African market have significantly affected product pricing, market competitiveness, and local manufacturing. Giovannetti and Sanfilippo (2016) opined that increasing supply and demand can be a critical indicator for market cost reduction. Chinese products in the African market are marketed within a price-sensitive model. This implies that Chinese products in the African market have affected the pricing strategy of the local and other foreign competitors. A collective response from the supply and demand of Chinese products can be seen within the market environment. The variable measurement has been observed under the pretext of a Likert scale, and the likert scale parameter is the primary measurement source.

Table 1. Reliability analysis	
Reliability Statistics	
Cronbach's Alpha	N of Items
.937	15

10. Dependent variables

Market cost refers to the general threshold level of product prices that domestic and foreign competitors sold in African markets before China dominated. *Technology performance* is related to knowledge, expertise, and skill in using advanced tools and techniques to solve business problems. An et al. (2020) state that employee skills, business performance, and customer purchase intentions may be dictated by a country's ease of adopting technology. Therefore, market cost and technical performance are the dependent variables that should be measured against the demand and supply of Chinese products.

11. Control variables

Participant *age* and *gender* were the control variables used in the descriptive and inferential statistics. Respondent's background information is important for ascertaining the reliability of the study.

12. Results

12.1. Descriptive statistics

After analyzing the descriptive statistics on the samples, we presented the mean, median, standard deviation (SD), maximum and minimum values of the key variables. According to Conner and Johnson (2017), descriptive statistics can characterize the demographic profile of control variables. Similarly, Table 2 shows descriptive statistics for age, gender, nationality, qualifications, and ties to Chinese companies.

HI

Table 2 shows the mean and SD of the control variables. The mean and SD for age is between 1.78 and 0.747. **The majority of the participants were between 25–30 years old.** Moreover, the mean and SD values for gender **ranged between 1.60 and 0.490.** However, the SDs of 0.747 and 0.490 indicate that the data are distributed by gender and age. Conner and Johnson (2017) **emphasize** that the mean and **SD should have a small variance.** Furthermore, the kurtosis values of –1.129 and –1.837 indicate that age and sex have broad-sense distributions. Similarly, the median qualification was 2.52, indicating that most participants had a college degree. The frequency of nationality was shown to be 33.33%, indicating that 93 participants from selected countries attended. The value of descriptive statistics only indicates that the data are of significant relevance to the scope of the study.

13. Inferential statistics

Inferential statistics can explain or predict mathematical reasons behind any phenomenon or situation. In this study, a regression analysis was presented with the help of a simple linear regression model. The simple linear regression model used in this study is as follows,

$$Y = a + bX + \epsilon$$

Here, the Y = Dependent variable (market cost, technology performance)

a = Intercept

b = Slope

ϵ = Residual (error)

X = Independent (explanatory) variable or Chinese product demand and supply

Table 2. Descriptive statistics							
Statistics							
N	Valid	Age	gender	nationality	highest_qualification	association_with_Chinese_company	
	Missing						
		279	279	279	279	279	279
		0	0	0	0	0	0
Mean		1.78	1.60	2.00	2.52		1.86
Median		2.00	2.00	2.00	3.00		2.00
Mode		1	2	1 ^a	3		1
Std. Deviation		.747	.490	.818	.885		.808
Skewness		.372	-.420	.000	-.092		.260
Std. Error of Skewness		.146	.146	.146	.146		.146
Kurtosis		-1.129	-1.837	-1.505	-.704		-1.423
Std. Error of Kurtosis		.291	.291	.291	.291		.291
Minimum		1	1	1	1		1
Maximum		3	2	3	4		3

a. Multiple modes exist. The smallest value is shown

H2

Table 3 shows the regression analysis on market costs and Chinese products. The R^2 change (0.104, $p < 0.100$) was significant. The R^2 indicates the degree of adjustment. A lower goodness of fit was observed for the regression model. Only 10.4% of the data fit the regression model. Kaliyadan and Kulkarni (2019) argued that all movements in the dependent variable can be explained by the R-squared change from 0 to 1. However, in this case the change in R-squared was only observed at 0.104. This suggests that only 10.4% of the change in market costs can be explained by increased demand and supply of Chinese products in African markets. It also shows that 89.6% of the change in market costs can be justified by factors other than supply and demand for Chinese products. The significance level or p-value is now 0.000, below the threshold of 0.05. Henceforth, at significance level $p0.000 < 0.05$, alternative hypothesis H1 is accepted.

However, the non-standard coefficient table shows that the predictor variables (supply and demand for Chinese products) observe a B-value of 0.386 for a constant of 1.846. According to the regression model, a change in predictor units should change the dependent variable by a factor of 0.386. Similarly, increased supply and demand for Chinese products should affect market costs for African products.

H2

Table 4 shows the regression analysis between technology performance and demand and supply of Chinese products. The observed R and R-squared values are 0.185 and 0.034. It shows that only 3.4% of the change in technology performance explained by the increase in demand and supply of Chinese products. Conversely, 96.6% of the change in technology performance explained by factors other than increased supply and demand for Chinese products. At a significance level of 0.002, below the 0.05 threshold, the F was observed to be 9.825. Therefore, the significance level is $P0.002 < 0.05$ Increased supply and demand for Chinese products will have a significant impact on technology performance. Therefore, we can accept the alternative hypothesis at N279, R0.034, p0.000, and F9.825.

However, the unstandardized coefficient values indicate that the predictor's B-value is -0.233 , while the constant is 2.910. Kumari and Yadav (2018) state that negative beta values explain a negative correlation between the predictor and the dependent variable. Similarly, we observed a negative correlation between technical performance and Chinese products. A beta value of -0.233 indicates that unit changes in demand and supply of Chinese products are subject to a negative change of 0.233.

14. Correlational study

The correlation table shown in Table 5 shows associations between predictor variables and dependent variables. The Pearson correlation value between market cost decline and Chinese products is 0.322. According to Kumari and Yadav (2018), Pearson correlation values range from 0 to 1. A correlation greater than 0.7 should be considered as a strong positive correlation. However, the correlation value between market cost and Chinese products is 0.322, which is less than 0.05. Therefore, this shows there is a weak positive correlation between market cost reduction and the availability of Chinese products. This implies that the increase in Chinese products in the African market will reduce market costs by a relatively small amount. However, a positive correlation also indicates that market price declines are dependent on increased product demand and supply.

Our results showed that the correlation value between Chinese products and technical performance was -0.185 . This indicates that there is a negative correlation between the predictor and dependent variables. Sommet and Morselli (2017) argued that a negative correlation means that a 1-unit increase in the predictor variable affects a negative change in the dependent variable.

Table 3. Regression analysis of Market costs and Chinese products supply and demand										
Model Summary										
Model		R	R Square	Adjusted R Square	Std. The error in the Estimate	Change Statistics				
						R Square Change	F Change	df1	df2	Sig. F Change
1		.322 ^a	.104	.100	1.142	.104	31.993	1	277	.000
a. Predictors: (Constant), Chinese_products_Supply&demands										
ANOVA										
Model			Sum of Squares	df	Mean Square	F			Sig.	
1	Regression		41.751	1	41.751	31.993			.000 ^b	
	Residual		361.482	277	1.305					
	Total		403.233	278						
a. Dependent Variable: Market_Cost										
b. Predictors: (Constant), Chinese_products_Supply&demands										
Coefficients										
Model				Unstandardized Coefficients		Standardized Coefficients		t	Sig.	
				B	Std. Error	Beta				
1	(Constant)			1.846	.149			12.390	.000	
	Chinese_products_Supply&demands			.386	.068	.322		5.656	.000	
a. Dependent Variable: Market_Cost										

Table 4. Regression analysis of technology performance and Chinese products supply and demand									
Model Summary									
Model	R	R Square	Adjusted R Square	Std. error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.185 ^a	.034	.031	1.243	.034	9.825	1	277	.002
a. Predictors: (Constant), Chinese_products_Supply&demands									
ANOVA									
Model	Sum of Squares			df	Mean Square	F	Sig.		
1	Regression			1	15.185	9.825	.002 ^b		
	Residual			277	1.545				
	Total			278					
a. Dependent Variable: Technology_performance									
b. Predictors: (Constant), Chinese_products_Supply&demands									
Coefficients									
Model				Unstandardized Coefficients		Standardized Coefficients		t	Sig.
				B	Std. Error	Beta			
1	(Constant)			2.910	.162			17.948	.000
	Chinese_products_Supply&demands			-.233	.074	-.185		-3.135	.002
a. Dependent Variable: Technology performance									

Table 5. A correlation studies				
Correlations				
Market Cost	Pearson Correlation	Market Cost	Chinese_products_Supply&demands	
	Sig. (2-tailed)	1	.322**	
	N	279	.000	
Chinese_products_Supply&demands	Pearson Correlation	.322**	1	
	Sig. (2-tailed)	.000		
	N	279	279	
Correlations				
Chinese_products_Supply&demands	Pearson Correlation	Chinese_products_Supply&demands	Technology_performance	
	Sig. (2-tailed)	1	-.185**	
	N	279	.002	
Technology_performance	Pearson Correlation	-.185**	1	
	Sig. (2-tailed)	.002		
	N	279	279	

**Correlation is significant at the 0.01 level (2-tailed).

Therefore, it can be said that if China's product supply and demand increases by one unit, the technological performance of the three selected countries will decline.

15. Discussion and conclusion

This study focus on how Chinese products demand and supply can reduce the cost and improve technological performance in the selected countries, Nigeria, South Africa, and Egypt. Based on this perspective, we re-introduce and expanded how the increase the demand and supply of Chinese product has negatively impact the Africa market. Our study findings show that there is a significant correlation between market prices and the availability of Chinese products. A Pearson value of 0.322 indicates that an increase in Chinese goods decreases the market price in Africa. According to Chen and Duggan (2016), Chinese products tend to be cheaper due to economies of scale implemented by manufacturers. Brautigam et al. (2018) found that because Africa has a weak business ecosystem, limited raw materials and poor regulations, it is easy for China to penetrate its market and offer cheap products. In addition, poor product quality and low labor costs also contribute to the price decline of Chinese products. These are relevant factors that help Chinese producers to infiltrate the African markets using a price-sensitive marketing strategy.

Therefore, Chinese products are affordable and accessible to African customers. This has prompted Chinese manufacturers to increase the supply of products to the African market, on the pretext of increased demand. Alden (2017) argue that the increased supply and demand suggests that consumers value Chinese products. The high value of Chinese products also indicates that customers prefer the price range of Chinese products to the perceived product value. This creates a standard for other local producers and foreign suppliers when it comes to selling their products on the African market. Local producers and overseas sellers should compare the value of their products with their major competitors or Chinese suppliers. To match prices in the African market, local sellers must reduce their profit margins, thereby lowering the market prices of their goods.

Furthermore, our empirical observations show that the increasing demand and supply of Chinese products has lowered the market cost of many African market products. Mlambo et al. (2016) suggest that increasing Chinese products in African markets has also led to a decline in demand for local products. Declining demand for local commodities is another factor influencing lower market costs. Finally, market prices always tend to have a downward effect on lower equilibrium product prices and higher product availability. The low value of goods in the African market is due to the high volume of Chinese products. It is evident from the empirical observation that increasing supply and demand for Chinese products has reduced the market costs of many African market products. Mlambo et al. (2016) suggested that increasing Chinese products in the African market also resulted in decreasing demand for local products. Decreasing demand for local goods is another influencer of decreasing market costs. Additionally, market prices always tend to see a reducing effect around a lower equilibrium in the product price and a higher quantity of the availability of goods. The lower value of the goods in the African market is due to the high quantity of Chinese products.

Though, we observed that increase in Chinese products decreases the market costs. Therefore, a significant flow of Chinese products is required to reduce the cost of products in the African market. An increase in the flow of Chinese products should positively impact the market costs. When Chinese manufacturers sell their products at very low prices, the demand and supply of Chinese products increases. Based on the efficiency of the statistical tests performed for the study our results supported the hypothesis. The regression values were found to be 0.000 and 0.002 for Hypothesis 1 and Hypothesis 2, respectively. This suggests a positive interaction between the factors selected in this study. Quantitative values provided important insights for continuing research projects. Thus, the relationship among supply chain, dependence on market costs and technology was visible.

Our study also focuses on the technology performance of Chinese product in the Africa context. Our findings show that there is a significant correlation between technology performance and availability of Chinese products. However, the Pearson correlation value between Chinese products and technological performance improvement is -0.185 , indicating a negative relationship. Therefore, the availability of Chinese products will adversely affect technology performance. Kaplinsky and Morris (2016) argued that despite the growing demand for Chinese technology and supplies, infrastructure in many African countries has not improved. Poor infrastructure generally affects the adaptation of new technologies. Similarly, a low level of technology adoption in the African market negatively impacts technology performance. We also discover that China's technology output has decreased due to the increased supply of Chinese products and poor infrastructure. At the same time, technology performance is highly correlated with the availability of Chinese products. Asongu & Ssozi (2015) state that outdated government policies and customer perceptions of a particular technology can directly impact technology performance. Ineffective policies and negative customer understanding lead to poor technology performance.

Finally, the impact of the TAM model has provided key knowledge and valuable insights to technical support to improve business performance. Our understanding of the Chinese market and its global reach extends to business organizations through SCM's technical capabilities. The study's finding show that technology adaptation can provide a variety of business dimensions that are also relevant to Chinese product distribution. It is important for Chinese companies to align product prices with market costs. Increasing supply of Chinese products should influence the pricing strategies of local and other foreign competitors in the future. Songwe (2019) found that technology performance can be influenced by level of skills and expertise. However, skills and expertise in many African countries are relatively low. This affects the adaptability of the technology. Therefore, the African market environment has been greatly influenced by the availability of Chinese goods and products. First, the market prices of our competitors in the African market are on a downward trend. Second, as Chinese products penetrate the African market, their technological capabilities tend to decline. As supply increases, the price point is likely to drop.

It is important that African leaders engage in youth skills and training programs in terms of increasing adaptability to Chinese technology. The supply of Chinese products is not positively correlated to technology performance. This means that despite the increasing relevance of new technologies, the skills and capabilities of African consumers is still low. Therefore, the number of Chinese products in the African market has increased significantly due to low cost and high demand. Despite this, the technological capabilities of the populations of Nigeria, Egypt and South Africa were still in a low trend.

16. Implications

16.1. Managerial implication

Our research will be useful for various managers working in the African goods and services market. Managers can use empirical evidence from this study when making production decisions. Ademola et al (2016) suggest that product and service industry managers should rely on data when making management decisions. African managers are now looking to market costs to determine product pricing. Technical assistance for business process evaluation was also considered. Chinese products are causing a decline in the market prices of several other local products as they rise in popularity on the African market. We expect that through this study, African leaders will be able to determine how cheap Chinese products should be controlled and regulated on African markets, which are currently unregulated. managerial decisions and leadership policies can be influenced by the empirical results shown in this study.

16.2. Theoretical implications

Our research has important implications for various marketing, pricing, and product theories. According to Cohen and Lee (2020), research should extend or refute existing theories. Our data

analysis observed a positive correlation between decreasing market prices and increasing product supply. Therefore, the empirical results of this study extend existing theories of supply, demand, and price. Extending theory can have a significant impact on academic disciplines. In addition, this study correlated Chinese products with market costs and technical performance. We further expand the theories about marketing cost management and technology performance can have a direct impact. Though, this study debunks existing theories about technology performance. It turns out that the performance of the technology can degrade in situations where product availability increases. We identified that the importance of adapting technology to generate knowledge and necessary skills for managers in Africa.

16.3. Limitations and directions for future research

This current study was designed to empirically test the impact supply and demand of Chinese products has in reducing costs in African markets. To do this, we chose a powerful approach by focusing on the three powerhouse of Africa country, Nigeria, South Africa, and Egypt. Particularly by adopting an experimental study design and the use of Primary data to analyze the performance of Chinese products in the selected country. This study was without limitation, we recognize some limitation in this study, using validity and reliability of study variables has restricted us to elaborate on the business performance in the selected country which has place some limitation in this study. Chien et al. (2021), research should be able to gather information about key questions that would enhance the effectiveness of the research. We expect that more theory could have been used to analyze the statistical factors for which evidence was required. Additionally, the lack of secondary data also acted as a notable limitation of this study. A lack of secondary research and analysis has also placed a restriction on our study, which we expect to have increase the generalizability of this topic. We expect future following our research limitation to further improve this gap.

We believe future studies to benefit from our research findings, as our study included primary data. The data and information provided in this study are genuine which will serve as a guidance for future studies probe to demand and supply of Chinese product. Zhai et al. (2018) posit that research should respect ethical grounds when interpreting data. Our current study provides a basis for this study and existing body of knowledge, making it a reliable source for future research and direction.

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