

Effects of Business Intelligence, Organisation Learning and Innovation on the Performance of Small and Medium Scale Enterprises (SMEs) in South-West Nigeria

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Abstracts

Business Intelligence (BI), both in process and product, is one of the methods used by organizations to develop and access useful information or intelligence that can help enhance their performance. This paper therefore evaluates the effect of business intelligence (BI), organizational learning (OL) and innovation (IN) on the performance of SMEs in the South West Nigeria. Ex-post facto design of descriptive survey was adopted for the study. Primary data were collected on SMEs from Southwest Nigeria. A structured questionnaire ($r=0.77$) was used to elicit information from selected respondents. The sample size of 400 was adopted as derived from Cochran sample size formula out of the population size of 299,401. The data obtained were analyzed using statistical and econometric techniques. The findings from the analysis through logistic regression showed that only Business Intelligent (organization learning and innovation) has a significant influence on firm performance. The study therefore concluded that firm performance could be boosted by the integration of business intelligence, organizational learning and innovation. Hence, it is suggested that Nigerian small and medium scale businesses that are yet to incorporate business intelligence-driven innovation into any part of their production and delivery processes should make a quick effort to do so.

Introduction

Business intelligence is the combination of data, appropriate metrics, and the relevant skills, tools, and processes on Firms operations (such as its Products, Process, Markets and organisational operations) to make sense of what is happening in a business (Organisation knowledge), and to make recommendations as to what should change or happen next (Innovation). In a 1958 article, IBM researcher Hans Peter Luhn used the term business intelligence. He defined intelligence as: "the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal." Organisation Learning (OL) on the hand is the management of internal and external information gathered on various activities of the Organisation to build a body of knowledge that will be used to orchestrate innovations that will enhance the performance and achievement of the goals of the firm. Organizational innovations vary from one firm to another. Ajibike and Ologunde (2019) postulated that various organizations change the ways of organizing things (through Innovations) in order to compete with their competitors and satisfy their customers.

This paper acknowledged the important of SMEs as the spine of all countries' economic growth (Ajibike and Fagbemi, 2022), which further act as suppliers of goods and services to big enterprises and consequently increasing job opportunities (Singh, Garg, and Deshmukh 2008). Abor and Quartey (2010) noted that performance of SMEs is imperative for both social and economic development of developing countries. Furthermore, small businesses have been recognized as the engines upon which the growth objectives of developing countries can be attained (Floyd and McManus 2005). In many developing countries, SMEs are potential sources of income and employment. Against the backdrop of the increasing realization of the vital contributions of Small and Medium Scale Enterprises to any economic well being that the present study is set to examine the effect of business Intelligence (BI), Organisation Learning (OL) and Innovation (IN) on the Performance of SMEs in Southwest Nigeria.

Conceptual Review

Business Intelligence BI is poorly understood and defined by both academicians and managers. Concepts like a competitive market or strategic intelligence, the data warehouse, business performance management and data mining are frequently used when talking about BI. In some situations, these terms are used as synonyms of BI. For example, Vedder et al. (1999) stated that competitive intelligence is a synonym for BI when they wrote "competitive intelligence, also called business intelligence." We believe that using different terms to explicitly discuss specific but different concepts related to BI create confusion in the literature and therefore confusion in the interpretation of results. Moreover, we have observed that researchers in the field have defined BI using many different definitions, each one with a particular orientation that best suited their particular study. Various stakeholders such as consultancies, software vendors, practitioners, and the scientific community have used the term business intelligence rather vaguely to describe processes and systems dedicated to the systematic and purposeful analysis of an organization and its competitive environment. For example, Glaser & Stone (Glaser & Stone, 2008) refer to BI as

the “IT platform and tools used to gather, provide access to, and analyze data about organization operations and activities.

However, for Azvine et al. (2005), BI is all about how to capture, access, understand, analyze and turn one of the most valuable assets of an enterprise — raw data — into actionable information in order to improve business performance (Azvine, Cui, & Nauck, 2005). As a third example, Negash defines BI as a system that combines data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers (Negash, 2004). Even if these three definitions seem similar, they do not correspond exactly to the same concepts. Indeed, the definition of Glaser and Stone (2008) is leaning towards the technological aspect of BI, while Azvine et al. (2005) and Negash’s (2004) definitions have a more managerial aspect. Moreover, Negash’s definition has a broader view of the scope of business intelligence since knowledge management and competitive intelligence are included in this last definition. We are convinced that this multiplicity of definitions helps create confusion around what BI is. We concurred with Eric Foley, (2010) who define business intelligence as a managerial and technological process.

Organizational Learning

OL is the capability “within an organization to maintain or improve performance based on experience”. It is a process whereby members in an organization are stimulated to strive continually for new approaches and to acquire as well as to share knowledge that emerges from interactions with environments. OL is thus the process of increasing the knowledge created by individuals in an organized way and transforming it into part of the organization’s knowledge system. OL complements the flow phase of knowledge management. “It not only occurs over a period of time and among different levels of the firm (individual, group, organizational and inter-organizational) but also creates tension between assimilation of new knowledge (feed-forward) and exploitation of what has already been learned (feedback)”.

Influence of Innovative SMES on Firm Performance

The current business environment is characterized by rapid innovation and development of new product and services within a short time. Numerous studies have identified a positive relationship between innovation and small and medium scale enterprises (SMEs) performance. Firms that engage in innovation activities achieve higher level of growth and profitability than those that do not Ajibike et al. (2019). As a result, firms that exhibit Cooperate Entrepreneurial (CE) are typically viewed as dynamic, flexible entities preparing or prepared to take advantages of new business opportunities when they arise.

Now-a-days, firms that exploit BI as a way of achieving better market positions have a strong incentive to be first innovators when the first-mover advantage is significant. Once an innovation is made, the entrepreneur must bring the innovation to the market in the shortest possible time, as the innovator’s position of monopoly might otherwise be quickly eroded by imitators or superior innovations. Innovative companies frequently develop strong, positive market reputations that

ensure customer loyalty, which enable them to exploit an additional basis for competitive advantage.

Entrepreneurship - Development Tendencies and Empirical Approach

First-mover advantages that translate into superior firm performance; such characteristics may well enable entrepreneurial firms to take advantage of the effects of learning and experience curves to improve their product, process or market strategies and achieve better organizational performance. These entrepreneurial firms are willing to deviate from prior routines, strategies, business models and operating environments to embrace new resource combinations that hold promise as potential enablers of innovation, such as exploitation of BI in firms.

Methodology

This study adopts Ex-post facto of descriptive survey design. Primary data were gathered on SMEs from southwest Nigeria out of which Lagos, Oyo and Ogun were purposively selected because of the large presence of SMEs in these States. The sample size of 400 was adopted as derived from Cochran sample size formula out of the population size of 299,401. The sample of 400 was confirmed to be adequate according to Creslo (1996). Simple Random sampling technique was adopted in selecting the sample.

Two instruments were used to collect data for the study, which are;

- i. Lin., Chen, Shun,Chiu. (2010) Business Intelligence scale; and
- ii. Firm Performance Scale (FPS).

The 21 items innovation scale constructed by Lin, Shunchiu and Chen (2010) was adapted to collect information on the extent and forms of innovation among SMEs in South West Nigeria. The instrument was sub-scaled into Business Intelligence, organizational learning and innovation (process innovation, product innovation and market innovation). The response format was patterned after Likert's modified format of Strongly Agree = 4points, Agree = 3points, Disagree =2points and Strongly Disagree= 1point. Firm Performance Scale (FPS)was developed using the work of Rensis Likert (1961), Michael Harrison (1994), Edward Lawler III (1993), and others.

The instrument was given to experts to establish the face and content validity of the instrument and ensure that the instruments measure what it intended to measure. Also, the instrument was trial rested to establish its reliability; Crombach Alpha reliability coefficient result is 0.77; which supports the reliability of the instrument.

Result

Effect of Innovation on Firm Performance

Table 1: Effect of Business Intelligence on Firm Performance

VARIABLES	(1) SMEs (Ordered logistic)	(2) SMEs (Binary Logistics)	(3) Micro Businesses
Organizational Innovation = (yes=1)	-0.826* (0.318)	1.396* (0.506)	0.297 (0.635)
Marketing Innovation = (yes=1)	0.274 (0.383)	-0.359 (0.626)	0.208 (0.844)
Product Innovation = (yes=1)	0.240 (0.364)	-0.393 (0.610)	0.173 (0.696)
Process Innovation = (yes=1)	-0.634** (0.321)	0.359 (0.522)	-0.094 (0.595)
Constant		1.806* (0.669)	
Observations	227	226	71
Pseudo R ²	0.030	0.064	0.005

Standard errors in parentheses (), * p<0.01, ** p<0.05, *** p<0.1

Source: Author's compilation (2019).

Table 1 gives an insight into the effect of business intelligence on firm performance. It is observed that those that adopted significantly improved new ways of exchanging information, knowledge and skills as a form of organizational innovation are 46% ($e^{-0.82601} - 1$, p<1%) more likely to experience improved performance compared to those that failed to adopt it as shown in model 1. This significant effect shows information exchange is considered central for improving firm performance as further supported in model 2 and 3.

Marginal Effect of Business Intelligence (Innovation Types) on Performance of Small and Medium Scale Enterprises

The table 2 below shows marginal effect of innovation types on performance of small and medium scale. It can be observed that product innovation as measured by newly or significantly improved goods is positively and significantly (p<1%) related with firm performance. This shows that for a unit increase in product innovation, the probability that performance will increase is 0.066. Also,

process innovation as measured by newly or significantly improved production method is positively and significantly ($p < 1\%$) related with firm performance. Hence, for a unit increase (decrease) in product innovation, the probability of having performance increase (decrease) is 0.093.

In a similar vein, organizational innovation measured using “improved knowledge management system” is positive and significant ($p < 1\%$). In essence, for a unit change in organization innovation, the probability of performance will change by 0.021. Lastly, market innovation, is also positively and significantly ($p < 1\%$) related with firm performance. With a unit increase (decrease) in market innovation, the probability that firm performance will increase (decrease) is 0.018.

Table 2: Marginal Effect of Business Intelligence (Innovation Types) on Performance of Small and Medium Scale Enterprises

VARIABLES	(1) SMS
Product Innovation	0.066***
Process Innovation	0.093***
Organization Innovation	0.021***
Market Innovation	0.018***
Observations	227
r^2_p	0.0298

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author’s Compilation (2019).

Discussion of findings

Empirical findings from this study revealed that there exist positive and significant relationship between product innovation and firm performance for the informal and formal sector. However, the result is positive but not significant for SMEs. The results of the study are also in alliance with study conducted by (Sandvik, 2003; Johnne and Davies, 2000; Otero-Neira et al. 2009; Varis and Littunen, 2010), whose findings indicate a positive and significant relationship between market innovation and business performance. Lastly, the findings on organizational innovation corroborates that of Salim and Sulaiman (2011) who confirmed a positive relationship between organizational innovation and firm performance. Table 1 shows marginal effect of innovation types on firm performance of small and medium scale. The results revealed that all types of innovation are positively and significantly ($p < 1\%$) related with firm performance.

Conclusion

Based on the findings, it could be concluded that business intelligence with respect to various forms of innovation seems to have an influence on different aspects of firm performance. On the

other hand, process innovation influences almost every aspect of firm's performance with significant impact on cost/unit output. Furthermore, observable among small and medium scale enterprises is that individual organizations have goals, activities gear toward adopting innovative methods at every level of production process but there is no formal programme to bring about such a critical approach. Thus, inference could be made that small and medium scale enterprises in Nigeria are yet to adopt innovation in some aspect of their production and delivery processes but could either be described as being in the constraint or emerging level of innovation.

Recommendations

In line with the findings of the study, the following recommendations are made:

- i. that small and medium scale enterprises in Nigeria should explore the innovative opportunities brought by the adoption of ICT in all areas of production and marketing.
- ii. government and other stakeholders in business sectors should lay a solid foundation for innovation in terms of policies and infrastructure that enhance business ideas and innovation.
- iii. individual small and medium scale enterprise in Nigeria should have innovative plan in form of formal documentation that will attract patent and differentiate product of one firm from the other.
- iv. stakeholders in Small and Medium Scale should be more particular about the kind of innovation that will reduce the cost/unit output as well as sustain market increasing marketing and sales.

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