

Roles of Information and Communication Technology (ICT) In Nigeria's Industrial Development

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Abstract - Information and Communication Technology (ICT) revolution has some roles and prospects in industrial development in Nigeria. Over the past decades, new applications of ICT have improved service delivery, manpower development, ease of transaction, quality/rate of production, transparency, and public access. This paper highlights some of the roles that ICT plays in industrial development. ICT services have helped in the improvement of the markets, reduction in transaction costs and increase productivity through better industrial management in both public and private sectors. Thus, the paper looks at the ICT facilities put in place in industries and their impacts on the industrial sector in Nigeria.

Keywords: ICT, Global Positioning System (GPS), Geographic Information System (GIS), and e-commerce.

I. INTRODUCTION

Information and Communication Technology (ICT) is a vehicle with great potential to improve or accelerate the developmental process of any developing nation [1]. ICT can be examined as a system within a specialized framework to achieve a particular task or objective. From the functional perspective, ICT can be set up to actualize the specific objective of collecting, storing, analyzing, and presenting information in a systematic manner. Structurally, it is composed of vast interrelated components that include a combination of data, technical, and human or personnel resources. It can also be viewed as being made up of input, processing, and output sub-systems, all working according to a well-defined set of operational procedures. ICT is one of the driving forces of globalization by fueling the rapid transformation of remote and isolated information units into global interconnected superhighways. In addition, it is a transforming mechanism that can influence the way we live by converting our societies into truly knowledge based ones thereby leading to society equity [2].

The development of ICTs brought about a major shift in the technological world. The Information Age is a contemporary meta-narrative that guides many studies in all fields. As a theoretical space within which to conduct contemporary research, the Information Age suggests we are moving beyond the Industrial Age into an era where the

sharing of knowledge and ideas is the new driver of power and the world economy. Whether one discusses the emergence of global financial systems or growing citizen solidarity networks, one thing remains common and is at the core of the new society, the solicitation and exchange of the world's most valuable resource: information. Defined as the new social morphology of our society, ICT is both a structure and a process that enables the exchange, the redirection, and the reception of information, on a global scale, without restraints of space or time. Distance is rendered irrelevant, allowing direct, simultaneous, decentralized, and expanding relations of collaboration, advocacy, trade, production, and innovation, generating new forms of power constellation and distribution [3].

ICT is now common in industries, most often used in both design and production. The use and deployment of Information and Communication Technology (ICT) has improved the efficiency and flexibility in providing services and many organizations today are increasingly relying on ICT which evidently handles a very critical part of the organizations' core services. This is because of the challenges many organizations face; one of which is, keen or stiff competition with other companies, by replacing the traditional forms of operations with the modern one in order to satisfy the demands of the customers appropriately as at when due to make their products or services have reckoning quality in the global market as a form of benefit to developing nations.

II. LITERATURE SURVEY

In the 1980s, main-stream firms began to use in-house ICTs such as Computer Aided Design/Computer Aided manufacturing (CAD/CAM), and CAE, but by the 1990s, firms began to adopt new advances in ICTs particularly the use of network technologies for intrafirm coordinating activities. Large corporations connect distant production facilities in order to create greater networks and reduce transaction costs. By the beginning of the twenty-first century, the adoption of ICTs for inter-firm commercial and non-commercial transactions was widespread [4]. While many manufacturing technologies have been industry-specific, business organizations and other institutions have applied networking technologies, including the Internet on a general

basis. Due to the unprecedented developments in communication and Internet technology, new trajectories of network technologies have emerged varying from the simplest forms, such as e-mail, to more complex forms such as portal-based technologies. Although these technologies are not activity-, firms- or industry- specific; their adoption was influenced by firm- and industry-specific factors. Presently there is relatively widespread use of ICTs by firms in developing, as well as developed countries in all industrial activities [5].

III. DISCUSSIONS

3.1 ICT Facilities in Manufacturing Industries

The roles of ICT in industries whether it is service or manufacturing cannot be over emphasized. It is noteworthy that the type and volume of product an organization produces determine the relevant ICT facilities and the capital spent to adopt and make available to the workers in order to discharge their specialized duties. The explosive growth of ICT as a strategic tool is needed by today's organization in order to adopt new, more powerful techniques to reduce inefficiencies and improve growth and development via commitment to

work. In order to understand the overall role of ICT at the industrial level, it is useful to begin by thinking about the qualitative impacts of ICT application and use in organization's production processes.

For Nigeria as a developing nation, the application and use of ICT in manufacturing industry is still very low compare to most countries. Thus most manufacturing industries in Nigeria are non-intensive ICT users (that is, such industries of course have some ICT facilities such computer, LAN, WAN, mobile and land phones) but could not afford internet and VSAT which could give them access to the outside world. The reason is due to cost, fear of fraudulent practices, lack of facilities necessary for their operations and epileptic supply of power. All the above factors militate against the proper adoption and effective use of ICT in industries and even in the country at large, except for multi-national companies and the banking industries which may be able to get all the necessary ICT facilities needed to transform work process from the traditional form to the modern day type; that is, via effective communication, these are called Intensive ICT Users. The table 1 shows an inventory of ICT facilities adopted and used in each unit in the selected manufacturing industries in Nigeria.

Table 1: An Inventory of ICT Facilities Adopted and Used in Each Unit in Selected Manufacturing Industries in Nigeria

Units in SBC	No. of workers	Computer	Telecom	Internet	Internal Email	External E-mail	LAN	WAN	CTCM	Television	Level of ICT
Administration	68	+++	++	~	~	~	~	~	-	+	High
Production	100	+++	+	~	~	~	~	4	-		
Marketing	150	+++	++	~	~	~	~	-	-		
Fleet & Transport	13	+	+	~	~	~	~	-	-	+	
Computer	10	++	+	~	~	~	~	-	-	-	
Total	353										
Units in FCD											
Administration	50	+++	++	~	~	~	~	~	-	+	High
Production	150	+++	+++	~	~	~	~	~	+++	-	
Marketing	30	++	+	~	~	~	~	~	-	-	
Engineering	14	+	+	~	~	~	~	~	-	+	
Finance	25	+	++	~	~	~	~	~	-	-	
Purchasing	25	+	++	~	~	~	~	~	-	-	
Total	294										
Units in APL											
Administration	14	+	++	-	-	-	~	~	-	+	Medium
Production	52	+	+	-	-	-	~	~	+	-	
Marketing	10	+	+	-	-	-	~	~	-	-	
Establishment	4	-	+	-	-	-	~	~	-	-	
Total	80										
Units in NML											
Administration	41	+	+	-	-	-	~	~	-	+	Medium
Production	389	+	++	-	-	-	~	~	++	-	
Marketing	15	+	++	-	-	-	~	~	-	-	
Engineering	74	+	+	-	-	-	~	~	-	-	
Finance	18	+	+	-	-	-	~	~	-	-	
Purchasing	4	+	+	-	-	-	~	~	-	-	
Total	541										

Key: ~ = Internet connectivity - = Not available
 + = Number of occurrence indicates quantity in the industry
 SBC= Seven-Up Bottling Company FCD= Friggoglass Cool Division
 APL= Askar Paints Limited NML= Niger Match Limited

Be that as it may, the status of establishments in Nigeria can be examined in respect to availability, accessibility and affordability of relevant ICT facilities to different organizations as regard to the size and what they produce or service them render for the entire public and the global world.

Thus availability, access and affordability of ICT facilities by organizations are naturally the first step to consider when discussing the application and use of ICT as a tool for industrial, organizational and national development especially in Nigeria. With a mix of visionary government ICT policy and profit-motivated private-sector competition, eventually, the issue of affordability becomes less important even though availability and universal access to ICT facilities are assured compared to what was obtainable in Nigeria 4-5 years ago when most SMEs in Nigeria could not afford relevant ICT facilities (See Table 1).

3.2 ICT in Communication Industries

Over the past few years, Nigeria has the fastest growing telephone subscription in Africa and among the world most populous nations as evidenced in Figure 1 below; voice, data and graphics form part of transmission over the GSM culminating into high level impact.

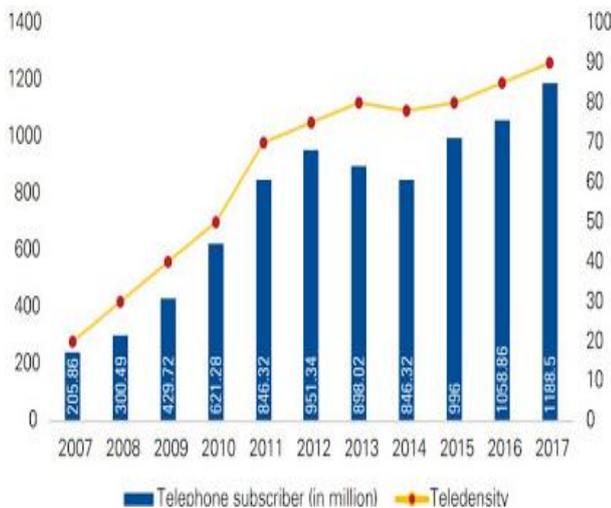


Figure 1: Growth in total subscribers

Unbound from the structures of the Post Telephone and Telegraph (PTT) days, ICT has become the foundation of every section of economy in the world including Nigeria. It is explicitly inferred that information and communication technologies (ICT) has been able to:

- Reduce transaction costs and thereby improve productivity.
- Offer immediate connectivity – voice data, visual-improving efficiency, transparency, and accuracy.
- Increase in networked process monitoring.

- Fewer tasks in ordering of raw materials.
- Simplify control of industrial processes.
- Substitute for other, more expensive means of communicating and transacting, such as physical travel.
- Increase choice in the market place and provide access to otherwise unavailable goods and services.
- Widen the geographic scope of potential markets.
- Channel knowledge and information of all kinds.

3.3 ICT in Transactions and Financial Industries

Information and Communication Technology (ICT) is an essential part of national infrastructure and factors greatly in both public and private sector industries.

It creates business opportunities, especially for companies located far from urban centers, and improves links among firms, suppliers and clients. When used well, ICT can also make management and operation more efficient. Some service industries such as finance, insurance, and real estate industries cannot operate without information systems.

The Introduction of the cashless policy and other payment initiatives has seen many Nigerians utilizing digital payment methods for their transactions. Figure 2 highlights the steady growth in the value of mobile payment transactions which improves financial management in industries. While the value of mobile transactions is on the increase, non-mobile transaction is decreasing. Figure 3 indicates the e-commerce growth over the years in various continents. Again this highlights a growing preference for electronic payment transactions.

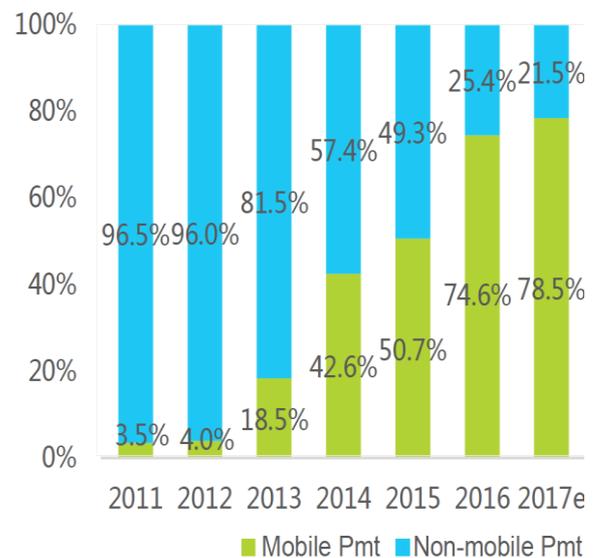


Figure 2: Digital cashless transactions

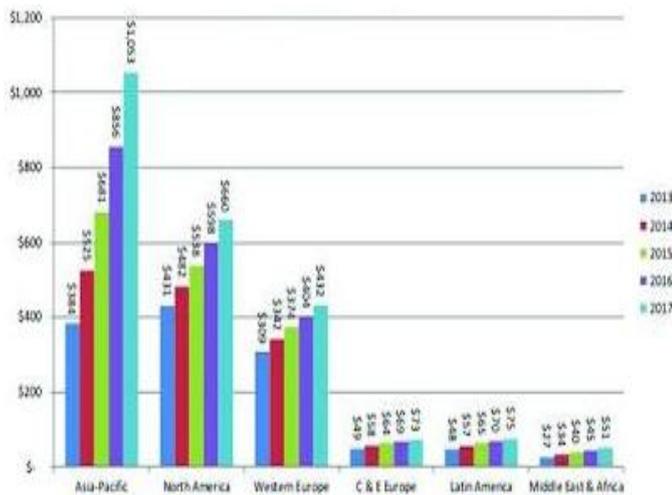


Figure 3: e-commerce growth by continents

Information technology and systems have revolutionized firms and industries, becoming the largest component of capital investment in many industrialized societies. Information systems are transforming business and the visible results of this include the increased use of the results which vary depending on how performance and ICT payoffs are measured and analyzed. For example, one empirical study finds positive impacts of ICT investments on productivity, but not on profits. Another study did not find positive effects of ICT capital on productivity, while ICT labour positively contributed to output and profitability. An analysis of the profitability of ICT investments in an empirical study that explicitly considered the competitive dynamics in a market showed that the profits of non-adopters of ICT are reduced as other firms adopt new ICT.

IV. RESULTS

It can be seen that Information and Communication Technology (ICT) has permeated into the industries; be it manufacturing, construction, or service industries. This infiltration has led to vast improvement on the industrial sector in Nigeria. Below are the roles ICT has played in industrial development:

- Increase choice in the market and provision of access to otherwise unavailable goods and service. This is made possible through the web, which has placed industries on the global stage, advertising their products and creating a channel of communication from different parts of the globe. This widens the geographic scope of potential markets.
- In addition to being online, transactions have gone online as well. ICT has provided a secured channel for money transactions which is a big plus to industries. You no longer need to carry cash around anymore; rather money related issues are taken care

of online. This reduces transaction cost and thereby improves productivity.

- ICT has played a significant role in agricultural industry as well. ICT tools such as Global Positioning System (GPS), Geographic Information System (GIS) software have been used to gather, store, view and analyze vast amount of data which can be converted to other usable information media for better farm management, weather forecasting, water level management and crop production. Also, ICT tools have been used to integrate geographical, soil, weather, market and human to assist farmer not only to better his/her lot, but also in getting the very best out of the soil and of course as bottom line from his/her efforts.
- ICT has also helped in research of new designs and production scheme. It eases the difficulty in accessing relevant and up-to-date information on research in similar areas/sectors. Exchange of information is as much a part of trade as the movement of goods.
- Control of processes and automation will not be left out. The use of ICT components like computers have really redefined the industrial processes.
- ICT enables competitiveness; knowing which technology to adopt, protecting your investment in ICT.

V. CONCLUSION

ICTs are enablers for economic growth because of their crosscutting nature thus affecting all sectors. Adoption and proper utilization of ICTs will lead, among others, to increased yields and quality production of goods and services. Thus, the adoption and use of relevant ICT facilities in industries whether service or manufacturing suggest that ICT has the strong potential, if conceived as a means and not an end in itself, to be a powerful enabler of industrial development. However, the fact that ICT can, in theory, assist development in organizations and society, does not mean that it will necessarily do so because of some nonchalant attitudes of some government at all tiers, Directors, management or managers. In order for ICT to positively engender rapid structural changes and development especially in this globalized and keenly competitive world, it must be employed as at when due and effectively used in all existing sectors (not just industries) and in the country at large. That is, all indigenous companies must be Intensive ICT users.

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