



INFORMATION TECHNOLOGY STRATEGY AND SUSTAINABLE COMPETITIVE ADVANTAGE OF SELECTED OIL AND GAS INDUSTRY IN NIGERIA.

KIFORDU A.A, PhD

Department of Business Administration

Delta State University

anthony.kifordu@yahoo.com,

aa.kifordu@delsu.edu.ng

Abstract

The purpose of this study was to investigate the relationship between information technology and sustainable competitive advantage in Nigeria's oil and gas industry. Two goals of organizational responsiveness and cost leadership outcomes measured through the import of information and communication technology were collected and empirically tested. Using a cross-sectional design, data collection was performed using structured surveys from a total of 120 employees in the company. Cronbach's alpha factor was used to assess the reliability of equipment customized for the research. Hypothesis testing shows that information technology contributes significantly to sustainable competitive advantage. Therefore, it was concluded that information technology is important to the functioning of an organization and its systems and has a significant impact on the responsiveness and cost leadership of the organization. The Research recommended that focus needs to be on innovation, technology development, the ever-changing market and organizational dynamics, and the constant update of an organization's IT requirements to meet customer expectations.

Keywords: *Information Technology, competitive advantage, cost leadership, organisational responsiveness*

Introduction

The recent fall in crude oil prices has been a turning point in Nigeria's oil and gas industry. This unprecedented turnaround has put many organizations in the industry in fierce competition to strengthen, survive and increase efficiency in the operations that will shape the future of the oil and gas industry. However, to drive hydrogen production and increase organizational efficiency in an environment of cost savings, capital discipline, transform management processes, build capabilities and reorganizes assets, we need to implement a technically feasible strategy towards a Sustainable Competitive Advantage (SCA). Many scholars have attempted to study various strategies and variables to achieve SCA because of its impact on business efficiency. According to Drobis (2020) study, organizational progress into a highly competitive market requires consistent increase in the need for innovation and communication, reaching diverse customers and sustaining competitive advantage (SCA) which should address this increased uncertainty as a result of increased customer expectations (Hilda, 2016). As the business environment becomes more dynamic, developing strategies that differentiate an organization from its competitors becomes an

important factor (Gathunguand Mwangi, 2018). Therefore, customers need to be aware of the differences between a company's product and a competitor's product. These differences should be due to the number of resources in the organization beyond the knowledge of the competitors. Rouse and Zietsma (2018) argued that learning to respond to early signals of environmental change represents the development of dynamic environmental adaptation skills.

In addition, Gowrie et al (2012), stated that the organizational environment is open to competitors, and imitation of products/strategies or rapid technological changes can reduce sustainability and shorten the life of a technology asset of an organization. Therefore, he argued that there was no benefit to long-term sustainability and to build a Sustainable Competitive Advantage (SCA), an entity must maintain the participation capacity of an existing organization. Due to the importance of SCA, many scholars have sought to find strategies for sustainable competitive advantage. They associated several variables in measuring sustained competitive advantage, (Porter, 1984). Therefore, administrators need to be fully focused, able to scan the environment, continuously innovate,

create features, and develop technologies to increase efficiency.

Despite the significant contribution of information technology to organizational transformation, few attempts have been made to examine its impact in Nigeria, especially in the oil and gas sector, on SCA. In addition, research has shown that most literature on this subject has little empirical support and focused on theoretical and speculative cases, (Zoubi, 2012). Most of these studies also developed a set of measurable variables that represent SCA in terms of financial indicators (sales, profitability, market share, etc.), Chi and Sun (2015) which are of essential reference. However, those results show that it is an important, positive and reliable indicator for measuring sustainable competitiveness, the outcomes ignored the core capacity and internal resources of a company's information technology that may help the company achieve a superior sustainable competitive advantage. Therefore, our starting point is to look at the relationship between information technology and sustainable competitive advantage in Nigeria's oil and gas industry, using organizational response and cost leadership as a measure of sustainable competitive advantage. Broadly, this study is aimed at establishing the effect of information technology on sustainable competitive advantage in the Oil and Gas Industry while the specific objective is to ascertain the effect of organizational responsiveness on sustainable competitive advantage and effect of cost leadership on competitive advantage in the Nigerian oil and gas industry

Related Literature Review

Conceptual Review

Concept of Information technology

Information Technology (IT) uses computers, telecommunications, digital, and system applications to store, collect, transmit, and manipulate commercially important data as a driving force and enabler of business processes has historically played an important role in improving business efficiency. Organizations are consistently committed to developing technology to increase efficiency and focus on innovation through cost-effective strategies for longer environments. IT can enhance business process transformation (Baker, 2019). IT is seen as an important factor in enabling new forms of work and collaboration within and across organizational boundaries. Therefore, the development of information technology is beginning to change the way we work, and these technologies can impact the future of the industry

over time. Hammer (1990) sees information technology (IT) as a key element in business process reengineering for organizations that want to experience "fundamental changes" in their operations. He stipulates that IT will be used to challenge the assumptions specific to working processes that existed long before the advent of the latest computing and communication technologies. He argues that at the heart of change is the notion of discontinuous thinking or the notion of recognizing and then breaking away from the underlying assumptions underlying outdated rules and operations. These work design rules are based on assumptions about technology, people, and organizational goals that no longer apply. Furthermore, Baker (2019) in his work has unveiled some of the key disruptive digital information technologies that can shape the future and increase business efficiency in legitimately sad times in the oil and gas industry. These include artificial intelligence/automation, data analysis, and internet of things / electronic monitoring.

Major destructive digital information technologies that impact Business Processes.

Artificial Intelligence (AI): This involves the use of technology and the development of system applications to perform tasks that typically require human intelligence and solve problems such as; human language recognition, vision, decision making, and multilingual translation. The use of these technologies can affect the operational efficiency of the oil and gas industry. Artificial intelligence applications can be used in a wide range of applications such as surveying, monitoring, inspection, and security. Operational details can be encoded in real-time on digital technology or handheld devices using specific information such as photos, measurements, analytics, and locations. This information can be automatically synchronized with a linked database with control systems, SMART rooms, maintenance scopes, schedules, and 3D virtual modelling or timely display on the side of all users and champions. It can be obtained via a graphic representation. The system can assess risks, report potential concerns, and recommend mitigation measures. This saves up time and costs.

Data Analysis (DA): The concept of data analysis is the process or science of collecting, investigating, cleaning, transforming, modelling, and integrating raw data to find information that will help you make operational decisions. It addresses the growing amount, diversity, and

speed of data in the oil and gas industry. This sector produces vast amounts of data from a variety of operational activities, including drilling data, maintenance data, 3D seismic surveys, safety data, production control, and surveillance data. Managing and analyzing this data presents challenges unique to many organizations in the industry. Analyzing this vast amount of information is an important innovation driver for players in the oil and gas industry, with a particular focus on improving exploration, production, and safety efficiency. The application of data analysis is important for operational areas such as maintenance, exploration, drilling, reservoirs and production engineering. The accuracy of this data helps deliver operations and improves the efficiency of the entire organization in real-time. When a discrepancy occurs, the application displays a maintenance error message to alert the user or creates a maintenance request for component replacement or proactive maintenance. It also accelerates data-driven innovation and improves industry productivity and process automation.

Internet of Things and Electronic Monitoring (IoT): This is the connection of sensors and monitoring devices for sending and receiving data over the Internet. It is a system of interconnected computing devices, machines, electronic, digital machines, and objects that are assigned unique identifiers (UIDs) and send data over the network without the need for human interfaces or interactions. To do. Communication and exchange are possible. These applications can also be remotely controlled and monitored from locations associated with offshore equipment in the oil and gas industry. Devices can provide real-time information about devices and machines. It can also be used to track equipment due to maintenance needs and monitor other factors that may affect production, such as temperature, corrosion, humidity, sea level, and wind speed. IoT technology was developed to improve the efficiency and security that was developed.

Aspects of Information Management Cost Leadership

Cost leadership is a business strategy that creates a competitive advantage for an organization by having the lowest operating costs in the industry. This is the ability of an organization to compete with large competitors for low prices (Li et al., 2006). According to Porter (1980), cost leadership is the achievement of industry-wide cost leadership through a set of functional policies

aimed at several basic goals. The aggressive construction of internal facilities is required for efficient scaling, strong cost trapping and reduction policies, overhead control, cost minimization, and more. Zoubi, (2012), argued that cost leadership can be achieved by focusing on organizational efficiency. Production and process (economy of scale). Therefore, cost leadership can be seen as a top low-cost strategy within an organization.

Aremu and Saka (2006) argued that information technology (IT) is a strategic resource that drives major changes in competitive behaviour, marketing, and customer service. Essentially, IT gives businesses a sustainable competitive advantage. Davenport (2012) conducted a survey and found that information technology (IT) plays a powerful role in sustainable competitive advantage. Similarly, one study (, Hammer and Chimney 2019) found that IT simplifies tasks, reshapes organizations, changes the way traditional works, and is sustainable. It shows that. This shows that you can gain a competitive advantage. They can leverage disruptive technologies such as shared databases, expert systems, telecommunications networks, decision support tools, and computers in their reengineering processes to achieve sustainable competitive advantages. However, according to a Frone (2013) study, information technology does not always create a sustainable competitive advantage within an organization. This may be because employees usually find it difficult to use destructive techniques or resist changes. They are more familiar with old methods than new ones, which can disrupt an organization's reengineering process and make it difficult for an organization to gain a sustainable competitive advantage. Based on this, the following hypothesis can be made

Organizational responsiveness

Organizational responsiveness represents an organization's ability to respond appropriately to the external environment (Clippinger, 2019). A more fundamental definition is that responsiveness is the aggressiveness of an organization's market strategy (Gresov, Haveman, and Oliva, 1993). This responsiveness allows organizations to maximize their ability to recognize and effectively adapt to ongoing changes in industry and customer preferences. Organizations that adapt effectively to change can better manage disruptions and consistently meet customer expectations. This responsiveness realization is based on the process of identifying, capturing, and transforming:

1. Identifying: Identifying is the capacity to identify possibilities inside the corporation and within the marketplace. A fundamental thing in being capable of discovering possibilities is the provision of perception generated from commercial enterprise intelligence and analytics. Being capable of correctly putting in force those structures of perception are a mirrored image that a corporation has contextualized and prioritized its facts, that it is aware of the effect of outside elements on its performance, and that it may always make this fact be had to decision-makers on the proper time.

2. Capturing: Capturing is the capacity to mobilize assets with the purpose to capture possibilities. A corporation's capacity to seize possibilities may be advanced in some ways. One instance is making sure bendy employer generation. Flexible employer generation permits for integration, scalability, and for the brand new capability to be added easily. Without this, groups will continuously be tied down through their employer structures. Inflexible structures frequently want to be replaced, while bendy structures may be prolonged tremendously simply. Companies additionally have a view to swiftly install services and products. While this frequently is based on being perception-pushed and having bendy employer generation, it's additionally encouraged through an organization's transport methods. Companies who undertake non-stop transport methods, for instance, can get their services and products to the marketplace faster, at the same time enhancing their capacity to make modifications primarily based totally on feedback, and uphold quality.

3. Transforming: Companies now no longer handiest have a view to discover and seize possibilities, however, reconfigure their assets and abilities to do that on an ongoing basis. Transforming is a corporation's capacity to evaluate and reconfigure its inner and outside competencies. Broadly, agencies need to not forget the right breadth and intensity in their abilities and assets to make sure they could correctly meet their commercial enterprise demanding situations on an ongoing basis. This method that there's a non-stop reinvention of procedures and commercial enterprise models, an emphasis on organizational learning, and extensive funding in employer generation.

Ultimately, agencies who're seeking to technique Digital Transformation will want to discover their

specific possibilities, however, all agencies can try to be responsive. Developing organizational responsiveness is based on setting up extra perception, green operations and dynamic abilities, velocity in handing over services and products, and reconfiguring employer generation to be extra bendy. Companies who broaden this responsiveness will efficaciously navigate extradite and keep their patron relationships, Burca, Fynes and Brannick (2006.)

Concept of Sustainable Competitive Advantage

Sustainable and positive profits are related to the organization's efforts to organize and maintain profits over the long term. Sustainable and positive utility suffers from three factors: the size of the target market, increased access to sources and customers, and regulation of competitiveness. Organizations that typically practice methods based primarily on properties that are not easily replicated can produce sustained offensive utility (Coynes, 2006). They further argued that customers want to understand the differences between an organization's products and its competitors to generate lasting positive utility. These variations are not available from competitors and must have been created from company sources. Other researchers have the resources and capabilities to contribute to the creation of sustainable and positive utility, as should be defined. For example, Barney (2011) argues that each source in an organization cannot create a Sustainable Aggressive Utility (SCA), which has four characteristics: shortage, value, irreplaceable, and irreplaceable. Is required. According, to Cegielski, Jones-Farmer, Wu & Hazen (2012). Adoption of cloud computing technologies in supply chains: An organizational information processing theory approach. The International Journal of Logistics Management 23 (2), 184-211), capacity SCA sources can be divided into financial, physical, legal, human, organizational, informational, and rational sources. They argue that a positive advantage in sources can be a positive advantage in the market (Hoffman and Nicol, 2000). Prahalad and Hamel (1990) argued that companies integrate sources and competencies with core competencies/ages. This is a good way to produce lasting positive utility in a regular and specific way.

Cost Leadership and Sustainable Competitive Advantage

To gain a competitive advantage, companies can focus on different strategies such as cost leadership,

quality, innovation and customer service. The most powerful benefits come from leadership in elements that are important to the customer and difficult to match with competitors. Cost leadership means being the lowest cost producer in the market segment of your choice. This allows you to set a lower price than your competitors and offer your customers the same benefits. According to Fast Company, cost leaders do not have to set the lowest prices or participate in price competition. If you have a cost advantage, you can offer your customers the same product quality or benefits at the same price as your competitors. This is an added value for customers. Your business has lower costs, so you can continue to make profits while maintaining competitive prices. Cost leadership also provides flexibility in dealing with strong buyers. If a buyer demands higher quality, higher level of service, or lower price, they will meet those demands without sacrificing profitability while competitors may find it difficult to meet. I can do it. This puts you in a strong position when you are doing business in a market with few product differentiations and many competitors. The same benefits apply if your

supplier wants to raise their price towards you. This increases costs and reduces margins, but it can still absorb the increase. If you have a clear cost advantage, you can create a strong barrier to entry. New entrants who are not cost-friendly need to make large investments to match the price while maintaining profitability. This is important in markets where customers can easily switch suppliers and where customers tend to seek lower prices. Similarly, according to Quality Digest, supply chain collaboration can enhance cost advantages. By working with members to improve efficiency and reduce costs across the supply chain, you can create a sustainable cost advantage that competitors find difficult to match with it. If your company is a cost leader in your market sector, you have a strategic choice. You can set prices at the level of your competitors to stay profitable or lower prices to increase your market share. Maintaining profitability allows you to invest in other activities to strengthen your cost advantage and to implement other growth strategies such as increased product development or marketing budget.

H₀₂: There is no significant relationship between cost leadership and sustainable competitive Advantage?

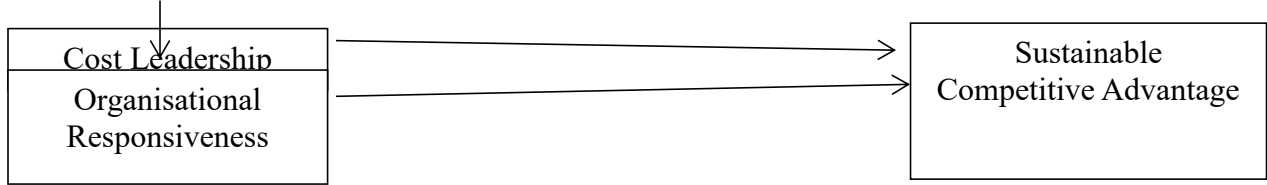
Organisational Responsiveness and Sustainable Competitive Advantage

Organizational responsiveness or mindfulness is argued to contribute to a business enterprise's functionality to make variations as soon as they want to be recognized. Groups which could generate numerous views, ideas, know-how, and competencies can also additionally have to get admission to a more arsenal of responses while confronted with the want to adapt (Ely & Thomas, 2001; Sutcliffe and Vogus, 2003). This happens in numerous ways. First, while the business enterprise is made of people and businesses with a lot of know-how and experiential backgrounds, it has to get admission to a bigger pool of capability responses to any given situation (Sutcliffe and Vogus, 2003). Second, such agencies can be higher ready to create new responses. Research indicates that businesses composed of people with numerous know-how and knowledge have to get admission to a greater diversity of cognitive factors that could then be mixed and recombined into novel solutions (Amabile, 2003). Finally, organizational mindfulness can also additionally enhance adaptability by encouraging divergent wondering at some stage in trouble solving (Clippinger, 2019) It is typically held that divergent wondering will increase the capability variety of novel

solutions (Bhardwaj, Varadarajan, and Fahy, 1993). It appears evident, therefore, that organizational responsiveness will increase skills to word and reply to diffused cues that edition is necessary. Without assisting in organizing systems and processes, however, agencies are not going so that you can generate or draw on them. Mindful organizing is enabled through organizing systems that each expands and draws upon mindfulness as a way of keeping adaptability (Weick et al., 1999). In particular, those are systems that permit agencies to (i) discover and use knowledge wisely, (ii) are looking for out and inspire opportunity views and frameworks, (c) awareness of the capability for failure, and (iii) research from mistakes. Recent empirical proof indicates that the quantity that agencies or businesses have interaction in responsive modifications to trap and save you errors (Huang, Li, & Chen (2019). This observation considers the equal set of behaviours with recognition to IT identifying, shooting and transforming.

H₀₂: There is no significant relationship between information technology and organisational responsiveness

Conceptual Framework of Information Technology and Sustainable Competitive Advantage
Independent Variable **Dependent Variable**



Source: Researcher’s Analysis, (2022).

Theoretical Framework

The Market-Based View (MBV)

The market-based perspective theory quoted by Chi and Sun (2015) dates back to Mason and Bain (1950), who linked the structure of the industry to corporate success with the so-called Structure-Conduct-Performance-Paradigm. They argue that key factors for an organization's success are barriers to entry, the number of players in the market, and the elasticity of demand. In 1980, Michael Porter further developed this idea in his book, ‘the Competitive advantage’. This is currently one of the foundations of business science. In his work, Porter introduces the so-called "five forces" framework that determines competition within the industry and the three "general strategies" that companies can adopt to succeed, and is a powerful IT. Management responsiveness and cost leadership has proposed to increase competitive advantage and can be maintained. The theory further argues that in an IT-driven industry, competitive advantage and external market-oriented industry factors are key determinants of corporate performance. Even after Bain's Structure-Conduct-Performance (SCP) framework and Porter's Five Forces model, two of the most well-known theories in the market-based view of strategic theory, many scholars say that the widespread use of IT is enterprise will lead to more fierce competition. IT can give organizations a competitive advantage by seizing opportunities,

defending against threats, and improving their ability to transform their position in the market. Therefore, this study maintains this theory to fill the gaps identified by this study.

Tools and Methods

This study adopted a multi-session study using the quasi-experimental design of oil and gas companies. The results are based on 116 completed survey responses. A total of 120 questionnaires were emailed to five selected multinational oil and gas companies in the Niger Delta, Nigeria. In a survey sent by email, the overall response rate was 97% with 116 responses. The selection of survey participants is based on the organizational analysis unit. An important position within these companies has been identified as essential to understanding information technology and its lasting competitive advantage. This includes the General Manager (GM) office, managers, supervisors, and team leaders responsible for key tasks such as maintenance (MTC), engineering, and procurement. And projects (ECP), materials and logistics, contracts and procurement (C & P), manufacturing and human resources (HR). Reliability testing of the appliance was performed using Cronbach's alpha coefficient and all items were rated above 0.7, as shown in the table below. Spearman's rank correlation coefficient has been used by researchers to determine the strength and direction of relationships between research variables.

Table 1: Reliability Co-efficient of variable measures

Variables	Measures	Indicators	Alpha
Information technology		3	0.882
Sustainable Competitive Advantage	Cost Leadership	3	0.842
	Organisational responsiveness	3	0.764

Source: Researcher’s data output, 2022.

Hypotheses Testing

The Decision Rule

If the probability value calculated is greater than the critical level of significance at 1.000 then the null hypotheses will be accepted while the alternate hypotheses is rejected and vice versa.

Hypothesis One

H₀₁: There is no significant relationship between cost leadership and sustainable competitive Advantage

Hypotheses Two

H₀₂: There is no significant relationship between organisational responsiveness and sustainable competitive Advantage

Results and interpretation

The hypothesis will be tested using Spearman's rank in the correlation tool with a 95% confidence interval (the significance level was set to a significance level of 0.05). Here, PV < 0.005 means insignificant associations between studyvariables rejecting the null hypothesis. Where P > 0.005 accepts the null hypothesis. Meanwhile the table 2 below shows obvious significant association of cost leadership and organisational responsiveness (independent variables) on SCA using technological adaptations. The analysis established a positive significant relationship with sustainable competitive advantage, hence accepting the null hypotheses 1 and 2 at 0.457 and 0.286 respectively.

Table 2: Information Technology and Sustainable Competitive Advantage

		Technology	Cost	Responsive	
Spearman's rho	Technology	Correlation Coefficient	1.000	.625**	.457**
		Sig. (2-tailed)	.	.000	.000
		N	116	116	116
	Cost Leadership	Correlation Coefficient	.625**	1.000	.286**
		Sig. (2-tailed)	.000	.	.002
		N	116	116	116
	Responsive	Correlation Coefficient	.457**	.286**	1.000
		Sig. (2-tailed)	.000	.002	.
		N	116	116	116

Source: **Researcher's data, 2022.**

Table 2 above shows obvious significant association of cost leadership and organisational responsiveness (independent variables) on SCA (dependent variable) using technological adaptations. The analysis established a positive significant relationship with sustainable competitive advantage, hence accepting the null hypotheses 1 and 2 at 0.457 and 0.286 respectively.

Outcomes and postulations

The results of this study confirmed that cost leadership and organizational responsiveness of information technology sub-variables are important predictors of sustainable competitive advantage (SCA). As such, information technology

can be seen as making a significant contribution to results by leveraging the responsiveness and cost leadership of an organization. In this way, organizational technology can be perceived as the key to effectively harmonizing systems, integrating functions, and driving, competing, and asserting current trends in the environment. This is the position of a former scholar (Aremu and Saka, 2018) who confirmed that information technology is an important aspect of a healthy organization because it provides a mechanism for an organization to grow at a more substantive level. It further supports the claim that communication and interaction deeply promotes sustainability in competitive advantage. Similarly, it stimulates

organizational adaptability and responsiveness competitively.

Conclusion

This study addressed information technology and sustainable competitive advantage in the Nigerian oil and gas industry. The study through its results presented that information technology contributes significantly towards achieving sustainable competitive advantage (organizational responsiveness and cost leadership). IT is also critical to the functionality of the organization and organization's market and the expectations of its customers.

ii. As Nigeria's oil and gas companies move towards the future of innovative smart technologies, the benefits of such investments are reflected in increased efficiency, reduced operating costs, and increased productivity and safety. However, technology can be error-prone, so care must be taken not to overly rely on technology that does not have a significant percentage of human input.

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