
INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY ON HUMAN RESOURCE MANAGEMENT IN SELECTED MANUFACTURING FIRMS IN SOUTH WEST, NIGERIA

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Abstract

Information and Communication Technology (ICT) is the processing and sharing of information using all kinds of electronics device. It is the umbrella that includes all technologies for the manipulation and communication of information. The critical role ICT plays in Human Resource Management (HRM) of manufacturing companies has been recognized. However, despite the significant roles they play their HRM performance has not been impressive. This paper seeks to explore the influence of ICT on HRM of manufacturing companies. Simple random sampling was used to select 305 workers of selected manufacturing companies in south west, Nigeria. Two hypotheses were tested to determine whether; ICT enhanced HRM performance, and that there is no significant relationship between adoption of ICT by workers and organizational productivity. In addition, correlation analyses were used to examine the data collected. It was found that there is a positive relationship between ICT and HRM performance of manufacturing companies especially in the area of training and development. It is recommended that managers embrace more the culture of ICT since it tends to improve on their HRM performance for increased productivity and competitiveness.

Keywords: ICT, HRM, Manufacturing Industries.

Introduction

The world today is shaped by the advancement in the field of information and communication technology (ICT). The relevance of ICT to the development of corporate organization and the entire world cannot be over emphasized. For instance, Nigeria like many growing economies has come to realize the fact that no modern economy can be sustained without integral ICT and has adopted technology towards the growth of its economy. The introduction of new technologies has led to higher level of production, improved communication and more effective and efficient process management. It has also been able to improve decision making, increase citizen participation in economic development, support a modern workforce, enhance social well-being and narrow the digital devices. Information and communication technology (ICT) have become key tools and had a revolutionary impact on manufacturing sector.

Today, the place of ICTs in manufacturing and the world in general cannot be undermined. Modern day businesses are conducted and facilitated through the use of telephones, fax machines and computer communication networks through the internet. This phenomenon has given birth to the contemporary e-commerce, e-government, e-production, among others.

ICT is a revolution that involves the use of computer internet and other telecommunication technology in every aspect of human endeavour. Ozoji in Jimoh (2007) defined ICT as the handling and processing of information (texts, images graphs, instruction, etc) for use, by means of electronic and communication devices such as computer, cameras, telephone. Offodu (2007) also refer to ICT as electronic or computerized devices, assisted by human and interactive materials that can be used for wide range of teaching and learning as well as for personal use.

From the definitions, ICT Could therefore be seen as processing and sharing of information using all kinds of electronic device, an umbrella that includes all technologies for the manipulation and communication of information. Aribisala (2006) posited that ICTs are increasingly playing an important role in organizations and in society's ability to produce, access and adopt information. They are however being heralded as the tools for the post-industrial age and the foundations for a knowledge based economy due to their ability to facilitate the transfer and acquisition of knowledge. The pervasiveness of ICT has brought about rapid technological, social, political and economic transformation, which has eventuated in a network society organized around ICT (Yusuf, 2005).

There is little doubt that technology is reshaping the way business is conducted in today's society. Historically, business is the organized effort of individuals to produce and sell, for profit, products and services that satisfy society's needs (Canzer, 2003). Today, the goal is still the same, but with greater utilization of technology to "fend off competitors, reinforce an existing competitive advantage, leapfrog competitors, or just make money in new markets" (Afuah & Tucci, 2003). Any company that is not constantly developing or adopting new technology will likely be out of business in a few years (Daft, 2001). In general, the widespread use of ICT has been associated with numerous changes in internal business processes such as organizational structure, job design, requisite employee skills and so on, aimed at improving flexibility, Bartel et al 2007, Bayo & Lera, 2007). More specifically, various studies like Arvnmitis and Haldenstein, 2001, Bartel et al 2007) identified the link between the employment effect of firms; ICT investments and the impact of ICT diffusion on organizational aspects related to human resource. Berman et al (1994) observe an increase in required skills during the 1980s in the manufacturing sector, which is partly attributed to the introduction of ICT.

However, ICT to an extent have not been able to relieve the complexity to manual aspect of organization activities. This is due to the fact that some stored data on the system can be lost if not manually backed up. Despite the fact that introduction of ICT has made the organization to be simple and faster, it has not been able to eradicate fraud and irregularities that occur in the organization. The

application of ICT has also led to fear of equipment by workers, information overload, increase work pressure etc. The fears of equipment's by workers are times displacing them from work, this is because the adoption of new technology will usually reduce the labour force trend in any organization. For instance, organizations with a high level of technology make use of ROBBOT instead of people to perform certain task. The application of ICT enables organization to displace workers with inappropriate skills and experience. Also, despite the fact that most of the organization under review are technologically inclined by incurring millions of naira to effect technological change or introduce new technology to their organization. Yet some of their workers are not in line with the new technology and this has seriously hindered their performance. The ICT revolves round people-the human resource of the organization. If the human resource is not well disposed to it, it will remain non-functional. For people to however responds to it, needs to be properly managed. Thus the essence of assessing the effect of ICT on HRM in Nigerian manufacturing industry, being the largest employer of labour in the country. Meanwhile, this paper examines the influence of ICT like computer and modern sophisticated equipment on HRM like training and development performance in the manufacturing industry. The first section of the paper is introduction, followed by literature review, methodology, and lastly recommendations.

Literature Review

Human Resource Management

The workforce of an organization is said to be life wire of an organization. The management of human resources is crucial to the growth and survival of an organization particularly those of the 21st century who encounter on regular basis unhealthy rival in the global market. Managing people is the responsibility of human resources manager. Therefore, HRM is the formal system for the management of people within the organization (Bateman and Zeithaml, 1993). Similarly, Henemann (1980) consider HRM as a set of organization wide functions or activities that are designed to influence the effectiveness of employees in an organization. Inyang (2001) argued that HRM is an organization's activities, which are directed at attracting, developing and maintaining an effective workforce. The many important

activities involved in managing the human resources of an organization are training and development, staff motivation, enhanced employee commitment, compensation, employee maintenance, quality performance, etc (Inyang, 2008). These activities, if effectively carried out would influence the achievement of corporate objectives. The human resources is a significant resources and a source of distinctive competence in the organization, which must be planned for to enhance organizational survival and growth (Oribabor, 2000). There is a growing literature to support the argument that HRM can impact on organizational performance and lead to sustain competitive advantage (Pfeffer, 1998 and Boxall, 2003).

ICT and Human Resource Management

Technology today is one of the major determining factors for survival in all organizations. It is its lifeblood, but it could only occur through human intervention. Quinn (1969) argued that it is incumbent on any organization to monitor technological changes, train and motivate employees to innovate, because technology covers every aspect of all organizations. Kubbr (1977) observed that new technology, whenever introduced in any organization, changes all aspects of its operations.

Dauda (2010) noted that the major challenge facing most organizations in the global economy is how to manage rapid and radical technological change. Technological innovations to a large extent determine organizational competitiveness. The technology of a firm includes a body of knowledge, skills and procedures and physical manifestations such as tools and machines (Merrifield, 1983). The effect of the rapidly changing technology has necessitated the need for the employment of skilled and knowledge workers and to motivate them to be innovative to cope with change. The level of technological development of any nation or organization influences its ability to create wealth and profitability and improved the people's performance and well-being (Dauda, 2009). Changes in technology have really affected most industries worldwide. Globalization, which dominates the world today, was influenced mainly by communication technology. Digital technology integrates the world and it "allows organizations to manage their channels of communication" (Negrophone, 2000).

There is tremendous increase in the number of internet

users in recent time. This shows that internet has significant effect on how, why, where and when people work.

The ICT have the most prominent influence on more educated, skilled and ambitious people, especially those, that are regularly working with information and communication technology (ICT). Because they are the one that occupy important positions in organizations hierarchy and are therefore of great significance for the overall success of the company. Baloh and Trkman (2003) argued that ICT and internet offer support in recruiting process in an organization. For instance, it lower cost of recruiting, that is savings in invitations for application, postal – costs data-processing costs. It also includes quicker process of recruitment that is period from the point when the need for a new employee is sensed until the point when he starts doing his job. In addition, possibility to attract better and more candidates that is invitation for application published on a web-site can also be spotted by those who are currently not seeking new employment actively. Evidence from several countries suggests that the ICT revolution is skilled biased and increases demand for high skilled relative to low skilled workers. Jorgenson and Stiroh (2000) maintained that high skilled workers are likely complementary to ICT, while low skilled are substitutable. High skilled workers are more likely to be hired than low skilled workers (the World Bank, 2006).

Equally, it is being now realized that ICT skills are critical to navigate in the complexity of today's world. It has also been observed that some of the production processes of goods and services, in societies with higher ICTs, are shifting from developed countries to developing countries. In line with the rapid development in ICTs the evidence of what is taking place in china, India, South Korea, and a few other non-western countries (Friedman, 2006). ICT and the internet have not affected only the IT professionals and those employees that use it for their work on a regular basis but also the environment of the organization, organization itself and the social universe (Drucker, 2001).

Tele- working is the use of computers and telecommunications to change the accepted geography of work. It means that we are moving the work to workers instead of moving the workers to work, with help of information technologies (Nilles, 1998). The impact of

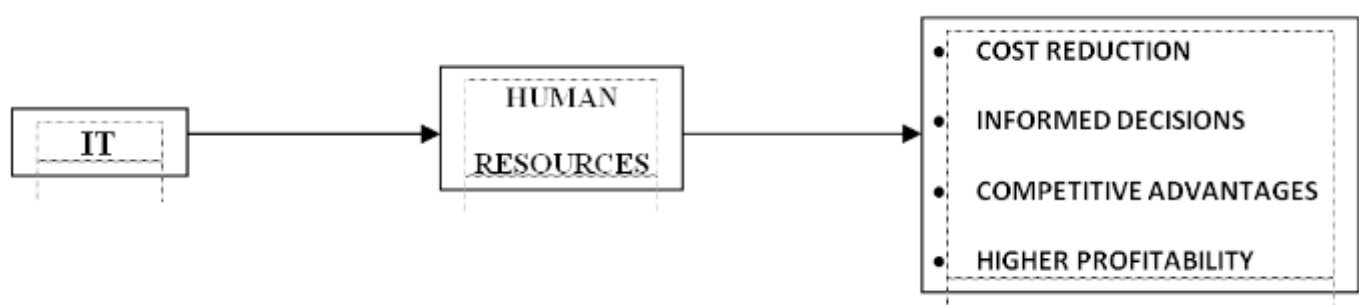
ICTs on the overall growth of the economy can be observed by looking at the multifactor productivity factor (MPF) measurement. In Organization for Economic Cooperation and Development countries, MPF coefficients have been found higher in their economies and more specifically in sectors with higher investments in ICTs (Irene, Bertschek, Fryges, & Kaiser, 2004). The productivity growth by ICTs is usually through two main channels: First, greater investment in ICT, which boosts labour productivity growth by raising the stock of capital available to each worker (capital deepening); and secondly, rapid productivity growth is occurring in the production of ICT goods (e.g. computers, mobile phones). This is because the spread of computing power has reduced radically the costs for companies of collecting, analyzing, retrieving and re-using information. For example, the growth of voice and data communications means companies are increasingly able to share and spread strategic information at great speed, over long distances but at a fraction of cost. So as computers continue to become cheaper and more powerful, the business value of computers is limited less

by computational capability and more by the ability of managers to invent new processes, procedures and organizational structures that leverage this capability.

Human Resource's Performance and Information Technology

Human Resources and Information Technology are put in place to create value, there are strong arguments that through collaboration between these two extremely critical components of a business, both IT's and HR's output can be enhanced resulting in higher levels of performance at the individual, department, and organization levels. In a model proposed by Ulrich (2000), HR provides IT with HR practices to ensure that IT has the talent, discipline, and accountability to design and use technology to provide decision based data. In addition, IT provides HR with technological infrastructure to more efficiency and effectively delivers HR.

Fig 1: Systems model approach showing the relationship between HR and IT.



Source: Ramlall, S.J (2000) Enhancing the effectiveness of HR through the integration of IT, *Journal of Business and Economic Research*; Vol.1 No.10.

To fully understand the value of IT in HR, the major clusters of HR are defined with the intended outputs each clusters, and IT potential role in realizing the intended outputs of the respective HR clusters. Given the increasing use of technology in the workplace, Ulrich (2000) noted that HR departments must adapt web-based systems in two major areas. Firstly, transaction activities in HR shifted in the 1990's from business units to service centres. This is where HR departments created 1-800 numbers for employers to seek answers to their questions and make basic request. The next step according to Ulrich (2000) is to put the service centres

online and build employees self-service or self-reliance. The potential benefits include the traditional HR administrative task such as payroll benefits administration, stock plan management, and other administrative tasks being done online at the employee's convenience, reduced labour costs, and generally a more efficient process and less expenses. Secondly, Ulrich (2000) maintained that it is the shift of transformational work of HR to the web. The need to transform traditional methods of conducting strategic planning, training and development, employee selection, knowledge management, organization communication, and other facets of HR activities to a web-based system is crucial to the growth, effectiveness and even the survival of the HR function.

ICTs and Organizational Productivity. .

Drucker (2001a) argues that ICTs have the potential to be to the information revolution what the railroad was to the Industrial Revolution - a totally new, totally unprecedented, totally unexpected development that transformed both the mental and economic geography of companies and communities. Continuing with the same line of argument, Drucker (2001) proffered that workers that would be the engine of economic growth will be those who can be categorized as "knowledge technologists", for example computer technicians and software designers. He asserted that these workers are as much manual workers as they are knowledge workers; in fact, they usually spend far more time working with their hands than with their brains. But their manual work is based on a substantial amount of theoretical knowledge which can be acquired only through formal education, not through an apprenticeship. He predicted that just as unskilled manual workers in manufacturing were the dominant social and political force in the 20th century; "knowledge technologists" are likely to become the dominant social-and perhaps also political-force over the next decades.

Furthermore, in terms of increasing effective management, just as electricity enabled development of the continuous production line processes, the decentralized availability of information through ICTs allows the reduction of hierarchical structures within firms and greater empowerment and capabilities for work teams and individual workers. ICTs can also transform a firm's relations with its customers, providing increased scope to tailor products to individual requirements. ICTs also allow more lean and timely inventory management. In other words, investment appears to have a greater beneficial impact if complemented by organizational changes, greater use of delegated decision-making and improvements in related workforce skills. Therefore, these benefits from ICTs to productivity can be categorized as tangible and intangible (Sheng, Nah, & Siau, 2005). The tangible benefits include the following: Reduced cost, Improved productivity (i.e; amount of output produced per unit of input), Increased market share, Savings in labor, Increased consumer surplus (i.e; the accumulated difference between consumer demand and market price), Improved customer service quality, Improved organizational efficiency,

Quicker response to customers, Deeper knowledge and understanding of customers; On the other hands, the intangible benefits include: Improved decision-making ability, Superior product quality, Knowledge/information management and sharing, Improved coordination/relationships with partners and Other forms of competitive advantages. As described earlier, for most developed countries there was a definite link between productivity growth and ICTs. But impact of ICTs on growth was non-existent and even negative in some developing countries. This is true because technology does drive growth - but only after a minimum threshold is reached. ICTs penetration and usage needs to attain critical mass before it will have a positive impact on country's economy (in order to attain optimum network effect alluded to earlier). Similarly, there is a considerable time lag before ICT benefits growth and productivity. The lag represents the time it takes organizations to assimilate and adjust to new technology. Also, ICTs enablers are crucial for technology to work. For example, quality of country's business environment, as well as its attention to specific ICT enablers significantly affects its ability to harness full benefit of technology. Specifically, the ICTs enablers include appropriate education, skills training, research and development (R&D), access to venture capital, affordability of Internet access, security of Internet infrastructure, government support for ICT development, and quality of ICT supporting services (Chandra, 2007). Another equally important enabler is the recruitment as well as promotion processes and recognition of professional skills attainment. Thus, for ICTs to effectively enhance labour productivity, nations ought to not only invest in ICT infrastructure but also in ICT enablers if benefits from ICT are to translate into higher human resource productivity on sustainable basis.

Materials and Methods

This study was carried out in South West, Nigeria. Lagos and its suburb in the South West are the industrial nerve centre of the country as more than 75% of the manufacturing industries are located in and around the place. Questionnaires were administered to workers of selected manufacturing industries with not less than fifty employees.

Methods of Analysis

The study made use of chi-square to show the extent of ICT adoption and the impact on HRM in Nigerian Manufacturing firms through the use of SPSS package because the data in question is qualitative in nature. More so, because chi-square tests are used to determine whether sample data are consistent with the hypothesized distribution.

Sources of Data

The research work relied basically on primary source of data obtained from the respondents answer to the administered questionnaires. 305 questionnaires were sent out to the respondents out of which 200 were returned dully completed and the remaining 105 were rejected because they are not properly filled and some are not returned.

The Variables Used

The major variables that were analyzed in this study are ICT adoption as represented by computers, fax machines, internet and the HRM as represented by training and development to ascertain the extent of influence of adoption of ICT and the resultant impact on HRM in Nigeria. To analyze these findings, ICT adoption and HRM would be used.

Decision Rule

Decision Rule: The decision rule is that if the P – Value for the calculated chi-square (X^2) is greater than 0.05 i.e. ($P > 0.05$), we accept null hypothesis. This further shows that the deviation is small enough that chance alone accounts for it. On the other hand, if the P- value for the calculated (X^2) is less than 0.05 i.e. ($P < 0.05$), we reject the null hypothesis, and conclude that some factor other than chance is answerable for the deviation in the observed value to be so great.

Data Analysis and Interpretation of Result

The study seeks to test 2 hypotheses (A and B). For hypothesis A, the chi-square value (X^2) = 6.817, with a degree of freedom (DF) = 2. At this value, we ascertain a P – value of 0.02 which depicts that P is greater than the standard level of significance i.e. ($P < 0.05$). Hence, we reject the null hypothesis and accept the alternative hypothesis which states that, there is a statistical association between adoption of ICT and HRM performance. Since the P – value is about 0.02 which

means that there is 2% probability that any deviation from adoption of ICT and HRM performance is not due to chance. More so, that the observed chi-square is significantly different from expected adoption which corresponds with Mendals' law.

In the same vein, hypothesis B depicts a chi-square (X^2) value of 7.698, degree of freedom (DF) = 2. Tracing the chi-square value from a chi-square distribution table, we get a P- value of about 0.01, hence $P = 0.01$. This states that P is lower than 0.05 that is $P < 0.05$. The implication from the above P – value is that there is statistically significant association between adoption of ICT by Human Resource and Organizational Performance. This also shows that there is a 1% probability that any deviation from the human resources/employees in our case study is due not to chance and that ICT tools is responsible for improved organizational performance in the manufacturing sector.

Results and Discussion

The P – value derived from the Pearson chi-square value and its corresponding degree of freedom respectively, from the cross tabulation of adoption of ICT and HRM and that of cross tabulating of adoption of ICT versus Organizational Performance are 0.02 and 0.01 respectively which depicts 2% and 1% deviation between the rows and columns respectively. The above, is an indication that ICT have significant influence on HRM performance. The result obtained from the collected data buttress the study of Offodu (2007) that ICT assisted by human and interactive materials that can be used for wide range of teaching and learning as well as for personal use directed towards HRM performance.

This implies that the adoption of ICT in manufacturing firms in Nigeria is higher. More so, that ICT deployment and adoption is a factor that can enhance HRM performance. Also, ICT adoption enhances organizational performance. In this regard, some other benefits of ICT critical to the performance of manufacturing firms are to reduce the time for data processing (for HR audit) and communicating information for effective decision-making and coordination among HR (Liston et al 2000). This is possible because the internet- based tools of ICT allow communication between even remote users and enables them to share files, comment on changes and post requests for information (De Lapp et al., 2004).

Findings and Recommendations

The study reveals that employee skills has improved as a result of frequent interaction with new form of technology i.e. ICT on daily basis. Also, ICT has made it possible for countries to trade without boarder restrictions through the internet. Some of the manufacturing firms are able to acquire more sophisticated machines and equipment from developed countries with the aid of ICT. The acquisitions of more equipment by manufacturing firms have enhanced their productivity, sales and profitability. ICT has become a major tool for manufacturing firm to have competitive advantage over their competitors. Productivity is an important measure in determining the growth and performance of manufacturing firms. Employee performance has increased with the availability of a dependable information system in the organization.

In conclusion, the application of ICT has become a major tool in maintaining a competitive position in the market as well as increasing organization productivity.

Today, organizations are faced with the articulation of machines to organization culture; values, objectives, goals and the success of these factors to large extent determine how best organization will perform. Therefore, more should be done to sustain employee commitment to organization performance and this can be achieved by making work less complex or rigid, and ensuring proper interaction between employee and machines.

Therefore, it is recommended that job satisfaction should be ensured through improving employee skills, good pay package, job structure and promotion system which ensure career development of employee. Regular ICT training and development should be enhanced so as to allow proper interaction between employee's and machines. Performance of employees with the aid of ICT should be encouraged and sustained in order to ensure improvement in productivity.

Poor management policy should be prevented by allowing employee involvement in decision or policy making and effective supervision through competent and experienced work force.

Management should pay adequate attention to the adoption process of ICT and managing it in such a way that negative efforts are discouraged.

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APPENDIXES

Table 1: Summary of chi-square analysis of influence of adoption of ICT on HRM Performance

Item	X ² cal	X ² table	DF	Decision
ICT Adoption	6.817	5.888	2	Rejectn a Null Hypothesis

Source: Computed by the Authors.

Table 2: Summary of chi-square analysis of adoption of ICT and Organizational Performance

Item	X ² cal	X ² table	DF	Decision
Adoption of	7.698	5.899	2	Reject Null Hypothesis

