Strategic ICT-Use Intensity of Manufacturing Companies in Nigeria

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Abstract

ICT is strategic to a firm if it helps to gain a competitive advantage and or reduce a competitive disadvantage. The intensity of ICT application in shaping or sustaining strategy will depend on the competition faced by companies, their strategic response to the competition, and their capability to dynamically integrate ICT and competitive strategies. Based on a sample of manufacturing firms, three questions were formulated to determine if manufacturing companies in Nigeria strategically deploy ICT and the intensity of the deployment. The evidence produced by our analysis found support for the strategic use of ICT by the companies. We conclude that companies will be using ICT more strategically if competition is driven by the competitive advantages that are more ICT intensive.

1. INTRODUCTION

Growth in manufacturing output has been a key element in the successful transformation of most economies that have witnessed sustained rises in their per capita incomes. This has been aptly demonstrated in recent time by the newly industrialised countries

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(NICs) and their success in the export of manufacturing (Söderbom & Teal, 2002). Although manufacturing is usually a small sector in African economies, in terms of share of total output or employment, growth of this sector has long been considered crucial for economic development. The special interest in Africa in manufacturing stems from the belief that the sector is a potential engine of modernization, a creator of skilled jobs, and a generator of positive spillover effects (Tybout, 2000). According to Loto (2012),

the manufacturing sector creates the investment capital at a faster rate than any other sector of the economy while promoting wider and more effective linkages among different sectors. Thus, in view of the very strong pull effect of the sector, most African countries have over the years formulated development plans and strategies around the manufacturing sector as the linchpin of economic and technological development.

In Nigeria, several plans and policies have been designed and implemented to enhance the productivity of the sector and propel economic growth and development. Nigeria adopted the import substitution industrialisation strategy during the First National Development Plan (1962-1968). The Plan was aimed at reducing the volume of imports of finished goods and encouraging foreign exchange savings by producing locally some of the imported consumer goods (CBN, 2003). Manufacturing under the import substitution strategy depended heavily on imported raw materials because of the weak local industrial raw material and technological base of the country. Following the collapse of the world oil market in the early 1980s, earnings from crude oil exports declined to severely render unsustainable the import-dependent industrialisation strategy as earnings could no longer support large scale raw materials import. Policies including the stabilization measures of 1982, and the restrictive monetary policy and stringent exchange control measures of 1984 were introduced to redress the situation. The failure of these measures led to the introduction of the Structural Adjustment Programme (SAP) in 1986 (CBN, 2003). SAP was introduced to reverse the downward earning trends of the economy, widen the country's industrial base, and provide stimuli for increased exports and incentives for the manufacturing sector to enhance its value-added and contributions to GDP (Bamidele, 2005).

The National Economic Empowerment and Development Strategy (NEEDS) which was introduced in 2004 were targeted, among others, at boosting industrial capacity utilization to 70%. Even though the objectives of NEEDS were not realized, according to Banjoko et al. (2012) it nevertheless positively impacted on the modest growth of the manufacturing sector, especially between the period 2004 and 2007. Further, Nigeria Vision 20:2020 was formulated in 2009 as a long term development goal to be implemented with a series of National Development Plans, beginning with the First Medium-term National Implementation Plan, 2010-2013. The Vision made elaborate provisions for the industrial development of Nigeria. In diversifying the economy, it provides for a shift in the structure of production towards processing/manufacturing activities with emphasis on the export of processed and manufactured products. The Vision also proposes a comprehensive industrial development policy towards industrial cluster development designed to make Nigeria a global hub in selected specialized products in which the country has both competitive and absolute advantages. Also, it prioritized ten manufacturing industrial sub-sectors to be developed in the short to medium-term, with potential to provide raw materials to downstream industries in the longer term.

The high growth in the GDP in the last one decade seems to have masked the fact that manufacturing, which is the main prime mover needed for industrial development is weak. Notwithstanding the policies and plans implemented over the years to propel growth of the sector, the manufacturing sector has continued to decline as well as its contribution to GDP. Aside from the manifest failure of most of the development initiatives aimed at propelling growth of the sector , the sector is further plagued by the myriad of other domestic constraints, including poor and decaying infrastructure, weak fiscal and monetary policy co-ordination, pervasive rent-seeking behaviour by private and public agents, including corruption, weak institutions and regulatory deficit, policy reversals and lack of follow-through, and disconnect between the financial sector and the real sector. The serial policy failures

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together with these domestic constraints to the growth of the manufacturing sector continue to characterise the operating environment of manufacturing companies in Nigeria. The operating environment of manufacturing companies in Nigeria though complex-changing is analyzable (Olamade *et al.,* 2013). Companies therefore engage in active, systematic scanning of the environment collecting and anlysing information to reduce uncertainty, update existing knowledge, support or shape strategy, and to test the appropriateness of actions already taken (Olamade *et al.,* 2011). Achieving these objectives in a rapidly changing business environment while gathering and processing information manually is growing increasingly difficult due to the ever increasing number of alternatives to be considered and the speed with which decisions must be communicated and effected. Consequently, gathering and processing of information for the purpose of strategy has become increasingly ICT intensive.

Strategists and strategic management scholars widely view environmental scanning as the first step in the process linking strategy and environment. Scanning the environment open up new fields of knowledge which can be developed for potential applications and diffused organisation wide to create competitive advantages. The whole of this process rests on and is facilitated by the deft integration of ICT at every stage. A learning organisation actively intrudes into the operating environment to acquire; process, assimilate, and distribute information about the external environment throughout the organisation. The newly acquired knowledge is combined with existing knowledge in the organisation to create a larger reservoir of knowledge. The knowledge reservoir of the organisation is then directed at leveraging existing competences and creating new competencies that are knowledge intensive. It is the dexterous deployment of different combinations of these competencies in product development, marketing, processes, internal structure design, and behavioural

change that creates competitive advantages that are costly or difficult to imitate by competitors. Once a competitive advantage is created it must be sustained as the environment changes. Thus, the requirement is created for new ways to look for information; new ways to process and make better sense from data; new ways of generating knowledge, and new ways of turning knowledge to advantages. ICT becomes strategic when integrated into the chain of activities from information gathering to creating competitive advantages. This paper is set in the context of an organisation using ICT to actively intrude into the environment, creating and utilising knowledge for competitive advantage.

The central objective of this paper therefore is to examine the ICT-use intensity of manufacturing companies in Nigeria for scanning the environment and ultimately for supporting advantages. Three questions were formulated by this paper to meet its objectives. First, given the pervasive use of the Internet by industries in other parts of the world, what strategy related activities are manufacturing companies in Nigeria do on the Internet? What strategies do the companies follow and how ICT intensive is the support for the strategies? And finally, how ICT intensive is the process of environmental scanning from information gathering to creating organisational memory? The next section provides a review of how organisations continually re-evolve through learning and change as their environment changes and the role of ICT in this process. The methodology of the research was discussed in section 3, while our results were discussed in section 4. The paper concludes in section 5.

2. LITERATURE SEARCH

2.1 Environment learning and change
As business environments evolves, organisations changes. To survive and grow in a rapidly evolving environment an organisation must, at the minimum, display the same level of "variety" as its

environments. Requisite variety demands that an organisation possess the inherent ability to vary/change the product it offers, the market it serves, the skills of its workers, its technology and structure. Organisational change is the process by which an organisation optimises performance as it works toward becoming its ideal state given the dynamics of its environment. According to Jones (2004) change may occur as a reaction to an ever-changing environment or as a response to a current crisis. In the view of Haveman et al., (2001), organisational change is particularly evident when the organisation has just undergone a transfer of executive power. As reported by Isem and Pung (2007) based on a survey conducted by the McKinsey consulting firm, the goals of organisational change are many-sided including costs minimisation, bettering the firm, mergence, crisis intervention or overcoming competition. Planned change is a product of conscious reasoning and actions on the part of the organisation. In contrast, emergent change unfolds in an apparent spontaneous and unplanned way. Three types of change were differentiated by Ackerman and Halverson (2000). Developmental change which seeks to correct or enhance existing aspects of the organisation, often focusing on the improvement of a skill or process. Transitional change seeks to achieve a known desired state that is different from the existing state. Transformational change entails a shift in assumptions made by an organisation and its members and can result in an organisation that differs significantly in terms of structure, processes, culture and strategy. Successful transformational change creates an organisation that continuously learns, adapts and improves.

It is critical in today's global competitive marketplace for an organisation to maintain or improve its position in a rapidly changing environment. This requirement demands an organisation maintain itself in a state of frequent, nearly continuous evolution through learning. A learning organisation can acquire and apply knowledge faster than the competition and therefore maintain a leading edge. Organisations not only need knowledge; they also need the skills dynamically to update and put knowledge into practice. Thus, organisations aim at converting themselves into "knowledge-based" entities by creating, acquiring, and transferring knowledge to change, and adapt (Cummings & Worley, 1993), and improve performance (Baets & Venugopal, 1998). A learning organisation develops the capability to operate itself as "experimenting" or "self-designing" and to maintain itself in a state of frequent, nearly continuous change in routines: structures, processes, domains, goals, etc., even in the face of apparently optimal adaptation (Starbuck, 1983). As succinctly described by (Senge, 1990), a learning organisation is a group of people continually enhancing their capacity to create what they want to create. Such an organisation enables each of its members to learn continually and help to generate new ideas and thinking require improving the organisation's chances of survival and long term growth. By this process, organisations are continually learning from their own experience and that of others and evolve themselves not only to adapt but also to create new standards of competition and environmental requirements.

Learning takes place within defined routines. These routines are transformed over time in adapting to the environment, anticipation of changes in the environment or to create new environmental requirements. Organisational behaviour, consequently, can always be explained by the different routines (Levitt & March, 1988) and their transformation over time. The course of action or process whereby these routines are transformed over time is known as organisational learning. This process, according to (Mangolte, 2000) is driven because the behaviour of an organisation is linked to targets and is dependent on the deviation between these targets and the results actually achieved. Lessem (1991) identified seven courses of action/processes comprising organisational learning. In his work, knowledge origination is the process which opens up entirely new

fields of knowledge. Knowledge development uncovers potential for the application of newly discovered knowledge across a wide diversity of fields in the organisation. Knowledge refinement distills and develops knowledge into systems, policies, routines and procedures while knowledge promotion advances the knowledge so that others can use it. The processes of adapting situation/field-specific knowledge to solve related problems, and the guarantee that the knowledge physically reaches the right place at the right time represent knowledge adaptation and knowledge implementation respectively. Learning from the perspective of a knowledge-based organisation is building up these seven processes (Baets & Venugopal, 1998).

In Wilber's (2000 and 2000b) integral model, an organisation subsists as individuals embedded in a collective. According to this view, organisations learn through individuals belonging to different functions within organisation. Each function interfaces with the external environment and thus allows learning to occur in the course of carrying out the various functions. Learning occurs when individual members form their views / knowledge of the action-response of organisation and environment, share their knowledge and form a pooled knowledge and, update their knowledge in a changing environment (Lee *et al.,* 1992). Thus, as members of the organisation meet (formal and informal meetings) in problem solving or decision-making activities, individuals transfer knowledge to the organisation that is used to detect or solve problems. These interactions create new knowledge that is added both to individual and organisational knowledge. Because organisations learn through individuals acting as agents, organisational memory is conceived as the combination of the experiences and skills about projects, products and decisions embedded in the minds of the workers or entrenched in the organisation's culture as tacit knowledge and the ability of the organisation to reuse its experience as a framework for evaluating and incorporating

new experiences and information (Atwood, 2002). Inter-organisation learning takes place as members meet business partners, suppliers, customers and competitors. Learning occurs in particular when an organisation studies and uses the experience of another in resolving a problem. Learning also can occur between organisations due to joint-ventures and through benchmarking. As noted by (Senge, 1990), given the increasing complexity and uncertainty of the business environment, the rate at which organisations learn may become the only sustainable source of competitive advantage.

Developments in ICT are making it increasingly possible for organisations to learn, communicate and coordinate thereby enhances their success in a competitive environment. Communication and co-ordination provide the means to produce; store, use, and reuse information that an organisation needs to transform its routines and achieve its desired state. The role of ICT in this process includes knowledge acquisition, information distribution, information interpretation and organisational memory. One instance of use of ICT in knowledge acquisition is that of Market Research and Competitive Intelligence Systems. At the level of planning, scenario-planning tools can be used for generating the possible futures. Similarly, use of Groupware tools, Intranets, email, and Bulletin Boards can facilitate the processes of information distribution and information interpretation. The archives of these communications can provide the elements of Organisational Memory.

2.2 ICT and the environment
ICTs are enabling organisations to develop and continually renew their ability to dynamically manage their interfaces with the environment. Today's successful organizations are strategically deploying ICT to influence the evolution of their environment and enhance performance. At national and organisational levels, development is increasingly viewed as a process of change and learning with

technological capabilities and institutional changes driving the process (Dosi *et al.,* 1988; Freeman, 1994; Stiglitz, 1996). In this view, technology is much more than an ingredient in development strategies; it is a conditioning element of their viability (Perez & Soete, 1988; Perez, 2001). At the organisational level, Charles (1996) identified three forces as exerting pressures on entities leading to change and development. The forces are identified as; changes in the external operating environments, internal changes of strategy and organisation, and production factor forces. The rapidity of change in these forces is an important element of the knowledge economy. The knowledge economy is typified by a virtuous cycle of competition, innovation and productivity growth. Fierce competition spurs innovation in both technology and business processes which spreads quickly, improving productivity across sectors. As productivity rises, competition intensifies further bringing a fresh wave of innovation (Farrell, 2003).

In these waves of innovation, ICTs as drivers of development are assisting organisations to respond to the forces of change in what has been termed dynamic flexibility by which short-term flexibility to cope with fluctuating demand patterns is combined with wider productivity gains from innovation in products and processes. Farrell (2003) and Charles (1996) identified ICT to have proved a particularly powerful tool in the achievement of dynamic flexibility through four main processes. First, ICT enabled the development of both attractive new products and efficient new business processes through administrative savings, higher quality, and lower costs. Second, ICT facilitated rapid, industry-wide diffusion of innovations. Third, it facilitated interface with the market through the capturing of market information, adjusting production to meet demand and exploiting scope economies through the target selling of complementary products or services. And finally, it exhibited strong scale-economies. Also, organising production and distribution around ICT has enabled the adoption of new processes, procedures, and

organisational structures, which in turn, have led to sustainable gains in productivity, quality, and responsiveness (Brynjolfsson & Hitt, 2000; Litan & Rivlin, 2000).

2.3 ICT, decision making and competitive strategy

The most important task performed by managers is decision-making. Often-times, speed is of vital importance in decisions involving customers and competitors. In a high velocity business environment, making decisions while gathering and processing information manually is growing increasingly difficult. According to (Turban & Wetherbe, 1996), the number of alternatives to be considered is increasing due to innovations in technology, improved communication, and the development of global markets. Many decisions must be made under time pressure. Frequently, it is impossible to manually process the needed information fast enough to be effective. Increased fluctuations and uncertainty in the decision environment often necessitate the conduct of sophisticated analysis in order to make a good decision. Such analysis usually requires the use of computer - based information systems.

According to (Drucker, 1998), the backbone of strategy is information. This information relates to markets, customers and non-customers; technologies in one's own industry and others; global finance, and the changing world economy. Information about a firm's operations, customers, suppliers, and competitors as well as other economic and demographic data is now viewed as a strategic resource. To formulate and implement strategies in today's business world managers frequently has to gather enormous information from dispersed geographical locations, and decisions communicated real time to staff, associates, suppliers and customers. As such, the concept of strategic information systems (SIS) involves ICT as an integral component of business processes, products, services, and decisions that help an organisation gain a competitive advantage in the global marketplace. The strategic role of information

systems involves using ICT to develop products, services and capabilities that help an organisation gain a competitive advantage, reduce a competitive disadvantage or meet other strategic enterprise objectives (Seev, 1994). According to Wiseman (1988), a SIS are characterised by the system's ability to significantly change the manner in which the business supported by it is done. This occurs through SIS contribution to the strategic goals of an organisation and / or its ability to significantly increase performance and productivity. Basically, information systems support a business enterprise in three major ways. It supports business processes and operations; it supports decision-making; and it supports strategies for competitive advantage. Most real world applications of Information Systems (IS) are typically integrated combinations of support applications. IS are designed to emphasise the many different roles that are combined into integrated or cross-functional IS that provide a variety of functions. Thus, most IS are designed to produce information and support decision making for various levels of management and business functions, as well as do record keeping and transaction processing chores.

An important way managers integrates information systems into business processes is through the value chain. The value chain concept developed by Porter, (1985) views a firm as a series, chain or network of basic activities that add value to its products and services, and thus add a margin of value to the firm. In the network, IS can support marketing and sales processes by developing an interactive targeted marketing capability on the Internet and its World Wide Web. Customer service can be dramatically improved by a coordinated and integrated customer relationship management system. An organisation can use ICT to identify and acquire external information and knowledge. An example is environmental scanning on the Internet using advanced search techniques, like agent-based search techniques. It can also be through interaction with consumers and customers or other value chain-partners

where the focus is on integration of knowledge resources in relationships and collaboration with partners. In this way collaborations and relationships are being structured to pursue goals beyond coordination and transaction efficiencies.

ICT-based relationships open up new ways to involve customers, for instance, in the creation phase of a new product. Using a "gated-community" approach in the creation phase, a firm can involve those current and potential useful idea generators and innovators. Using an open approach in the creation phase a firm makes it possible for any customer to participate in the phase leading to an input from a larger number of customers. Dahan and Hauser (2002) made extensive review web-based methods for generating and capturing knowledge from customers. The information pump (IP) according to Prelec (2001) is a "focused group" device that enables customers to interact with each other through a web-based game to verbalise the product features that are most important to them while the customers pose and answer each other's question. Like in the creation phase of a new product, customers can also play critical roles in the development phase. Customers' involvement can range from design to development and engineering. To use a gated-community approach is to involve a selected group of customers representing the most valuable and important customers to participate in product design and development.

In user design (UD), organisations offer customers the possibility to configure and order products by selecting features from drop-down menus. Using UD in a new product development (NPD) process it makes it possible to show to a customer the result of choices interactively and to track the customer-system interaction. Using web-based UD makes it possible to show real and virtual features to a customer and to display changes interactively. This enables an NPD-project to have better knowledge when determining what products and product feature to offer customers. An alternative

approach is to actually allow customers, using "tool kit for customer innovation", to design and develop their specific products (Thompke & Von Hippel, 2002; Von Hippel, 2001). The tool kit gives customers the possibility to develop their custom product via iterative trial-and-error. Customers/users can create a preliminary design, simulate or prototype it, evaluate its functioning in their own use environment, and then iteratively improve it until satisfied. As the concept is evolving, toolkits guide the user to ensure that the complete design can be produced on the intended production system without change (Von Hippel, 2001).

In the case of digital products, like software, customers can act as beta testers and the product to be tested can be distributed to the testers over the net. Using customers to act as testers can lead to a speed-up of the testing process, decreased cost for the test, and a more varied test of the product. The testing of a product, like software, can continue even after the product has been launched. For non-digital products, virtual concept testing offers an alternative way to test products (Dahan & Hauser, 2002). In virtual testing, consumers view new product concepts and products and indicate what concepts they are likely to buy at varying prices. With the development of multimedia concept representations and increased bandwidth, virtual concept testing can reduce the time and cost of testing. Also, it can provide for an increased number of concepts test as well as increase the number of testers. Consumers can also play a critical role in the diffusion and ending phase as expert users of the product (Nambisan, 2002). Some organisations are creating online communities for their customers. In these communities the customers can exchange experiences (knowledge) on the ways of using the product, new ways to use the product, and problems in using the product and how to solve these problems (McWilliam, 2000). Online communities can be a valuable source for customers, but they can be a value for the firm. The exchanged knowledge in a community can be captured and fed into the firm's NPD process.

3. METHODOLOGY

This paper is based on a sample of eighty-four manufacturing companies in Southwestern Nigeria drawn across the three scales of small, medium and large companies. The sample consisted of thirteen large scale, fifty-four medium and seventeen small scale companies drawn from the automobile and tyre; food, beverage and tobacco; pharmaceutical, chemical and paints; breweries; building materials; and industrial and domestic goods sectors. A questionnaire was administered to gather information regarding intensity of ICT use in: (i) the activities involved in the companies' environmental scanning process, (ii) creation and sustenance of the advantages on which the companies compete. Information was also obtained on the strategy related activities the companies carried out on the Internet. Mean ICT use intensity was computed from information obtained on a 5 point Likert scale instrument. Lorenz curve computation was performed to rank in order of importance the advantages on which the companies compete.

4. RESULT AND ANALYSIS

Given the pervasive strategic use of the Internet by businesses in other parts of the world, the research attempt to find out what companies do mainly with the Internet. The following five major areas were examined: e-mail, company news, e-conferencing, e-commerce, and research and information. About 93.6% of Internet usage was devoted to e-mail, company news, and research and information. E-commerce and e-conferencing attracted the least Internet use by companies at 3.7% and 2.7% respectively. High use of company Internet facility for e-mail and company news suggests enhanced communication between individuals and groups within the companies, and with external components of the companies' environment. Benefits of this will include speedy problem solving, accelerated knowledge sharing, and faster competitive response times. Decisions are also communicated quickly enough to those who

need them as inputs for time bound actions. Jacques *et al.,* (2013) described how searching for information, reading and responding to e-mails, and collaborating with colleagues take up about 60% of typical knowledge worker's time and how they could become up to 25% more productive through the use of social technologies. This result confirms that Nigerian manufacturing companies are taking advantage of the global trend whereby organisations connect internally and increasingly reach outside their borders and creating an environment in which more and more business is conducted. In determining the use intensity of the Internet by companies in interfacing with the external environment, use intensity was computed on a scale of 5 for the Internet and other media used by the companies. The Internet came behind all other media at use intensity of 4.2. Telephone (4.8), print (4.7), radio (4.5), television (4.5) were all used more intensively than the Internet. Relatively higher use intensity for telephone suggests that people contacts play prominent role in providing information about the environment. While, the Internet is yet to displace any of the traditional technologies it is nonetheless assuming a growing influence in facilitating interactions, communication of decisions and widening of the business environment and thus becoming strategic to competition.

Research and information use of the Internet took the form of surfing the net for information considered important to company strategy. In arriving at our submission here, we calculate the mean frequency of visits to sites considered of strategic importance to companies. The two most frequently searched sites are those of technology vendors, R&D institutions and regulatory agencies. This result is indicative of the awareness by companies of the need to be abreast of technology development in one own industry and other related industries, technology options available to players in the industry and information about the providers. Globally, companies monitor technology trends for early discovery of new

developments, patent registrations and continuous observation of relevant technology fields. As technology and their strategic deployment increasingly becomes the most important factor in domestic and international competition, manufacturing companies in Nigeria are beginning to be conscious of developments in this field and the implication of being left behind by the competition. Whilst visits to R&D sites may not necessarily suggest the existence of relationship between companies and R&D institutions, it does suggest the possibility of companies forging such relationship with research institutions that are active in their field of interest. It does also suggest that companies may have demand for R&D outputs that are relevant to their competitive strategies. R&D outputs are supportive of strategy if, for instance, they lead companies to new products and to create new markets. However, Nigeria's manufactures are presently not R&D intensive. The manufacturing industry in Nigeria is relatively unsophisticated, focusing largely on low technology products for a very large domestic market. However, the increasing drive toward regional and global markets is creating demand for R&D. To facilitate this process, Nigeria's national policy on science, technology and innovation launched in 2012 recognised the very weak link between research and industry and seeks to remedy this incongruity as an important specific objective of policy. Objectives (ii)-(v) of the policy addresses different aspects of the problem. Specific objective (iv) provides to "support mechanisms to harness, promote, commercialise and diffuse locally developed technologies for the production of globally competitive goods and service that intensively utilises Nigeria's raw materials". One of the ways the Policy seeks to diffuse technologies from research to industries through the establishment and maintenance of a national database on STI input/outputs and the strengthening of existing information management system of R&D in all sectors (NSTI, 2012).
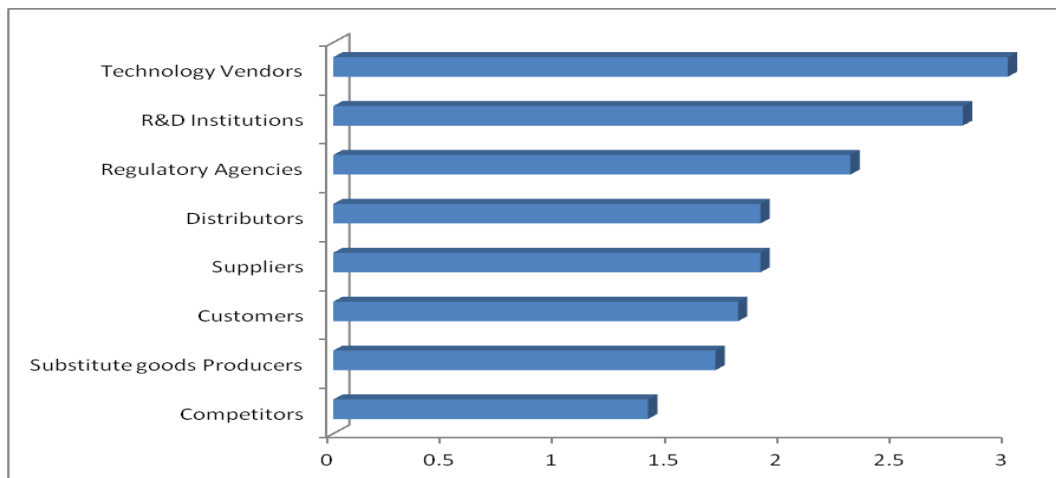
Figure 1: Mean frequency of visits to sites on the internet

Regulatory agencies of government, distributors and suppliers also came up high in the mean frequency of visit to sites of strategic importance to the companies. In an environment characterised by multiplicity of regulatory agencies, multiple tax and tariff regimes, and frequent change in regulations regular continuous interactions with these agencies are inevitable. More importantly, agencies of government at federal and state levels are ever more conducting their activities via digital platforms. Operations especially in the areas of revenue collection, regulatory information and compliance requirements are now carried out digitally. This development will continue to increase the frequency of visits by companies to web sites of industry regulators. That visit to distributors' sites came up higher than customers' sites may be explained by the fact that the manufacturing industry is dominated by fast moving consumer goods in the food, beverages and tobacco; breweries and pharmaceutical sectors. Here, customers are individuals and households who take up products as final consumers. As a result, companies in these sectors shipped their products through distributors down the value chain to the consumer market and often by themselves operate distribution outlets located in large cities throughout the country.

Whatever the strategy pursued by companies in an industry ICT is strategic to the companies if it helps to gain a competitive advantage and or reduce a competitive disadvantage. Since the ultimate aim of environmental scanning is to compete favourably in a given environment through creation of specific advantages, the intensity of ICT use in creating such advantages was examined. Information given in Figure 2 lends credence to strategic use of ICT by the companies. Fourteen strategic advantages were presented to the companies to be ranked in order of importance to the overall competitive strategy of the companies and to indicate the intensity of ICT use in creating each advantage. The result is presented in Figure 2. Predominantly, companies place much premium on relationship with customers, and suppliers, new market development, quality improvement and efficient business processes as competitive advantages. In creating the advantages of benefits from scanning, it is observed that the intensity of ICT use does do follow the order in which the advantages were ranked. That is, higher ranked advantages do not necessarily use ICT more intensively than the lower ranked advantages. In absolute term, much of ICT is deployed to forge relationships with customers and suppliers, in new market development, and in creating efficient

business processes. In relative terms, however, the ICT component of some lower ranked benefits of scanning is higher than the much-favoured benefits. While companies are found to be about four times more disposed to forge relationships with customers, as they would like to leverage the capabilities of employees with ICT, the ICT support for this less favoured benefit was about half the deployment to build relationships with customers. Similar observations can be made in the case of shorter production time and regional / national expansion. The inference from this development is that; information leveraged manpower, shorter production time, speed of developing new products, and geographical expansion are more ICT intensive in the manner companies currently operates than forging relationship with customers and suppliers.
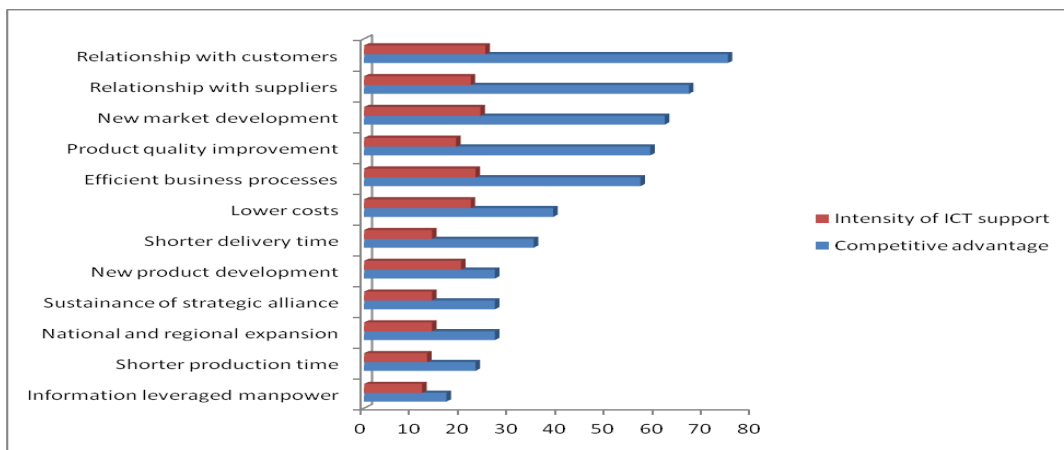

Figure 2: ICT-Use Intensity of support for competitive advantages

As discussed earlier in section 4.21, the classical perspective that organisations are basically market-driven is consistent with the result of this research. In this perspective ICT is seen as a resource to be deployed according to the needs and pressures of the environment. The job of strategy is to transmit such pressure by forging links between internal structure and ICT resources, on the one hand, and external product-market moves, on the other hand (Scarbrough, 1998). Manufacturing companies in Nigeria are market-driven. Companies are driven by the desire to be dominant in the different segments of the market through innovative products. The link between strategy and ICT is the application of ICT potentials to achieve internal flexibility and dominance of the product markets. In line with the strategy of the companies, ICT is most intensively utilised in new product development than in any other strategic focus except information leveraged manpower. National and regional expansion also came up to be ICT intensive.

Utilisation of ICT in this regard is largely in coordination of dispersed activities and product promotion through electronic media. This position was taken as we find very little evidence of e-commerce in the industry.

Companies compete by embedding unique insights into the products they produce and the channels through which they sell the products. These insights can be captured through interactions with, and feedback from customers. ICT provides a quick and effective way to keep that communication active and permanent (World Bank, 2005). Unlike financial services where ICT is used to codify transactional information which consumers can use to make their own choices on a self service basis, and equipment or automobile design in which case customers participate in the design of some features of the product via on line community systems. Manufacturing companies in Nigeria are predominantly in sectors like foods and beverages, pharmaceuticals, and household products

which product designs offer fewer prospects to co-design with consumers. Consumer participation in product design is very minimal and is captured by other less ICT intensive means. In addition, most pharmaceuticals are generic and many of the products in foods and beverages are foreign brands produced in Nigeria. Thus, customers' involvement is often limited to testing products for local adaptation. Relationship with customers essentially takes the form of building customer brand loyalty for products which is achieved principally through advertisements and promotional activities. The ICT resources and capabilities required for these activities are not usually resident in the manufacturing companies but in media and advertising companies. This aspect of communicating with customers does not always intensively utilise the ICT resources and the capabilities of the manufacturing companies. Thus, communication with customers in the manufacturing companies is more intensive in ICT resources and capabilities of media organisations than it is of the manufacturing companies.

Strategic advantages such as quality improvement, shorter delivery time, lower costs, and new product developments are all market driven and as such tools for fostering relationship with customers. Creation of these advantages as shown in this research is more intensive in companies' ICT resources and capabilities. As Figure 2 showed, competitive advantages can be achieved in certain areas of strategy with less ICT utilisation than others. For instance, ICT support for competitive advantages in new product development, sustenance of alliances, national and regional expansion, delivery time and information leveraged manpower are higher than in relationship with customers, relationship with suppliers, development of new markets and quality improvement. Companies will be utilising ICT more strategically and beneficially if areas of strategy that are already more intensive in ICT are used to drive more customers to their products and gain market dominance.

In answering the third research question, four activities considered as encapsulating the process of business environment scanning and requiring ICT integration were recognised as information gathering, analysis and interpretation, decision support and organisation memory. Figure 3 showed that the mean level of ICT application measured on a five point scale for each of the four activities was high but decreasing from information gathering to organisation memory implying decreasing ICT intensity as the level of sophistication increases. ICT is more intensely used to capture information about customers and suppliers, for instance, than to support decisions concerning customers and suppliers, or archive such decisions and the processes through which they evolve for future reference. ICT is employed more as operations support resource than as a management support tool. When disaggregated by company size, the mean ICT use intensity in medium scale companies increased progressively from information gathering to organisation memory. In large scale companies, the mean use intensity of ICT is highest in decision support. Generally, medium scale companies showed higher intensity in the use of ICT for environmental scanning and in the creation of competitive advantages than small and large scale companies.

5. CONCLUSION

A large and growing domestic market like Nigeria presents a good environment for a thriving manufacturing business. Notwithstanding the growing domestic market size, the manufacturing sector in Nigeria has continued to decline as well as its contribution to GDP. Governments since independence have recognised the importance of the manufacturing pull effect for industrial and economic development and implemented various plans and strategies to stimulate growth in the sector, it however remains weak owing in large parts to a myriad of domestic constraints including, poor and decaying infrastructure, pervasive rent-
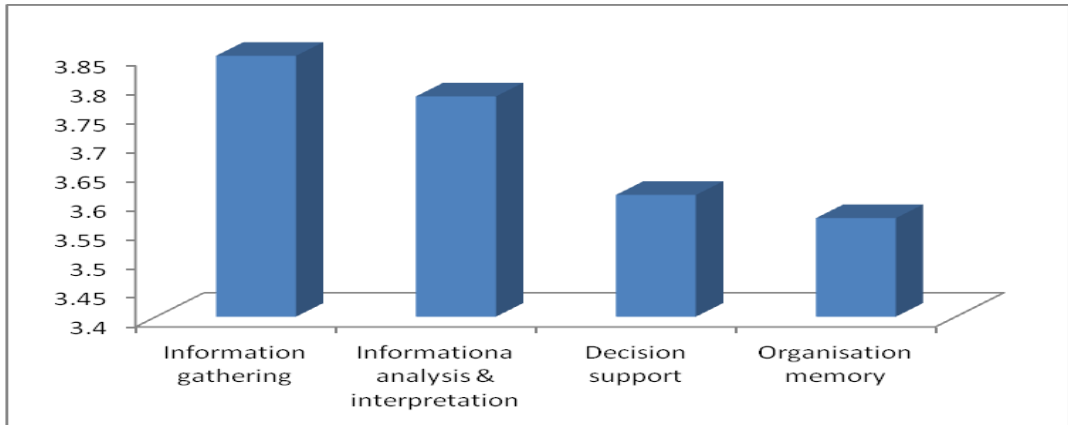
Figure 3: Mean ICT use intensity of environmental scanning activities

Seeking behaviour by private and public agents, corruption, weak institutions and regulatory deficit, policy reversals and lack of follow-through, and disconnect between the financial and the sectors.

The complex-changing but analysable manufacturing business environment in Nigeria (Olamade *et al.,* 2013) drives the dynamic behavior of companies in the industry. Companies engage in active, systematic scanning of the environment collecting and analysing information to reduce uncertainty, update existing knowledge, and support or shape strategy (Olamade *et al.,* 2011). Based on continuous updating of knowledge about the environment, companies develop competitive advantages for a market driven strategy. The crux of this paper is the investigation of the intensity of ICT use in activities supporting strategy. Manufacturing companies are strategically deploying ICT from such activity as monitoring global technology trends to archiving decisions and decision processes. The research found evidence of deployment of ICT in creating and sustaining competitive advantages as well in continuous updating of knowledge about the environmrnt. Paradoxically, competitive advantages that are most intensive in ICT use are ranked lower in the market driven strategy of the companies. Relationship with customers which ranked the topmost competitive advantage is less ICT intensive than ICT leveraged manpower ranked least in the order of competitive advantages. Generally, manufacturing companies in Nigeria are strategic in their ICT deployment with medium scale companies showing greater ICT intensity in all the strategic activities examined than the large scale companies.

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