
DIGITAL TECHNOLOGY ADOPTION AND FORMALIZATION OF QUOTED ORGANIZATIONS IN AGRICULTURAL, BANKING, AND FOOD AND BEVERAGE INDUSTRY IN SOUTH-SOUTH NIGERIA

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ABSTRACT

The study examined the influence of digital technology adoption on formalization of quoted organizations in agricultural, banking, food and beverage industries in South-South Nigeria. The study adopted survey design while the population of the study was 33 quoted organizations in agricultural, banking, food and beverage manufacturing industries in South-South Nigeria. The study took a census. Primary data was collected from 3 senior management staff each in the 33 quoted organizations (making a total of 99 respondents) using semi-structured questionnaire. The validity of the instrument was ascertained using content and face validity, while reliability was measured using Cronbach Alpha. The instrument attained the threshold of .70. The multiple regression statistic was employed to test the influence of digital technology adoption on formalization in the studied organizations. The findings showed that digital technology adoption has more influence on formalization of quoted organizations in agricultural industry, than in quoted banking firm and further in foods and beverages firms. The study concludes that digital technology adoption influence formalization of organizations in agricultural industry than organizations in banking and foods and beverages firms in South-South Nigeria. The study therefore recommends that management of banking, agricultural and foods and beverages manufacturing firms South-South in Nigeria should adopt digital technologies if they intend to formalize their firms in terms of documentation and standardizing work process to survive in the turbulent operating environment.

Keywords: Digital technology, documentation, job standardization, formalization

INTRODUCTION

Disruptions in the business environment have tasked organizations to structure and re-structure themselves, organize, and adopt innovative models in reaction to change. This is in line with the position of Ng'ong'a et al. (2019) that organizations with formalized structures that do not realign to volatile industry trends face challenge of not keeping pace with competition and becoming less profitable. However, Hamilton (2003) posits that the question of how organizations structure themselves has been a central interest to strategic management scholars from the inception of the development of management thought and philosophy.

Thus, the initial interest of scholars was on formal structures, that is, official relationships and formal communication among members of the organization. Formalization refers to an organization structure where there are rules, clear job descriptions, and clearly defined work procedures and processes. Formalization also describes the extent to which rules, procedures, instructions and communication are written (Eze et al., 2017).

Hamilton (2003) indicates that reliance on direct supervision and job standardization which are mechanisms of formal structure is more in consort with the psychological health of workers. Apparently, proponents of informal structure advocate the use of mutual adjustment as an important coordinating

mechanism to cope with changing industrial operations. Kenneth (2021) states that coordination can be achieved through a range of structural configuration such as: hierarchical reporting relationships (vertical, horizontal and spatial complex relationships), formalized communication systems, cross-functional teams in terms of matrix design structure and coordinator's position in the organization. Hamilton (2022) posits that structure allows the organization to divide its labour and achieve coordination.

The Covid-19 pandemic that started in 2019, the Central Bank of Nigeria (CBN) Naira Devaluation programme of 2021 and the Russian-Ukraine war that started in 2022 have collectively, drastically altered business activities globally, and has instigated the adoption of modern technologies in business operations. The basic undercurrent of this race to adoption of modern technologies is to improve productivity, reduce costs and decrease redundancy in the workforce.

Hiring modern technologies like automation and digitalization has induced organisations to set advanced skills, knowledge, capabilities, modify job roles and generate new positions to comply with current realities (Redwell-Emotongha & Poi, 2020). To keep pace with technological change, digital skills including data and trends analysis skills, automation management skills, industrial cybersecurity management skills, big data management skills, programming, and infrastructure engineering and design skills have come under increased demand at all levels in all organizations.

Woodward (1965) studied relationship between technology and structure in nearly one hundred manufacturing organizations and classified them into unit, mass and process production organizations, with unit production as the least complex and process as the most complex. The study concluded that a clear relationship exist between technical system classification and structure of a firms. The study further concluded that the effectiveness of organizations depend on the fit between their technical systems and structures. Woodward (1965) further suggests that a highly structured and formalized organization may be more appropriate for the effectiveness of a mass production technology, the unit and process technology might require an organic structure with fewer rules and control and greater degree of interpersonal interaction.

Several other scholars have examined the relationship between structure and technical systems (Perrow, 1967; Thompson, 1967; Hamilton, 2003). Bayo and Redwell-Emotongha (2020) found that disruptive technologies influence productivity of soft drink firms in Nigeria. Ford and Slocum (1977) reviewed the combined influence of size, technology and environment on organization structure and identify areas of agreement and disagreement, and offers directions for future research. Ondiek (2021) conducted a study on digital technology and performance of commercial Banks in Kenya and concluded that adoption of digital technology has led to an overall improved performance at KCB Banks.

This study therefore opted to join the discourse by questioning how digital technology adoption predicts formalization in organizations. Hence, the purpose of this study was to ascertain the impact of digital technology adoption on formalization in quoted Agricultural, Banking, and Food and Beverages firms in south-south Nigeria.

LITERATURE REVIEW

Digital Technology Adoption

Technology is a widely used concept in contemporary research; and no generally accepted definition in the literature. Hamilton (2003) posits that technology refers to the information, equipment, techniques and processes required to transform inputs in to outputs. It has to do with the science and art adopted in the production and distribution of goods and services. Technology also refers to how organizations transform inputs in to outputs. Every organization has at least one technology for converting resources into products.

According to Moffat (2016) has to do with the emergence of new information that seeks to improve existing methods and processes. It consists combination of factors whose objective is to enhance efficiency for operators and beneficiaries of a process. Digital technologies are dynamic, and have the capacity to transform organizations and entire industries (Ondiek, 2021) due to changing preferences, needs and expectations for customers.

Market demands have evolved over time, and have forced the emergence of new organizational models and processes. Digital technologies inform products, methods, inventions, and standards used to produce information (Kroenke, 2012). Digital technologies resources are divided into: information technology infrastructure and information technology resources. Information technology infrastructure includes hardware, software, communication technologies, shared technical platforms, and databases. Thus, Buschgens et al. (2013, as cited in Ebere & Ateke, 2019) states that implementation of digital technologies is not only influenced by firms' need to become market leaders or achieve competitive advantage, but also by a quest for long-term survival.

Concept of Formalization

Formalization is defined as the degree to which rules and procedures within a system are specified and adhered to (Ford & Slocum, 1977; Nahma et al., 2023). Formalization is the degree to which rules and procedures are standardized and utilized. It means the degree to which jobs within an organization are standardized (Robin, 1990). More so, formalization is the degree to which employers are provided with rules and procedures that deprive creative, autonomous work and learning.

In other words formalization is the extent to which written procedures, instructions laws and communication guides a firm's operational activities. Formalization can be done within a job or imposed from outside when it is determined from outside. In this case rules and procedures are executed directly by lower management (Dehkordi, 2009).

Although formalization is measured by extent of documentation, it can also apply to unwritten regulations. In this study formalization is defined as the extent to which rules and procedures mandated for work are explicitly stated. Rephrasing the definition, the degree of formalization in an organization can be measured by the number of rules and regulations that ought to be followed in any work-related procedure by every member of the organization. The study therefore used job standardization, documentation and rules and regulations to represent formalization.

Digital Technology and Formalization of Organizations

There are studies that have probed the relationship between digital technologies and sundry organizational outcomes, save formalization. There have also been studies that sought to explain formalization in organization using other predictors. However, studies that examined the relationship between examine digital technology and formalization in organizations are scarce. Ondiek (2021) studied digital technology and performance of commercial banks in Kenya and observed that adoption of digital technology led to improved performance of commercial banks in Kenya. The study also found that the adoption of digital technology helped commercial banks in Kenya to improve customer acquisition rates.

Bayo and Redwell-Emotongha (2020) examined disruptive technologies and productivity of soft drink manufacturing firms in South-South Nigeria and found that 3D printing, additive manufacturing, and mobile internet have a positive significant correlation with productivity of soft drink firms in South-South Nigeria. In Ebere and Ateke (2019), the nexus between technological options and competitiveness of hotels was examined. The study observed very strong and statistically significant connection between technological options and competitiveness in terms of differentiation and cost advantage and recommends that firms that seek differentiation and cost advantage should adopt available technologies that have become indispensable competitive tools.

Ouma and Ndede (2020) investigated adoption of digital banking technology and financial performance of commercial banks in Kenya. The study found that ease of access to digital banking through digital-banking technology positively influence financial performance of commercial banks in Kenya.

On formalization, Okinaye and Tamunomiebi (2020) examined agility and formalization of deposit money banks in Rivers State. The study generated primary data through questionnaire, and same using Spearman’s Rank Order Correlation Statistics. The study found a significant relationship between agility and formalization of Deposit Money Banks in Rivers State. Based on the foregoing, the study hypothesizes as follows:

H₀₁: Digital technology adoption does not significantly influence formalization in quoted agricultural, banking and foods and beverages manufacturing firms in south-south Nigeria.

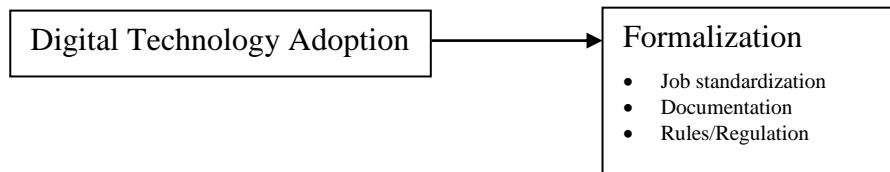


Fig.1: Conceptual model of digital technology and formalization

METHODOLOGY

The aim of this study was to examine the influence of digital technology adoption on formalization in quoted agricultural, banking and foods and beverages manufacturing firms in south-south Nigeria. The study adopted a survey research design. The population of the study comprised agricultural, banking and foods and beverages manufacturing firms that are listed and trading on the Nigerian Exchange group as at the last week of May, 2023. The accessible population for the study was 33 agricultural, banking and foods and beverages manufacturing firms that have operational presence in South-South Nigeria. South-South Nigeria consists Rivers, Delta, Cross River, Bayelsa, Akwa-Ibom, and Edo States. The reason for focusing on agricultural, banking and foods and beverages manufacturing firms in South-South Nigeria was to allow for a more incisive assessment of the manifestation of digital technology adoption and formalization within manageable parameters and frameworks.

The study took a census. As an organizational level unit of analysis, the study chose three (3) respondents from top management category of each of the 33 firms. This includes the following Chief Executive Officers, Head Human Resources and Head Operations making it 99 respondents. The study used questionnaire to collect primary data from respondents. The reliability of the instrument was confirmed through test of internal consistency using Cronbach Alpha.

Table 1: Results of Test of Reliability

S/N	Study Variables/Constructs	Cases	Cronbach’s Alpha Coefficients
1	Digital Technology	4	0.980
2	Formalization	4	0.975

Source: SPSS Result, 2023

The results of Cronbach’s Alpha test 0.95-0.98 and this was found reliable for data analysis and making generalization. The quantitative data analysis techniques for this study involved both descriptive and inferential analysis. The study used Multiple Regression Analysis to determine the directions and predictive influence of digital technology adoption on formalization.

DATA ANALYSES AND RESULTS

Table 2: Response Rate for Field Data Collection on Industry Basis

	Industry Firms			Total
	Food and Beverage Manufacturing	Banking	Agriculture	
Copies Distributed	45	42	12	99
Copies Retrieved	38	39	10	87
Copies not Retrieved	7	3	2	12
Copies Used for Analysis	38	39	10	87

Source: Field Survey, 2023

A total of 99 copies of questionnaire were distributed to respondent in 33 firms across 3 industries (agriculture, banking and food and beverage manufacturing). 45 copies were administered on food and beverage manufacturing companies; 42 copies on deposit money banks, and 12 copies on agricultural firms. A time window of 3 weeks was allowed for the completion of the (Google Form) questionnaire after which they were recorded on the Google Drive App.

Descriptive Analysis

Response rate on formalization in the Industry: this section asked respondents on data relating to formalization structure in terms of job standardization, documentation and rules/regulations.

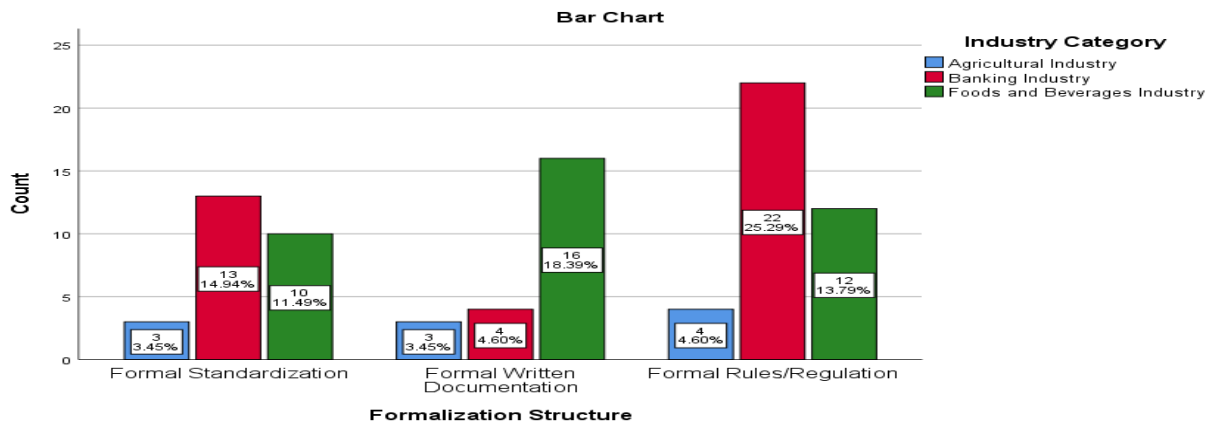


Fig. 1 indicate the response rate on formalization of organizations in the three industries in Nigeria. Total of 87(100%) copies of questionnaire were retrieved from 33 quoted agriculture, banking and food and beverage manufacturing firms. Majority of respondents 4(4.60%) affirmed that firms in the agricultural industry are structure with formal rules/regulations. Also, majority of respondents 22(25.29%) affirmed that firms in Banking Industry are structured with formal rules/regulations. Furthermore, majority of respondents 16(18.39%) affirmed that firms in foods and beverages industry are structure with formal documentations.

Inferential Analysis

The regression analysis was modeled to measure how well our overall model fits, and how well digital technology adoption predicts formalization in organizations. The multiple regression analysis was used to ascertain the predictive power of the independent variable (digital technology adoption) to either improve or reduce the outcomes of the dependent variable –formalization.

Table 3: Model Summary on effect of Digital Technology on Formalization

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.967 ^a	.935	.932	.24636

a. Predictors: (Constant), Technology

Source: SPSS Result, 26.0 (2023)

The coefficient of determination ($R^2 = .935$) establish the predictive power of digital technology adoption and the result showed that 93.5% change in formalization of quoted agricultural, banking and food and beverage manufacturing firms was affected by digital technology adoption while the unexplained 6.5% could be due to the effect of variables that were not included in the study.

Table 4: ANOVA^a of the Regression of Predictor Variable and Formalization

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	71.528	1	17.882	294.632	.000 ^b
	Residual	4.977	85	.061		
	Total	76.504	86			

a. Dependent Variable: Formalization

b. Predictors: (Constant), Technology,

Source: SPSS Result, 26.0 (2023)

The ANOVA results in Table 4 show the numerator df (1), which indicates the number of predictor variables in the study (i.e. digital technology adoption) and the denominator shows the degree of freedom ($86 - 1 = 85$) for bivariate regression use. The value of the F test is $F(1,82) = 17.882$, ($p\ 0.000 < .05$). The F-value indicates that the relationship between variable in the regression model was fit; hence it has some explanatory value in the studied organizations. This indicates that there is a significant effect of digital technology adoption on formalization in quoted agricultural, banking and food and beverage manufacturing firms in South-South Nigeria.

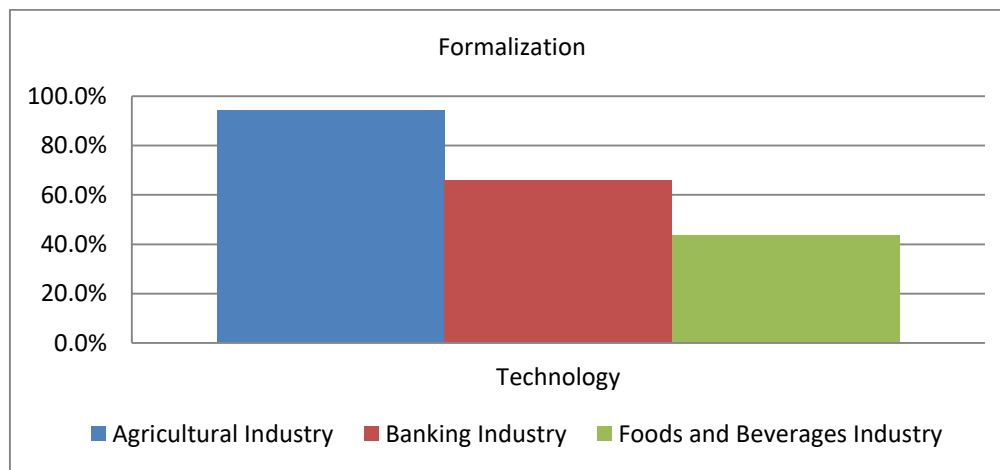


Fig. 3 showed the extent of digital technology adoption on formalization in each industry

The result in figure 3 indicate the predictive power of digital technology adoption on formalization in each of the industries under study in south-south Nigeria. In agricultural firms, the results indicates that a unit change $\beta = 0.944$ in digital technology adoption explain 94.4% change in formalization in quoted agricultural firms in South-South, Nigeria. In banking firms, the results indicate that a unit change $\beta = 0.658$ in digital technology adoption explain 65.8% change in formalization of quoted banking firms in

South-South Nigeria. The results in foods and beverages manufacturing firms indicate that a unit change $\beta = 0.437$ in digital technology adoption explain 43.7% change in formalization.

The empirical findings showed that digital technology adoption significantly influence formalization in agricultural, banking and foods and beverages manufacturing firms with (standardized $\beta = 0.477$; $P < 0.000 < 0.05\%$). Therefore, the null hypothesis was rejected. That is to say the prevalence of digital technology adoption play key roles in formalization in terms of job standardization, documentation and rules/regulations.

DISCUSSION OF FINDINGS

The study examined digital technology adoption and formalization in quoted agriculture, banking and foods and beverages manufacturing firms in South-South Nigeria. The findings showed that digital technology adoption has more influence on formalization in quoted agricultural firms than in quoted banking firms. The influence of digital technology adoption on formalization in foods and beverages firms is the lowest. These findings agree with the findings of Ondiek (2021) that digital technology adoption improves overall performance of commercial banks in Kenya. This is evident by the fact that over 90% of bank transactions have shifted to digital platforms.

Also the study findings corroborate that of Ouma and Ndede (2020) that adoption of digital technology significantly influence financial performance of commercial banks in Kenya. The ease of access to digital banking through digital-banking technology have positive influence on financial performance of commercial banks in Kenya. The current findings also align with that of Afrika (2018) that adoption of cloud computing technology enables sustainable development of commercial banks in Uganda. The study indicates that the deployment of cloud computing technology is integral to growth of commercial banks by contributing to active operations of the banks.

The findings further align with the position of Bayo and Redwell-Emotongha (2020) that disruptive technologies have positive significant correlation with productivity of soft drink firms in Nigeria. In addition, the findings align with the position of Broadbent et al. (1999) that IT play an important role in enabling the implementation of successful business process reengineering. However, the inventiveness of information technology provides a basket of automated solutions that can be applied in various stages of business context at a high cost to organizations. Hence, the high prevalence of digital technology in terms of social networks, internet of things, cloud computing lead to formalization and restructuring of organizations.

CONCLUSION AND RECOMMENDATIONS

The study concludes that digital technology adoption significantly influence formalization of organizations in agricultural industry than banking industry while it has low predictive power in foods and beverages manufacturing industry in South-South Nigeria. The digital technology adoption has significant predictive power on formalization of agricultural, banking and food and beverage firms in South-South Nigeria. This means that most modern organizations operate with some form of formalization which everyone in the organization must follow. Job description provides guidelines for specific tasks to be completed along with a regulated pattern for resources to be allocated. The study thus recommends that management of banking, agricultural industry and foods and beverages manufacturing industry in South-South Nigeria should consider adopting digital technologies to improve documentation, rules and regulations and standardization of their work process.

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