

Block chain technology adoption and supply chain management efficiency in Nigeria

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Abstract

Recently, innovation in information technology and management has been trending and getting emphasis from global organizations. In this regard, this study investigates the effect of adopting blockchain system technology on supply chain management efficiency in Nigeria. The study employed a sample of 270 firms, using ordinary least squares technique as the method of the model analysis. The estimated model found a positive influence of adopting blockchain technology on supply chain management. The result also indicates that gender; age, education, income and experience promote supply chain management. Therefore, policymakers should emphasize on adopting new technology ideas especially with regard to information technology that would enhance management efficiency for better firm's performance. This could be done through policy reform that will target innovation in technology and management in the nation.

Keywords: Block chain technology, supply chain management, education, Nigeria, OLS

1. INTRODUCTION

In the last decade the trend in management information technology and supply chain efficiency have been receiving attention in the world (World Bank, 2019). It is argued that this has focused to high level of economic performance (IMF, 2019). WTO, (2020) estimated about \$ 1.9 trillion was recorded from online transaction in 2020. Similarly, in United state of America almost 5 % increase in such transaction was realized annually (US Department of Commerce, 2015). In the emerging nations, the capacity of management information and supply chain have continue gaining recognition and acceptance (World Bank, 2019). In this context, Nigeria is not exempted from the nations that emphasized and focus on information management and supply chain. It is expressed that manufacturing and fashion industries have gain a tremendous growth. NBS (2020) reveals that over 150 billion naira was recorded in the last decade for fashion industry. Increasing capacity in customer awareness through innovation and management information has reached a significant stage leading to upsurge in profit,

output, investment and economic performance. Nonetheless, acceptability, awareness of adopting management information technology on supply chain efficiency remain challenging in the country (Minoli & Occhiogrosso, 2018). Therefore, blockchain technology is regarded as a new way to facilitate and promote firm performance through effective supply chain management and the linkage of upgraded data, information, storage and transparency. This technology was introduced in the nation through financial sector management in dealing with financial fraud and theft. This is done to promote transparency, trash out illegal cash transaction and stability in the system (Nam et al., 2019). For example, over 20 billion naira was saved due application this technology in the sector. It is argued that almost 100 firms are now linked to blockchain technology information system in Nigeria and has facilitates over 250,000 translations from 2019 to 2020. According to Central Bank of Nigeria (2020) legal online cash transaction in the nation has been increasing and leading to a positive impact to economic activities and the growth of the economy. However, this development has several challenges especially with regard to new technology adoption and awareness in most of organizational management. Therefore, the current study examines the effect of adopting blockchain technology on supply chain management in Nigeria.

2. LITERATURE REVIEW

Linkage between blockchain technology, management and supply chain exists in the empirical literature. For example Guo and Liang (2016) stressed the emphasis that blockchain information system promotes supply chain efficiency. Kumar and Iyengar (2017) investigate the effect of adopting blockchain system technology on supply chain efficiency. The outcome reveals a positive link among the relationship. Similarly, Kamble, Gunasekaran and Arha (2019) used 181 firms to studied the effect of blockchain system on supply chain in India. The study findings indicates that blockchain increases supply chain efficiency of firms. Kim and Shin (2019) emphersized that blockchain system strogly influence firms performance through supply chain management. Nontheless, Su et al., (2015) indicates that socioeconomic nature of the firms owners positively influence supply chain performance. Chowdhury et al. (2020) explains that innovation in technology and ideas enhance supply chain efficiency. Therefore, from the above literature review there is evidence of relationship between blockchain system technology and supply chain. Nevertheless, examining the influence of adopting blockchain system on supply chain performance has not been examined in Nigeria.

3. METHODOLOGY

Model specification

Empirical model by Wang (2016) is modified and utilized to estimate the effect of adopting blockchain system technology on supply chain management. The model was estimated through the OLS technique as in the below function.

$$SM_i = \alpha + \beta_1 Babt_i + \beta_2 Bawt_i + \beta_3 But_i + \beta_4 Ed_i + \beta_5 Ag_i + \beta_6 Fs_i + \beta_7 Gn_i + \varepsilon_i$$

From the above equation Bat means adopting blockchain tech, Bawt shows awareness, ut indicates use of tech, Ed illustrates education level, Fs is family size and Gn means gender.

4. RESULT

In table 4.1 the result of estimated model is explained. The outcome indicates that adopting blockchain system technology enhance supply chain performance in Nigeria. It implies that one unit change in blockchain system improves supply chain efficiency by 1.3 units. Therefore, based on outcome implication policies should be toward government to grant all avenues for firms to take new innovation in technology for effective management performance. The result is consistent with outcome reported by (Kumar and Iyengar, 2017). In addition, increase in awareness and usage of new technology system upsurge the capacity of supply chain performance by 1.00 and 2.00 units. Similarly, age, education, income and experience of the firm’s owner’s raise supply chain efficiency by 0.01, 1.9, 1.5 and 0.033 units. In the other dimension family size has negative influence on supply chain. Nonetheless, marital status and gender are not significant in influencing supply chain performance in the country.

Table 4. 1 Estimate of the model

Variables	Co-efficient	SD error	T-value	Prob.
BTA	3.170**	0.551	0.629	0.008
BTW	1.031*	0.814	6.433	0.000
BTU	2.004*	0.974	-0.745	0.000
AG	0.182**	0.086	2.743	0.057
GN	2.421	0.473	-5.784	0.491
FS	-0.032**	0.826	1.436	0.040
IN	1.961*	0.113	1.902	0.012
ED	1.582**	0.094	2.083	0.000
EP	0.338**	0.183	0.158	0.041
MS	0.044	0.748	1.509	0.119
Constant	1.632**	0.652	2.784	0.004
R ² Adjusted = 68.0				

*, **, *** Illustrate 1, 5 and 10 % significant level.

Table 4.2 illustrates the post estimation validation checks. The result shows that the model is free from all econometric problems as shown in the table. Therefore, the model is fit for policy analysis.

Table 4. 2 post estimation validation checks

Test	F-statistics	Prob.
Serial cor	0.784	0.241
Breusch-Pagan	0.612	0.832

5. CONCLUSION

The study investigates the effect of adopting system technology on supply chain performance in Nigeria. The study employed a sample of 270 firms, using OLS as method of analysis for the model estimation. The outcome reveals a positive influence of adopting blockchain technology system on supply chain performance. The finding illustrates that new technology awareness and use upsurge the capacity of supply chain efficiency. Additionally, the result also indicates that income; education, age, gender

and experience enhance supply chain efficiency. Hence, policymakers should device a means for firms to take new innovation in technology and ideas for better management and supply chain efficiency. The limitation of the study may include inability to incorporate other factors like innovation in science that will enlarge policy recommendation. In this regard, future studies should consider these factors in order to fill this gap.

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