

## Framework for Knowledge Management Strategy for Competitive Advantage in Industrial Production in Nigeria

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### Abstract

The dynamic growth of information technology (IT) in recent years has put managers on their toes. Managers have come to recognize the alignment of business and information technology strategy as a key issue for their success. During the course of transactions, organizations generate large amount of data. They also spend a lot of resources trying to transform these data into information and consequent knowledge. Today, organizations rely more on what they know rather than what they have. This is the concept of knowledge management. Possession of and adherence to this concept makes the difference between developed nations and under developed nations, successful organization and non-successful organizations. Storing and applying knowledge empowers organizations to succeed in an enterprising and competitive environment. The purpose of this work is to build a framework on how production industries can use knowledge management systems to achieve their business vision so as to be relevant in the international market by using DIKAR/RAKID model.

**Keywords:** Information strategy, Competitive strategy, Organizations, Business strategy, Data warehouse, Knowledge management, Database, Data mining.

### 1.0 Introduction

Many technologies have had significant impacts on people's lives since the twentieth century, but none as profound as information technology (IT). The information technology revolution has had an enormous influence on how organizations are managed. Almost all the innovations in the practice of modern management have

had their influence from the development of information technology. The emergence of global economy and the increasing knowledge-based nature of modern organizations are all integral part of information technology.

Since the recognition of information systems as a vital tool in the production process, organizations have come to realize the importance of managing knowledge. Knowledge is a component of company's intangible asset which sometimes determines the market value of such companies. According to Malhotra (2000), "Knowledge has become a key source for organizations to enhance the competitive advantage which is a prime significance for the organization's performance. In addition, Knowledge Management (KM) has become embedded in the policy, strategy, and implementation processes of worldwide corporations, government and institutions" (Kroenke, 2008, 5).

As companies and organizations in Nigeria do their business, they collect large amount of data relating to the business operations and activities. These collated data need to be conscripted and consolidated for future reference especially during planning process. Interpretation and analysis of these data can provide valuable insights into their production processes or operations for competitive advantage. This would help to identify areas that need improvement as well as optimize areas of efficiency for market dominance and relevance. Most third world countries including Nigeria, lack the ability to convert data into knowledge. This is evident in the way and manner we run our systems. It is the purpose of this paper to develop an information technology framework on which business organizations in Nigeria can grow their businesses and make profit using tools of knowledge management.

Many developing and Third World countries are still battling to breakthrough in terms of development but it has not been an easy task for them as a result dearth of technology. The mode of business processes are still at its primitive stage and all these has led to high cost of production and consequently decline in expected profit, and this raises doubts about developing countries' ability to participate in the current Information and Communication Technology (ICT)-induced global knowledge economy (Okunoye, 2003). Information systems are more than just a set of technologies that support workgroup and enterprise collaboration, efficient business

operations or effective managerial decision making, it can change the way businesses compete (O'Brein, 1999).

Nigerian economy is today witnessing high cost of production and inflation. These problems are not necessarily due to economic forces known to us, but partly due to developed culture of wastages in time and material resource. As part of the solution, evaluation of our business processes in line with other developing countries have been suggested.

Many have reasoned that lack of performance is as a result of non-application of information technology to our business or production processes (Stephen and Connell, 2006; Akomea and Sampong, 2012). The purpose of this paper therefore is to build a conceptual framework on which the problems facing our industries may be solved using the tools of knowledge management as a strategy for competitive advantage. This implementation of this concept will produce managers who are proactive. They will be able to access up-to-date information on *what* works, *where* it works, *how* it works, *when* it works and *what* makes it work.

### **1.1 The Theory of Competitive Strategy**

Strategies are general approaches that illustrate how organizational goals can be achieved, and tactics are more specific guides to actions that would implement strategies (O'Brien, 2003). Ideally, in their strategic planning process, organizations try to develop firstly, a shared vision using variety of techniques, followed by the development of their mission, goals, strategies, and policies. Powell (2001), views business strategy as the tool that manipulates the resources and create competitive advantage, hence, viable business strategy may not be adequate unless it possesses control over unique resources that has the ability to create such a unique advantage. Organizations will have to understand and deal with their environment. A superior understanding and representation of their environment leads to superior choices that they have to make. According to Gavetti (2011), some firms are endowed with better ways of representing the world around them than others. Superior representations lead to superior choices that are not easy for other firms to understand and copy.

Competitive advantage seeks to address some of the criticisms of comparative advantage Michael Porter in 1985 proposed the competitive advantage theory which suggests that states and businesses should pursue policies that create high-quality goods to sell at high prices in the market. Porter emphasizes productivity growth as the focus of national strategies. Competitive advantage rests on the notion that cheap labour is ubiquitous (everywhere) and natural resources are not necessary for a good economy. The other theory, comparative advantage, leads countries to specialize in exporting primary goods and raw materials that trap countries in low-wage economies due to terms of trade. Competitive advantage attempts to correct for this issue by stressing maximizing scale economies in goods and services that garner premium prices (Stutz and Warf, 2007). Competitive advantage occurs when an organization acquires or develops an attribute or combination of attributes that allows it to outperform its competitors. These attributes can include access to natural resources, such as inexpensive power, or access to highly trained and skilled personnel human resources, new technologies such as robotics and information technology either to be included as a part of the product, or to assist making it. Information technology has become such a prominent part of the modern business world that it can also contribute to competitive advantage by outperforming competitors with regard to internet presence and knowledge based systems.

The term competitive advantage is the ability gained through attributes and resources to perform at a higher level than others in the same industry or market (Christensen and Fahey 1984, Kay 1994, Porter 1980 cited by Chacarbahi and Lynch, 1999). The study of such advantage has attracted profound research interest due to contemporary issues regarding superior performance levels of firms in the present competitive market conditions. "A firm is said to have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential player" (Barney 1991 cited by Clulow et al, 2003, 221). Successfully implemented strategies will lift a firm to superior performance by facilitating the firm with competitive advantage to outperform current or potential players (Passemaid and Calantone, 2000). To gain competitive advantage, a business strategy of a firm manipulates the various resources over which it has direct control and these resources have the ability to generate competitive advantage (Reed and Fillippi 1990 cited by Rijamampianina, 2003:362).

Superior performance outcomes and superiority in production resources reflects competitive advantage (Day and Wesley 1988 cited by Lau, 2002).

It is important to note here that during Reagan Administration in the United States, he realized that American industries were losing in international competition that he appointed a team of experts led by Michael Sekora to determine among other things: 1) Why US industries were losing their ability to compete in the world marketplace and 2) develop a solution to restore US industries' ability to compete. This project was tagged "Project Socrates". The Socrates team launched one of the most in-depth research undertakings ever conducted in the US intelligence community, producing ten key findings that became the basis for the "Socrates technology-based competitive strategy" system, and support tools for developing and executing competitive strategies.

Strategic Information Systems (SIS) are systems that support or shape the competitive position and strategies of an organization and place the organization in a leadership position. An organization can survive and succeed in the long run if it successfully develops strategies to confront five well-known competitive forces that shape the structure of competition in its industry. According to O' Brien (1999), the competitive forces that confront an organization are:

- 1) Rivalry of competitors within its industry
- 2) Threat of new entrants
- 3) Threats of substitutes
- 4) Bargaining power of customers
- 5) Bargaining power of suppliers

Various well known competitive strategies including knowledge management can be developed to help an organization confront key business challenges and decisions in order to curtail the aforementioned competitive forces. These competitive strategies include among others:

- 1) Becoming a low cost producer of products and services
- 2) Finding ways to help suppliers or customers reduce cost
- 3) Finding ways to differentiate products and services from competitors
- 4) Finding new ways of doing business

- 5) Significantly expanding the companies capacity to produce goods and services (diversification)
- 6) Establishing new business linkages and alliances with customers and suppliers

The implementation of knowledge management strategy in creating viable values that enhances comparative advantage and superior performance in industrial processes and production is the germane objective in the introduction and acceptance of any emerging innovation. How then can knowledge management serve enhance competitive advantage?

## 1.2 Knowledge Management as a Competitive Strategic Tool

According to Bipin (2010), “knowledge is an abstract entity that can be characterized according to its use. We consider knowledge to be a justifiable belief. We use a pragmatic rather than the philosophical approach in a knowledge base system” Knowledge is a component of information. It is a component that has gone through the processes of extraction and filtration. Generally, when we talk about knowledge, we tend to mean knowledge derived from information which is subjected to some tests of validation.

Knowledge is a theoretical paradigm that defines *what to* and *why to*. According to Stephen (2004), quest for knowledge is an internalized principle and pattern of behaviour that determines the success of any industrial process. Figure 1 shows the relationship between knowledge, skill and desire in determining an industrial production strategy.



Figure 1: An Information Strategy paradigm  
Source: (Stephen, 2004)

Therefore, to transform information into useful knowledge, manufacturers must expend additional resources to discover *what* (patterns, rules, and contexts that) works, *why* it worked, *where* the knowledge works, *when* it worked, and *how* it can be feasibly deciphered, deployed and distributed for viable competitive advantage (Asiegbu and Ajakwe, 2016).

### 1.2.1 Organizational Knowledge Management

When individuals in the organization pool their knowledge together it gives the organization advantage over others in the same industry. Organizational knowledge resources include: Individual or personal knowledge; Group or community knowledge; and Structural or embedded knowledge. Organizations face innumerable challenges in nurturing and managing knowledge. Unlike manufacturing activities, knowledge activities are difficult to monitor and control, because only a part of knowledge is internalized by the organization, the other part is internalized by the individuals. This duality between individual knowledge and organizational knowledge demands different sets of management strategies in knowledge management (Ganesh, 2002). Organizations should work towards encouraging individuals to release substantial amount of their knowledge to organizations through motivations, incentives, training, etc.

Because companies spend additional resources in processing information to discover patterns, contexts and rules where the knowledge can work, it therefore requires application of wisdom which is the collective and individual experience of applying knowledge to the solution of problems (Kenneth and Laudon, 2007). From the above, we can see that knowledge is a type of invaluable asset to an organization such as building, financial assets etc. This is why managers in developed countries of the world believe strongly that information systems are integral part of production systems. Accumulation, storage and application of knowledge in specific discipline or business function area assist managers take quality decisions that affect the future of their organization. Thus through knowledge creation, viable business strategy are deployed, processes are controlled and unique resources maximally utilized for unique advantage. Organizational knowledge will

also help managers in superior understanding and representation of their environment which lead to superior choices and proactive decision making.

## 2.0 Framework for Knowledge Management

In the business world, we can have knowledge that describes business models and procedures, and business rules are often used to capture how activities are performed within an organization. Best practices capture the knowledge and behaviours of skilled employees. At this juncture, it is important to examine a proven model for knowledge discovery and deployment for competitive advantage in any production environment.

The Figure 2.1 is the DIKAR/RAKID Model illustrating the strategic value of knowledge management for competitive advantage.

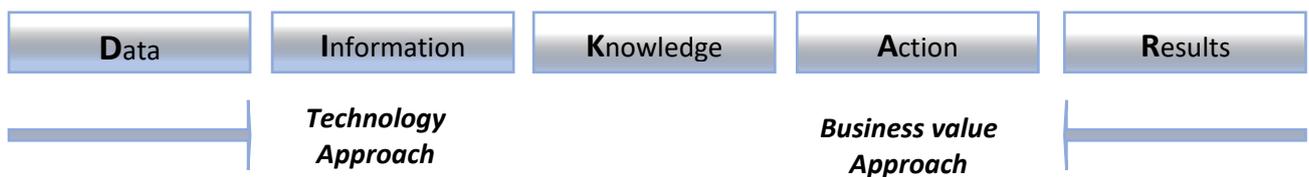


Figure 2.1: The DIKAR model (after Venkatraman, 1996)  
Source: (Peter, 2002)

The **DIKAR** (**D**ata **I**nformation **K**nowledge **A**ction **R**esults) model in figure 2.1, tracks the relationship between data, information, knowledge, action and results (Peter, 2002). If we view the model from left-to-right, we will be viewing knowledge from supply-side perspective. Supply-side places too much reliance on hope. In other words, we are saying that the achievement of result is based on hope. This only confirms the fact that knowledge management is only an enabler. To interpret the model conventionally, we view from left to right (from data we move towards the result. As we get closer to data stage, procedures and technology are applied. Towards the end emphasis is laid on people. Technology alone cannot deliver benefit that grows business rather it enables people to work better. It then means that knowledge management as an enabler works better when people do things differently in a better way through timely knowledge discovery, deciphering, and deployment for comparative advantage in industrial production.

This model can also be used to view knowledge from the demand-side requiring us to move from right-to-left. This is another way of growing business and enhancing industrial production using knowledge management. The movement from right-to-left in the model is called **RAKID (Results Action Knowledge Information Data)** model. RAKID model allows organizations to use their resources in a new value-adding ways thereby using their capabilities to establish their intended goals and not to rely on hope. RAKID model drives knowledge from results perspective. Once organizations identify results to aim for, they must ensure that knowledge management remains focus on them through the deployment of knowledge base management system in extracting factual valuable information for informed proactive decision making.

Demand side driven RAKID model can be implemented using the following techniques or their combinations:

1. *Driver Analysis*
2. *Balanced Scoreboard Card*
3. *Critical Success Factors*

Drivers' analysis include: Competition, Government regulations and Stock market opinion. All these drivers cause business to change over time. It is therefore the core responsibility of executives to proactively determine the drivers that cause changes to occur in business. If any organization uses balanced scoreboard card, the objectives derived from drivers analysis can be regarded as "goals" (Peter, 2002). As balanced scoreboard card has no formal statement to support how the goals are achieved, the success factors are applied to each goal.

## **2.1 Knowledge Creation in an Industrial Production**

Manufacturing companies use their databases to keep track of basic transactions, such as daily production, inventory management, paying suppliers, processing orders, and paying employees, etc. They also need databases to provide information that will help run the business more effectively and help managers and employees to take quick and quality decisions. These costly, sensitive and time-bounded decisions require high level sophistication and expertise. Hence, most organizations incorporate information technology as an enabler as depicted in Figure 2.2.

The Figure 2.2 depicts knowledge creation through database related concepts.

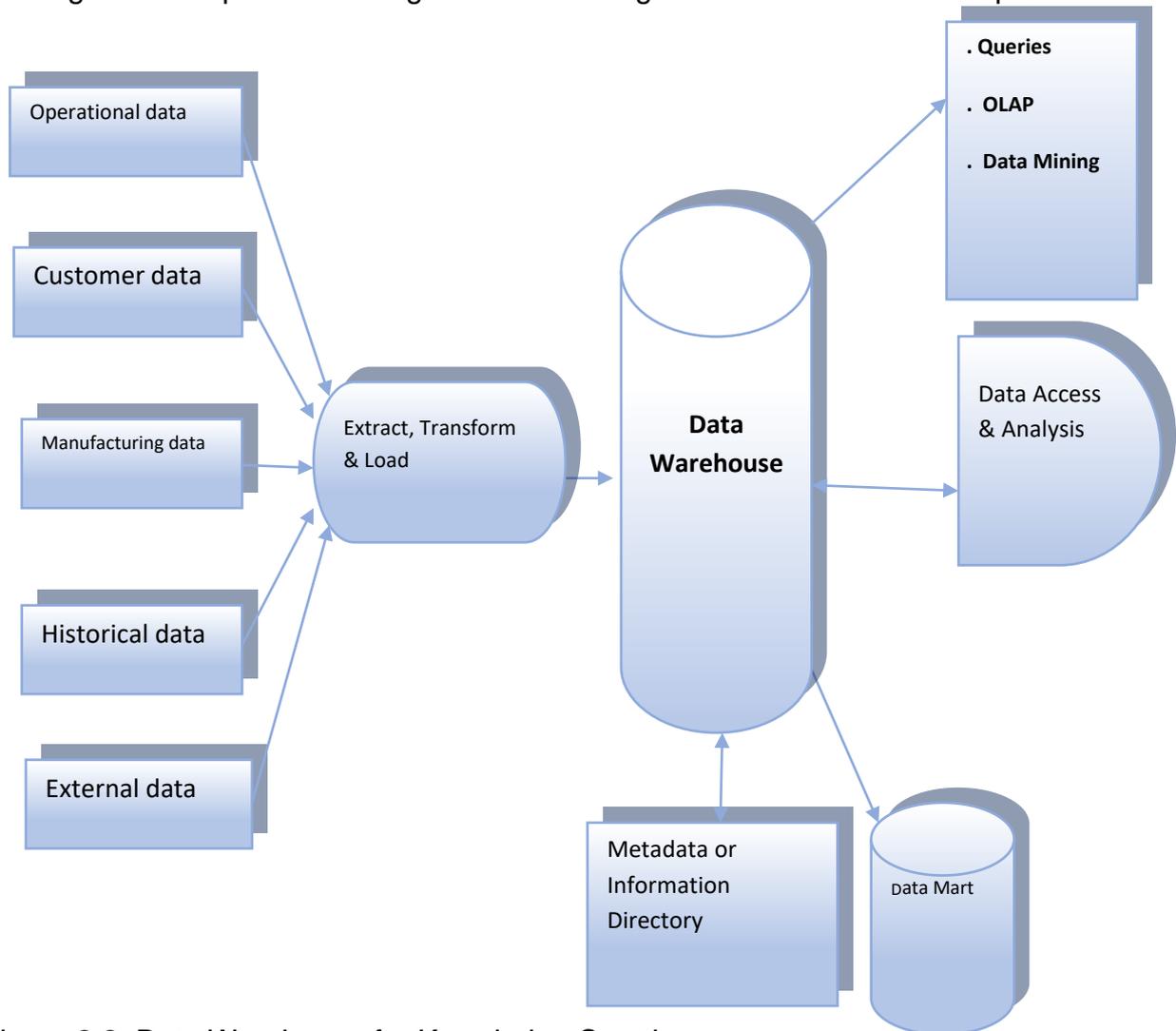


Figure 2.2: Data Warehouse for Knowledge Creation

In large organizations, with large databases for separate functions, such as manufacturing, sales, and accounting, tools are acquired for analyzing large amount of data and for accessing data from multiple systems. These tools include: data warehousing, data mining and tools for accessing internal database through the web. Each of these tools and process can provide various dimensional transformations of data (discovery, deciphering, development, distribution and deployment) to create knowledge.

## 2.2 Strategic Data Repository-Data Warehouses

Data Warehouses store historical data of potential interest for decision makers throughout the organization. The data may originate in many core operational transaction systems, such as systems for sales, customer accounts, and

manufacturing, and may include data from the web site transactions. One of the motivations for using a data warehouse is efficiency.

Data warehouse professionals build and maintain critical warehouse infrastructure to support business and assist business executives in making smart business decisions. Warehouse ETL (Extraction, Transformation and Loading of data) is an essential part of data warehousing where the data warehouse professionals populate data warehouse with information from production databases.

### 2.3 Strategic Data Analysis-Data Mining

Once data are captured in data warehouse and data marts, they can be further analyzed to discover new patterns, trends and relationships that are useful for guiding decision makers. Data mining is an information analysis tool that involves the automated discovery of patterns and relationships in a data warehouse which helps managers in strategic planning and decision making process. It provides insight into corporate data by finding hidden patterns and relationships in large database and inferring rules from them to predict future behaviour.

### 2.4 Creating Business Intelligence for Competitive Advantage

The tools for consolidating, analyzing and providing access to vast amounts of data to help users make better business decisions are often referred to as *Business Intelligence* (Beynon, 2009). Business intelligence provides firms with the capability to amass information; develop knowledge about customers; competitors and internal operations; and change decision making behaviour to achieve higher profitability and other business goals.

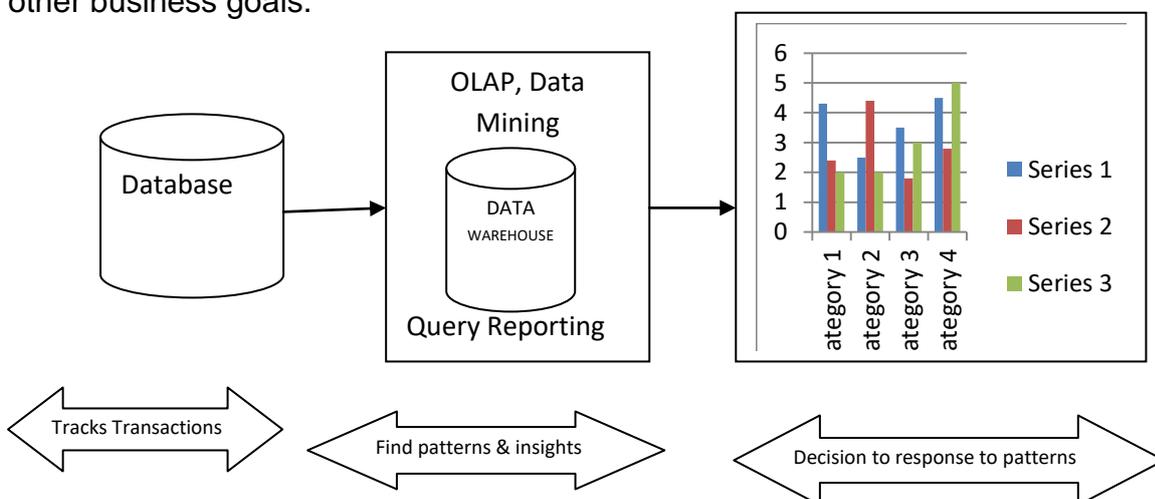


Figure 2.3: Business Intelligence and its interwoven components

From the foregoing, business intelligence as an information technology strategic tool emanates from knowledge engineering innovations which provide industrial managers with objectivity, priority, associativity, proactivity, viability and reliability in plan implementation and tactical decision making thereby creating a worthwhile pool of intangible asset and information benchmark for global relevance, market dominance, and competitive advantage.

## 2.5 Capturing Knowledge from Knowledge Warehouse

Data mining tool is used in capturing information from the data warehouse that has been proven to be knowledge, and it is stored in the *knowledge base*. The knowledge is retained and refreshed periodically in the knowledge base which is resident in the knowledge base management system. It can also be transferred or applied, and all these are the objectives of knowledge management in enhancing managers' organizational productivity for comparative advantage. According to Bipin C (2010), the first generations of commercial knowledge based management systems (KBMSs) are just beginning to emerge and its integration with DBMS is a current research issue.

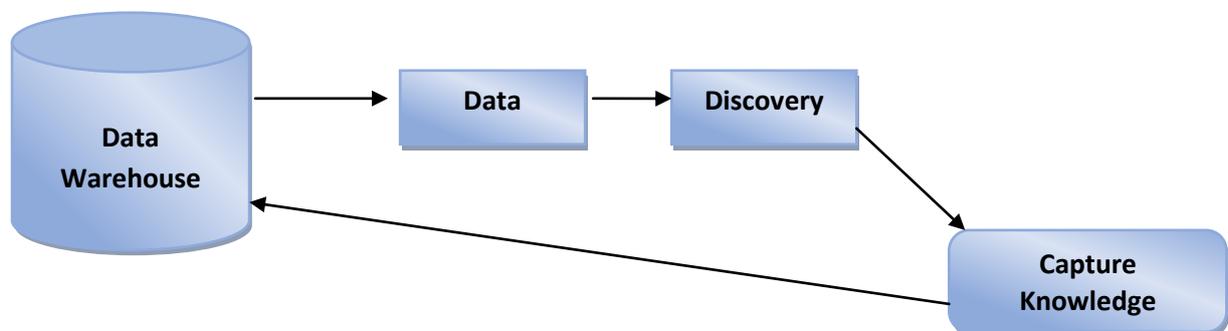


Figure 2.4: Capturing knowledge from the knowledge warehouse

In Figure 2.4, data in the data warehouse is extracted and operation is performed on the data to discover patterns. These patterns are captured as knowledge and stored in the knowledge base system. As the process continues, the volume of data captured, the amount of information created, the wealth of knowledge refined and re-invented, and the reservoir of business intelligence coming from deploying knowledge base management system puts any manufacturing company or industrial plant in an enviable position as managerial decisions and operational activities are

performed proactively, purposefully, promptly and with utmost priority in a well principled manner.

Therefore, knowledge management enhances strategic planning for competitive advantage in any industrial production/process for the following reasons:

- It reveals possible competitors and demand threats,
- It determines possible decisions to be made,
- It predicts alternatively informed choices to be made,
- It creates productive time-bound policy-driven priorities,
- It provides a measure for evaluating organizational progress (profit and corporate image).

### **3.0 Conclusion**

Knowing what to do, how to do it, and when to do it gives an enterprise a competitive advantage. Performance improves when people do things differently and that is what RAKID model seems to explain. Technology is an enabler. It cannot deliver benefits on its own, rather people along with technology delivers benefit. Therefore, by utilizing the wealth of knowledge provided by knowledge warehouse, intelligent and innovative business ideas and industrial processes can be realized through maximum utilization of resources in new value-added approaches for competitive advantage and global relevance. Indeed, Nigeria and other African countries still run resource-based economy rather than knowledge-based economy. This accounts for so much importation of goods and services. They export raw materials without adding value to them because of lack of knowledge and poor idea of knowledge management in production processes.

### **3.1 Recommendations**

On the basis of this work, we wish to emphasize that organizations in Nigeria should embrace and apply knowledge management in production processes as the wealth of knowledge garnered from it can drive organizations to higher profits by enhancing their competitive advantage and in decision making process. It makes managers to take proactive decisions based on reliably informed performance index rather than guess work or reactive quick-fix syndrome that prevails in most enterprises.

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