MANAGING GLOBAL TECHNOLOGY INNOVATION AND WORK SYSTEM DYNAMICS: IMPLICATION FOR EMPLOYMENT RELATIONS IN NIGERIA

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ABSTRACT

Technological innovation encompasses any change in a product, process or system that were the outcome of new technology. It also embodies a new method or new idea that improves quality of goods and services. Employment prospects, employee productivity, improved balance of trade and national economy were often the result of improved technology. Technological innovation changes the character and nature of work. It is a significant force of social change which changes human values and alters the character of human relationships and work performance. The present global economy based on free movement of trade and capitals were the outcome of improved technology innovation. But the pace of change or dynamism has made it to be agent of disequilibrium and disruption in many organizations in Nigeria. It has precipitated many employment problems and crisis in Nigeria. This paper uses descriptive method to examine the effects of technological innovation on the work system and employment relationships in Nigeria. The paper argues that the use of new machines and equipment that were the outcome of technology innovation have changed the work system, but have not substantially facilitate efficiency and effectiveness of workers. The problem is not unconnected with the failure of manager to effectively manage the interface between technological innovation, work system dynamics and employment relations. It recommends effective methods by which human resource could be managed to cope with dynamic work system associated with technology innovation for organizational competitiveness and national development.

INTRODUCTION

Changes in technology have really affected most industries worldwide. Globalization, which dominates the world today, was influenced mainly by communication and information technologies. Digital technology integrates the world and it "allows organizations to manage their channels of communication and integrates all their systems" (Negrophone, 2000). Information technology (IT) has transformed the process of production, product design, sourcing for raw materials, transport, manufacturing, marketing and delivery. Improved telecommunication has also revolutionized communication and information traffic within and between nations of the world. Information technology (IT) today help business to produce and create better, faster, cheaper and bigger than before goods and services. Broadband telecommunication has turned the telephone network from being primarily a medium for voice communication into multimedia network, which carries video and other image-based services, high-speed data communications and other computer-to-computer traffic, as well as voice and text communication. It was mostly these that allowed globalization to develop, thrive and blossom. All organizations and nations depend on technology to be competitive and develop in the global economy.

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.

Innovation is important in the life of any organization, as it enables it to move along with the changing condition. Foster (1986) suggested that organizations and nations should not engage in wait and see but must constantly innovate by engaging in what he regarded as attacker advantage. He argued that "Innovation may be achieved by an organization and exploited by others, while it may be entirely nurtured within and without recourse to external ideas." Nations and organizations should engage in both, which may be combined or separated. Innovation could also be achieved through solitary process that requires creativity genius and greatness, and through effective management of the human resource. In both, it is the human element that can innovate out of all the organization resources. Innovation can be nurtured through effective human resource management.

It is safer to innovate than to allow organization and nations to be overwhelmed by changing conditions. Innovation enables organization to survive at the critical stage where organization technology could not provide required goods or services. This is what Foster (1986) regarded as limitation, to which technologies, machines, and processes are about to become obsolete. Ability to recognize the limit is crucial in determining whether organizations will succeed or fail, because the limit provides the best clue they have for recognizing when they have to develop new technology to improve their product or process.

One of the major challenges facing most organisations in Nigeria is how to manage rapid and radical technological change in the global economy. This paper uses descriptive methods to examine the effects of the improved technology innovation on the global economy, and the how it has influenced human resource performance. The paper also seeks to determine the relationships between technology innovation and the changing work systems and their implications on employment relations in Nigeria.

MANAGEMENT OF TECHNOLOGICAL INNOVATION EMPLOYMENT RELATIONS .

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Innovative and creative individual tend to maintain their motivation to the extent that their desire to excel is given encouragement and a climate to operate. Industrial relations can be used to provide for individual and group needs and general improved working conditions that will enable employees to implement and operationalise their desire. Interactions between workers and with management generate their own excitement which Manners, et al. (1997) called "positive tension" that motivate innovative people. Many organizations have failed to survive globalization challenges due to their inability to manage innate capability of their human resources to innovate.

Socio-technical system of Merguiles and Colflesh, (1982) explained the relationship between technology and management of human resources at groups and individuals' level. They provided a way of developing a better 'fit' between technology and structure and employment relations.

Socio-technical system in Figure 2 shows organizational components. They are combinations of tasks, technical subsystem factors, human processes and management subsystems.
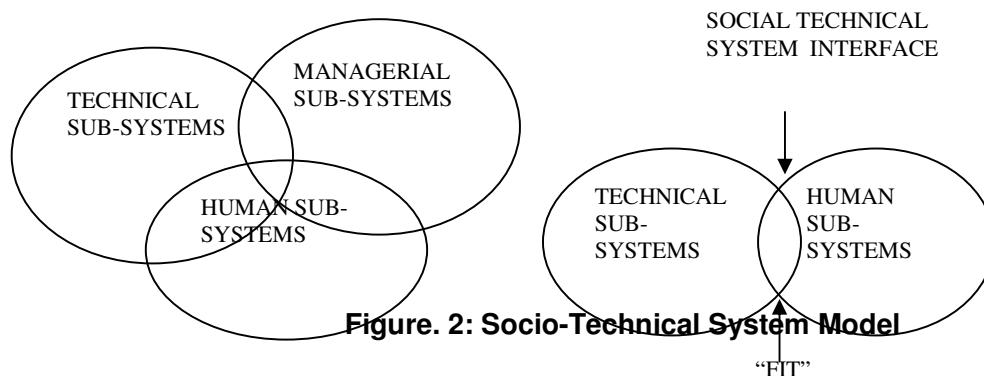
SOCIAL TECHNICAL
SYSTEM INTERFACE

TECHNICAL
SUB-SYSTEMS

MANAGERIAL
SUB-SYSTEMS

HUMAN SUB-
SYSTEMS

TECHNICAL
SUB-
SYSTEMS

HUMAN
SUB-
SYSTEMS

Figure. 2: Socio-Technical System Model

"FIT"

Source: Merguiles and Colfesh (1982). A Socio-Technical Approach for Planning and Implementing New Technology, Training and Development Journal, p. 16.

Technological subsystem includes the technology itself, workflow, information flow, job roles and relationships, task configuration and relationships, policies and job feedback. Human subsystem includes organizational climate, level of motivation, communication, and level of commitment, participation, co-operation, and satisfaction with work environment, willingness to accept change, work group factors, human resources development, and satisfaction with compensation and company policies. Management subsystem includes technologies and structures used to control and direct technology (Margulies and Colflesh, 1982).

The most difficult task of human resource managers in technology-driven organizations is to manage the interface between technologies and human subsystems. This interface when managed properly provides the appropriate compatibility or "fit" between the two subsystems. Understanding of both the technical and human subsystems is essential to manage this "fit" even during times of rapid technological change. Management of the "fit" at all times becomes imperative because of high probability that technological changes can create a "misfit" or disequilibrium in the existing organizational structure and main groupings within it, and in its projected input and output systems. This problem can also occur when major transforming process is taking place within the technical system, and with other relevant technical information system e.g., nature of raw materials, the equipment and critical interface. (Gupta and Singhal, 1903) Organizations and nations should employ skilled worker and invest on their training and development to continuously improve their performance and cope with technological changing. Such training and development should be directed towards acquiring job-related knowledge, skill and attitude in order to perform efficiently and effectively in a specific task now and in future.

WORK SYSTEM DYNAMIC AND EMPLOYEE TECHNOLOGY INNOVATION NIGERIA

Work is performed within work systems and subsystems. Analysis of work system is required for selection and placement of employee in different units of the organization. The work system is based on formal relations and planned instrumental activities on which usual theory of innovation relies. Brulin and Ekstedt (2005) criticized the traditional approach on the premise that it relies on a linear and sequential chain of order. Innovation may not be linear, but technology from invention to product is based on production. Technology innovation in industry is evolutionary as the complex chain or network of new technology develop from the earlier ones and could still provide the foundation for future innovation..

Work system, knowledge and skills have a great influence on innovative capability of individuals and teams, most especially in R&D units and organizations. Takeda (1993) agreed that evolutionary innovation alone is not enough to ensure company prosperity, but the

organization still need to contribute to evolutionary innovation to harness groups and individual efforts. Work systems include all the elements that directly or indirectly influence human resource performance. Skills, knowledge, abilities and attitude of human resource could be enhanced at all times through training for performance system or through the introduction of appropriate methods or interventions to enable employees to reach their highest level of performance. Performance system consists of training, incentives and motivation, environment and time support mechanism. must be effectively combined together in harmony to enable employees to perform at a peak level. Training enhanced ability of employee to achieve regular, problem solving or innovative objectives of the organization.

The Human Resource Cycle of Devanna, (1986) starts with selection of the employee and it moves towards performance, which determines the reward. Appraisal of employee performance also leads to the reward. Employee selection and appraisal also determines his development. Human resource planning is based on recruiting the right people, creating venture terms and allowing voluntary assignments. Performance appraisal should encourage risk that demand innovation, generating or adopting new idea, frequent evaluation and auditing of innovation process. Reward system should provide for freedom to run business, balancing pay and self-esteem, promotion of employee from within, reciprocal rewards and balancing of team and individual rewards. It also includes planning, assigning of current work and following it up. Career management should focus on empowering people and on continuous training and development of employees.

Figure 1 explains the interconnection between various aspects of the human resource management.
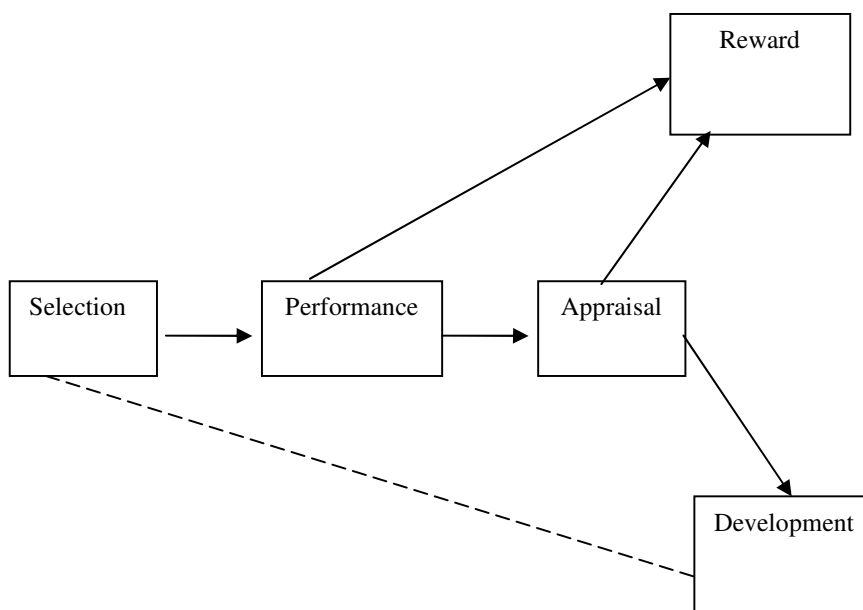

Figure 1. Human Resource Cycle

In spite of the unprecedented development and domination of technology in the global economy, human resource is still the most important resource in all organizations and nations. Only human being has the capability to organise and utilize other resources for achieving organizational and national goals and objectives. This implies that efficiency and effectiveness of all parts of the organization, nations and global a large extent depend on the quality of human resource. In this regard, human resources knowledge, skills and abilities are used with other inputs such as raw materials, money, equipment, machinery, information, processes, procedures and others to produce all goods and servicess.

Nigeria could not harness her natural, material and human resources for socio-economic development as a result of her inability to utilize effectively and manage science and technology. This is not unconnected with the failure of their governments to encourage technology innovation and/or lack of commitment of organizations to encourage and train their employees to innovate. But the advanced countries of Europe, America, Russia and few emerging countries such as China have succeeded through the efficient application of science and technology in transforming their material and human resources into goods and services and dominate the world market. In the developed countries, government and organizations provided enabling environments and rewards to motivate their scientists, engineers, technologists, technicians and artisans/craftsmen to innovate. Apart from these, human resources were not encouraged to generate, acquire, adopt and transfer technology. Employment relations strategies provide effective method for the country to achieve these.

The country have also not really benefited from increased the productivity that was the outcome of improved global technology innovation and work system. This makes it difficult for the country to meet the basic needs of her people. Technological development of a nation is directly related to the creativity and innovation of her people. High quality and low cost goods cannot be manufactured 'in', unless they are first designed 'in'. Since Nigeria is mainly a buyer of machinery and equipment that are used in the production of nearly all goods and services from the advanced countries, she is indirectly excluded from determining the prices of her goods and services, and could not increase the living conditions of her people.

EMPLOYMENT RELATIONS STRATEGIES AND TECHNOLOGICAL INNOVATION

The complexities of the current major characteristics of the existing human system with the set of complex task relationships required to complete various tasks; the set of attitudes predominant in the group and the organizational climate, give credence to the use of industrial relations system in the improvement of technological innovation. Industrial relations system can be used in analyzing and structuring carefully organization, individual, and group interests. It provides possible avenues to draw sufficient and relevant information necessary for the design of the human system. It can stimulate improved employees performance in the new global production system and in the description of the activities associated with workers roles. Industrial relations also enable employees to take active part to provide means of assessing new skills required of supervisory personnel and specification of development plan to increase employee's innovativeness.

Job Structure

A well-structured job satisfies and motivates scientists, engineers etc., to work harder and have interest on their work and to be creative and innovative. Job structures have to be complemented with task structure for its effectiveness.

Task Structure: The internal structure of each task consists of three elements: which are planning, executing and controlling.

Planning: Deciding on the course of action to be taken, its timing and resources required. Scientists and engineers should take part in decision-making on issues that affect the organization technology innovation improvement.

Executing: Carrying out the plans that were made by the scientists and engineers and ensuring plans are carried out to improve technology innovation.

Controlling: Monitoring performance and progress and taking corrective actions when required.

Each of the task include these elements for the accomplishment of the task, the worker, the manager or the supervisor specify the output, quality and cost target. Scientists, engineers, and technical personnel decide on how the work is to be done, assemble resources, perform the work, and monitor output, quality and cost standards for improved technology innovation.

Job Enrichment

Effective job enrichments, which can encourage technology innovation, are those that are based on, and are of the following types:

- A complete piece of work in the sense that the engineers and scientists can identify tasks or activities that ends in a recognizable and definable product or service.

- Job that affords the employee as much variety, decision making responsibility and control as possible in carrying out the work.

- Direct feedbacks are provided through the work itself on how well the employee is doing the job. (Blauner, 1972).*Job Design and Motivation*

The way in which jobs are designed influence the degree to which they provide intrinsic motivation from the work itself. This is related to the fundamental concept that people are motivated when they are provided with opportunities to achieve their goals. Work provides the means to earn money, which is an extrinsic reward that satisfies basic needs and is instrumental in providing ways to satisfy higher level needs. But, it also provides intrinsic rewards, which are under direct control of workers themselves. There are four characteristics of intrinsic motivation. They are:

1. **Feedback**: Individuals receive meaningful feedback about their performance, preferably by measuring and evaluating it themselves. This implies that they should work on complete product or a significant part of it, which can be seen as a whole.

2. **Use of Abilities:** Jobs are perceived by individuals as requiring them to use abilities they value in order to perform the job effectively.

3. **Responsibility:** Jobs maximize the jobholder's responsibility for performance and quality.

4. ***Self-control:*** Individuals feel that they have a high degree of self-control over setting their own goals and over defining the path to these goals.

EMPLOYMENT RELATIONS STRATEGIES FOR IMPROVED TECHNOLOGY INNOVATION

Employment relations strategies can be used not only to sensitize employee to be creative and innovative, but also for the management and government to understand innovative people idiosyncrasies and problems. Employee's creativity can be enhanced when he is recognized and appreciated, and when he is given freedom to work in areas of his greatest interest. Innovative employees contact with stimulating colleagues, and encouragement to take risk improve their performance. Other factors such as toleration for non conformity, opportunity to work alone, monetary rewards and creativity training programmes are what Badawi (1989) claim can stimulate innovation and creativity among employees, and their neglect can result to what he regarded as "creativity mismanagement. Human resources managers should therefore, play an important role in initiating, maintaining and monitoring technology available to the employees.

To achieve technology innovation, human resource managers should be placed at a critical position in the organization, especially in the area of facilitating positive change towards effective technology innovation. Individual innovation is meaningful and workable when combined with that of others. The collective innovation is also impossible without individual innovation, hence the two are separate, but could only work in the production process when they are combined and effectively managed to produce result. (Burns and Stalker, 1961); (Cimoli and Dosi 1988). Managers therefore need to provide enabling work environment that enhances collaboration and team-networking to encourage employee initiative to innovate for technological development within and between organizations and nations. Managers should posses and practice leadership and team management skills which include the followings:
- Setting direction through the development and communication of a vision of what type of technologies that the teams need to achieve in future. That is setting the vision and target to achieve the types of technologies that will be required in the future and directing the team innovation toward them.
- Communicate effectively the vision to all member of the team repeatedly so that they could direct their efforts and at all times towards the achievement of the vision.
- Motivating and inspiring team members to overcome major obstacles towards achieving the vision by communicating and involving others
- Publicly acknowledging and showing appreciation for contribution of team members
- Considering the interest of others when making decision or planning.
- Building trusting relationship.
- Mobilizing the full participation of team members from diverse backgrounds, disciplines and perspective for the achievement of the team's vision.
- Continuously communicating organization team's vision in a persuasive way to carry along member's with him at all times.
- Influencing and motivating the external partners to collaborate effectively in order to achieve results.
- Representing the issues and strategies of the organization, team, and project to top management or other stakeholders in the organization.
- Creating an enriching and enjoyable work environment.
- Demonstrating respect for people of different culture, gender and background.

It is imperative for managers to employ human resource management theories, concepts and practices for the progress and development of their organizations and nations. They should plan, staff, organize, control and lead their human resources in the most appropriate manner. They should also acquire, train, appraise, reward and compensate them to get the best from them. These will enable organizations and the government to hire the right employee, placed

them on the right job, experience low turnover and motivate their employee to work efficiently and effectively and to motivate their employees to innovate.

SUMMARY AND CONCLUDING REMARKS

In spite of the dynamic technological changes, human resource still needs to apply his skills and intellect in practical ways for improved technological innovations. Whenever management styles of top managers deviate from human resource management theories, concepts, models and practices, they are often off-target in their efforts to improve employee performance for technology innovation and for the overall organization improved performance. Employment relations and management of work system dynamics provide managers with adequate tools for improving technology innovation for organizational competitiveness and national development.

Employment relations are intimately linked to technological change, technological innovation and work system dynamics. Technological change could be effectively managed through human resource joint approach. Individuals can innovate and achieve great technological breakthrough but the complexities of modern technology require effective combination of different innovations based on different aspects of technology. Hence human resources need to work as an individual and as a team and combine their innovation for production of new technology, goods and services. It is therefore necessary to make use of human resource management strategies at all times to enable the organization cope with changing and dynamic technology.

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