

# **A STUDY OF HUMAN CAPITAL AND INNOVATIONS IN THE TECHNOLOGY-BASED ENTERPRISES IN NIGERIA**

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Innovation in the manufacturing sector is germane with the view of economic growth and development and this is propelled by a number of factors such as technological and non-technological innovation (Becheikh et al., 2006). Innovation is of great important in creating competitive advantage for a firm and its processes vary in dimensions based on sector, field of knowledge and size of the firm, corporate strategy, prior experience, age, technological level, the objective behind the innovation and the market (Olomu et. al., 2015). Hence, Schumpeter (1912) the father of innovation studies noted that innovation consist of any of the following phenomenon: the introduction of new goods, the introduction of new method of production, the opening of a new market, the conquest of a new source of supply of input or materials and the implementation of a new form of organization. In addition, product and process innovation in manufacturing firms are reflected as technological innovation, whereas, organizational and marketing innovations in services are considered as non-technological based innovation (Battisti and Stoneman, 2007). According to Ali-Yrkko and Martikaine (2008) noted in terms of firms' profitability and employment that firms with only technological innovation do not grow more rapidly than other firms. However, firms' profitability is positively associated with the combination of technological and non-technological innovation. Studies have showed that innovation contributed positively to the performance of enterprise (Marius-Dan, 2011; Abereijo et al., 2009; Frenz and Lambert, 2008; Sandvik, 2003; Robert and Amit, 2003).

Meanwhile, innovative manufacturing firms are competent and continually responding to change of any sort in their environments and are characterized by intellectual people developing new products and services and not superfluous staff. The innovative people are of high human capital or people with high human resources (e.g human intellectual capacity). This human capital is as an important factor of production that required investment in physical capital which leads to economic growth. It is an essential element of the production process (Ducharme, 1998). Studies have showed that human capital has a positive impact on the productivity of an enterprise (Kendrick, 1976 and Denison, 1962).

Studies have revealed various measurement of business performance. Simmons (2000) asserts two types of performance measurements: objective and subjective. Subjective

measurement is based on perception while objective measurement is monetary based. Financial or accounting measures like profits, returns on sales and returns on assets (ROA) are examples of objective measurement while customer satisfaction and quality of a product or service are examples of non-financial and subjective measurements. Gorgievski *et al.* (2011) posit ten performance measurement which are both objectives and subjective measures: (1) Profitability (2) Growth: growth in the number of employees, sales, market share and/ or distribution, (3) Innovation: Introduction of new products or production methods, (4) Firm survival/Continuity (5) Contributing back to society (6) Personal satisfaction (7) Satisfied stakeholders (8) Good balance between work and private life (9) Public recognition (10) Utility or usefulness.

In a developing economy like Nigeria, micro and small enterprises play tremendous role in repositioning the socio-economic landscape of the country and these enterprises largely represent a stage in industrial transition from traditional to modern technology. Hence, micro and small enterprises are vital in developing the Nigerian economy for the following reasons: income generation, social and political role in local employment creation, balanced resources utilization, utilization of local technology and raw materials in helping to promote change in a gradual and peaceful manner”(NMSMECS, 2010). The importance of micro and small enterprises were recognized by Federal Government, State Governments and other organizations in Nigeria and this led to various supports and policies to enhance and encourage entrepreneurship development. The establishment of research institutes and technology incubation centres (TICs), the Small and Medium Enterprise Development Agency of Nigeria (SMEDAN), National Directorate for Employment (NDE), and Industrial Development Centres (IDCs) are some of the means through which the Governments of Nigeria is encouraging entrepreneurship development. The degree of efficiency of government and other organizational aid to boost entrepreneurship development and enhance entrepreneurs' performance are challenged because the abysmal performance of micro and small technical enterprises in Nigeria. This have been of great concern to governments, citizens, practitioners and organized private sectors in Nigeria. This phenomenon may not be unrelated to the human capital and innovativeness of the firms. Several studies have assessed the performance of micro, small and medium enterprises,(Ogunjemilua *et al.*, 2015a, Ogunjemilua *et al.*, 2015b, Osotimehin, *et al.*, 2012; Sullivan and Marvel, 2011; Chen *et al.*, 2007; Simmon, 2000), but it seems that few or no studies have separated the performance measurement of technical enterprises from other forms of enterprise likewise, studies have measured performance of enterprise using input and output measures separately (Olomu *et al.*, 2015 and Osotimehin, *et al.*, 2012). In addition, many studies have been carried out on micro and small enterprises in Nigeria; it seems that none of them have proffer e-database for

these enterprises in Nigeria. Hence, this study is designed to consider only micro and small enterprises that are technical in nature either in service or manufacturing and to also use both input and output measures together to evaluate the performance of micro and small technical enterprises (MSTEs). The performance measures are number of staff/staff strength (input measure), sales volume and profit (output measures). In addition, the study will create electronic database for the type of enterprise considered (Technical) for easy access by stakeholders; respondents' clients, Government, researchers, local and international organization.

The broad objective of the study is to develop policy innovative framework for monitoring and evaluation of MSTEs performance in Nigeria while the specific objectives of the study are to:

- (a). create electronic database for micro and small technical enterprises in Nigeria;
- (b). identify factors influencing human capital of the operators in the firms;
- (c). examine the factors influencing firms' innovativeness;
- (d). determine the extents and depth of firms' innovativeness;
- (e). assess the impact of human capital and innovations on the performance of MSTEs in Nigeria.

The theories behind this study are intellectual investment theory (IIT) (Ducharme, 1998), knowledge based theory (KBT) and resource-based theory (RBT) (cited by Ogunjemilua et al., 2015a and Ogunjemilua et al., 2015b), Oslo manual and Frascati Manual (cited by Jegede et al., 2015). This IIT implies that the efficiency of a firm depends on the mobilisation of resources (including the general knowledge and culture of the firm) to appropriate technology and market opportunities (Ducharme, 1998). Moreover, the resources devoted by management to anticipate needs of clients, pre-competitive research, market intelligence, quality-circle, performance review of employees, creation of industrial and multinational networks, consulting services, alliances, joint ventures and consortia, etc., can be considered as intellectual (Ducharme, 1998).

The study will be carried out in twenty randomly selected states in Nigeria. Primary and secondary data would be used for this study. Primary data will be collected using one set of questionnaire and supplemented with guided interview. The questionnaire and interview guide would be designed using Community Innovation Survey CIS 4 (Oslo manual) which have been widely used for innovation survey (Jegede et. al., 2015). Two Local Governments will be selected from each of the states. Questionnaire will be administered purposively to

twenty five randomly selected micro and small technical enterprises in each Local Government, making a total of one thousand respondents. The criteria for purposive selection are (i) the enterprise must have been established for at least five years ago before the study is conducted (*Establishment year must be at least five years*), this was done in order to validate the performance measures deployed for this study. (ii) the enterprise must be technical in nature (*this is an enterprise that produce goods or render technical services for wealth creation*). The criterion for random selection is gender consideration (*both male and female respondents were given equal chances of been selected for the study*). Secondary data would be obtained from the firms' records and relevant journals. Pilot survey was conducted for this study in one of the state that was not included in the selected states using thirty copies of questionnaire in order to improve on the effectiveness of the study design and the result of its Cronbach Alpha (0.853) indicated that the scale used for this study is reliable.

### **Objective one**

The data collected via questionnaire will be used to create electronic database for micro and small technical enterprises in Nigeria; (i) Socio-demographic, business profile such as business location, registration number with corporate affairs commission would be indicated if registered. (ii) Expertise; type of technical enterprise, areas of specialization of the respondents would be obtained, ditto to the remaining objectives. Hence, general type of database would be created and be flexible for further updates from the respondents and database manager.

### **Objective two**

The questionnaire will elicit information on the factors influencing human capital of the operators of MSTEs in Nigeria such as socio-economic background of the respondents, cultural factors; orientation/motive, environmental conditions and cost of schooling/training. Hence, human capital would be measured with education and training (*formal and informal education*). Knowledge and skills' acquired by an individual's learning activities such as skills, experience, and competency. Human capital and 'knowledge as broad meaning as they are is recognized as synonymous (DAE-BONG, 2009).

### **Objective three**

The questionnaire will reveal the factors influencing firms' innovativeness such as owners and MSTEs characteristics, environmental factors (Hadjimanolis, 2000). Private and public knowledge infrastructure, production column (Oerlemans, et al., 1998) and top management characteristics, strategy and structure (Kim et al., 1998).

#### **Objective four**

The study will determine the extents and depth of firms' innovativeness such as types/forms of innovation, these innovation measurements would be adopted from UNU-INTECH (2004) such as technological innovation (process and product innovation), non-technological innovation (organizational innovation and marketing innovation) and diffusion based innovation.

- Process innovation is to determine whether the technical enterprise (TE) introduced a new processing method in their production/services activities or modified an existing one (Djeplat, 2009; 2011; and Romijn and Albaladejo, 2002).
- Product innovation is to determine whether the technical enterprise introduced a new product or repackage their product.
- Organizational innovation is to determine whether the TE have maintenance routines and waste management procedures.
- Marketing innovation is know whether the firm developed a new local or foreign market; and further determine whether the firm introduced a new marketing technique.
- Diffusion-based innovation will be measured to determine if the TE acquire product license and/or process license,

#### **Objective five**

The questionnaire will also be used to elicit information on the influence of human capital and innovations on the performance of MSTEs such as; human capital measures, extents and depth of firms' innovativeness, profit, sales volume and number of employees/ staff strength. The data obtained will be analyzed using appropriate descriptive and inferential statistics.

#### **Expected Contribution to Knowledge**

The study will create e-database for technical enterprises in the study Area. This study will provide information about the key factors influencing human capital and innovativeness in the MSTEs in Nigeria. It will provide information about the extent and depth of innovativeness in MSTEs in Nigeria. The study will reveal the impact of the explanatory variables on the response variable (s) and further give policy innovative framework that will enhance the performance of MSTEs in Nigeria.

**Keywords:** Human capital, Innovations, Nigeria, Performance and Technical Enterprises