Trend in Technological Changes and its Effect on Organizational Performance of Manufacturing Firms in Enugu State, Nigeria.

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ABSTRACT

The study was carried out to examine the trend in technological changes and its effect on organizational performance of manufacturing firms in Enugu State. The specific objectives were to assess the extent rapid technological changes affects the profitability and determine the effect of rapid technological changes on the employment generation of manufacturing firms in Enugu State. Three manufacturing firms were studied, namely Innoson, Emenite and Alo Aluminium. A survey research design was adopted for the study and a sample size of 315 employees of the firms were drawn from a population of 1,580 using Yaro Yamani formulae. Bowley’s population allocation formulae were also employed to determine the various proportional sample to the proportional population sizes. The main instrument for data collection was structured questionnaire. Data was presented in tables, while tables and frequencies were employed in analysis. Formulated hypotheses were tested using t-test statistic. The study revealed that trend in rapid technological changes have positively and significantly contributed to the profit of manufacturing firms in Enugu State based on t-calculated 65.29 > critical value t(1.645). Also trend in rapid technological changes have positive and significant effect on employment generation of manufacturing firms in Enugu State. This was also based on t-calculated (71.58) > critical value t(1.645). We therefore concludes that the trend rapid technological changes have positive and significant effect on organizational performance of manufacturing firms in Enugu State. Based on these therefore the study recommends trending on technology of production and support by government to the manufacturing firms to enable them not only perform internally but contribute to national development.

Keywords: Technological changes, organizational performance, manufacturing firms.

INTRODUCTION

Technology has huge impact on globalization, this enables companies of all sizes to do business with customers all over the world. In addition, businesses can establish satellite offices in practically any country no matter how remote as long as there is Internet access. The competition for providing Internet access to developing nations proliferates, and enables growth in areas previously deprived of business opportunities due to lack of communication devices. Productions of goods and services in the world today have been greatly influenced by the systematic application of physical forces through different types of technology. Technology in most organizations provides the required forces through various forms by which goods and services are produced. [1] suggests that this may be in forms of machine, equipment information and communication made up of knowledge, tools, method and system directed to production or output from the hardware and the brain ware is the reason for using the technology in a particular way. All these depend on a particular way. [2] sees technology to be the result of mans learned and acquired knowledge or his technical skills regarding how to do things well. The state of technology determines the quality and quantity of
goods and services produced. Organizational performance and development are determined by the types of technologies they use in production. Technology also influences living conditions of individual and groups in organizations and nations and the relationship between them. Technology is prone to change, and the state of technology have direct link to the relationship between the employer and employee. Technology, labour and capital are interconnected.

STATEMENT OF THE PROBLEM

The state of technology in any organization influences the quality and quantity of production of its goods or services. But despite this, technology is prone to constant change which organizations have to monitor, manage and cope with. Manufacturing industry that want to be competitive and profitable should ensure that employees are trained and involved in the management of technological change for organizational survival and profitability. But most organizations tend to undermine the contribution of employees in managing technological change, the outcome of which are low profitability and performance. The problem is that management cum employees may not be abreast and informed on the changes in the ever dynamic technological environment and they may have not strategy to effectively tackle this trend for increase in profitability and employment generation to our teeming youths.

It has been observed that the main cause of poverty in underdeveloped countries is that they suffer from the technological backwardness. A specific level of technological advancement is the necessary pre-condition for rapid growth. Therefore, the task of technological change in underdeveloped countries is difficult because the social set up in backward pre-industrial economies is not conducive to technological improvements on any significant scale. The absence of proper technological change retards the economic growth, reduces rate of profit and equally encourages unemployment. Thus, it is imperative either to explore new technology or import technology from industrially advanced countries to promote the economic growth. The U.N. experts observe that, "unless special effort is made, the process of technological development in the UDC's (Underdeveloped countries) are relatively slow and the gap in technology continues to grow wider as the cumulative scientific progress of developed countries accelerates." Beyond the standard office laptop and smart phone, organizations implement information systems, custom software or specialized technology equipment to keep operations running smoothly. Advancements in technology have the potential to decrease the time needed to complete a task, or in some cases eliminate the need for a business process or job function. Typically, the desire for increased productivity drives upgrades to technology within an organization, which can significantly influence company operations and profitability. Repeated economic crises and steadily increasing competition, brought about in particular by the globalization of markets, are forcing an unprecedented rationalization of resources. These and other short comings gave rise for this study and it is designed to proffer solution for our manufacturing firms to remain in the business not minding the recession that has crippled all facet of our economy.

JUSTIFICATION

The inability of manufacturing firms to meet with the pace of technological changes leads to drop in revenue, profit and employment, hence low contribution to national economic growth and development. The justification therefore, is to create an integrated network of communication on the trend of changes in technology on daily basis for manufacturing firms. These firms are required to register for the information with a token and use the information they got for strategic planning in the technological competition that have engulfed the manufacturing firms. This also helps in determining the type of human resource to employ and the training to be given to the workers. The study is optimistic that the choice to use these three
manufacturing firms namely: Innoson Nig. Ltd. Emene, Emenite Nig. Ltd. Enugu and AloAluminium Nig. Ltd, gives an empirical result that is useful to both the private and government owned manufacturing firms as they compete for a favorable gap in the craze technological environment.

OBJECTIVES OF THE STUDY
The main aim of the study is to examine the effect of trend in technological changes on organizational performances of manufacturing firms in Enugu State. The specific objectives include to:

1. Assess the extent, rapid technological changes affect the profitability of the manufacturing firms in Enugu state

2. Determine the effect of rapid technological changes on employment generation of the manufacturing firms in Enugu State.

RESEARCH QUESTIONS
In order to achieve the stated objectives, the following research questions were posed:

1. To what extent does rapid technological changes affect the profitability of manufacturing firms in Enugu State?

2. What has been the effect of rapid technological changes on employment generation of manufacturing firms in Enugu State?

STATEMENT OF HYPOTHESES
Based on the objectives and research questions, the following hypotheses was also formulated to guide the study.

1. Rapid technological changes have no positive and significant effect on the profitability of manufacturing firm in Enugu State.

2. Rapid technological changes does not have positive effect on the employment generation of manufacturing firm in Enugu State.

REVIEW OF RELATED LITERATURE
Conceptual Review
Rapid Technological Changes
The world of computers and information technology has become such an important aspect of our lives, and it’s highly doubtful that there will be a return to traditional methods of conducting business. The primary benefit of technology is efficiency. Businesses—from small scale to large scale are capable of providing products and services at a faster, more efficient rate which can result in higher profits. Technological changes impacts on all organizations. There is the need for new types of managerial, diplomatic, and social skills and a need for a new type of decision making process to be accommodated by existing organizational structures. Three particular aspects of the organizational environment affected by technological change are as follows: the amount of market competition and uncertainty increase the need for more diversity and higher quality in the organization's products or services; external politics and legislative reform increases in complexity. Each of these changes provokes responses from the organization in its structure and relationships with employees and customers. Technological change force changes in basic managerial functions. There are need to increase responsibility on management for organizational outcomes leading to added emphasis on planning, decision making, control, and coordination. These often rely on computer-based management science techniques which demand a higher intellectual capability of managers. This produce strain on managers and other individuals, potentially affecting morale, productivity, and output. Significant changes in the workplace are the result of new and advanced technology. For the past generation, technological inventions and improvements seem to be introduced every week. The trend is guaranteed to continue. Technology impact on the 21st century workplace resulting in rapid changes. Productions of goods and services in the world today have been greatly influenced by systematic application of physical forces through
different types of technology. Technology in most organizations provide the required forces through various forms by which goods and services were produced. [3], suggests that it may be in forms of machine equipment information and communication made up of knowledge, tools, method and system directed to work in specific manner. Technology is made up of the hardware, the software and the brain ware.

The hardware is the physical structure and logical of equipment, the software is knowledge and method used for production or output from the hardware and the brain ware is the reason for using the technology in a particular way. All these depend on a particular way. [4] sees technology to be the result of man’s learned and acquired knowledge or his technical skills regarding how to do things well. The state of technology determines the quality and quantity of goods and services produced. Organizational performance and development are determined by the types of technologies they use in production.

Technology also influences living conditions of individual and groups in organizations and nations and the relationship between them. Technology is prone to change, and the state of technology have direct link to the relationship between the employer and employee. Technology, labour and capital are interconnected. Some technology use a lot of labour and some use more of other equipment or capital. Investors and management base their selection on the quality and their price and prefer or choose the one with lesser price, and higher quality to maximize their profit.

The choice is explicit but rapid and radical change and regulatory control may create problem that make it sometimes difficult to make a rational choice. The choice and the preference place on capital at the expense of labour may reduce labour co-operation, lowered their morale, productivity, create conflict that may reduce organizational profit. On the other hand choice of labour may reduce the quality and quantity of goods produced and lowered organizational profit, competitiveness and profitability. Investors constantly face the dilemma of making rational choice and to balance the needs for each of them so as to make sustainable profit [5]. However, [6] suggests that in order to increase organizational performance, there is need for organizations to introduce RAMELA technological compliant test. This he describes as reliability, affordability, maintenance, ease of leaving and adaptability to the environment. From the foregoing it entails that costs and suitability to productive system must be adhered to enable technology provide profit and employment for national development. RAMELA could also form part of training of workers on technological performance.

Information and communication technologies (ICT) have changed all aspects of organization direction and operation. Work systems and employment relations have been affected by ICT in nearly and its major aspects. Microchips revolution and optic fiber cable have altered technology and work as never before. Employee and managers are interconnected through network of computers and other information gadgets. Many aspects of organization, industrial, national and international relations are organized and directed through ICT networking. These networking also connect production within and outside the industry and it extends to customers, suppliers, vendors, research and development maintain its systems. Workers of different categories, even the less educated factory workers have benefited. Internet and multimedia telephone and other communication systems have provided opportunities to all categories of employees to receive and send information from and to anywhere in the world. This has provided access to technical and non-technical solution to their individual and organizational problems and increase their efficiency and effectiveness. Engineers, technologist, technicians, craftsmen and artisan now use internet to search for solution, tools and materials that may help to improve performance and solve problems which have increased individual and team performance in many organization [7].
The concept of organizational performance:
Organizational performance is connected to the ideas of effectiveness and efficiency. A business organization must produce the right things and it must produce them using the fewest possible inputs if it must be seen to have performed. In recent years, many organizations have attempted to manage their performance using the balanced scorecard methodology where performance is tracked and measured in multiple dimensions such as: Financial performance (e.g. shareholder return); Customer service; Social responsibility (e.g. corporate citizenship, community outreach); Employee stewardship; Organizational performance; Performance measurement systems; Performance improvement; Organizational engineering.

What Is Technological Change
In economics, a technological change is an increase in the efficiency of a product or process that results in an increase in output, without an increase in input. In other words, someone invents or improves a product or process, which is then used to get a bigger reward for the same amount of work. Technological change, technological development, technological achievement, or technological progress is the overall process of invention, innovation and diffusion of technology or processes.

Impacts of Technological Change
We have all likely experienced the impact of technology. Let's take a look at the ways, both good and bad, technological change has impacted our world:

Creates new products and processes
When telephones were first invented, the object was to be able to verbally communicate with someone. Due to technological changes, we have multiple ways to communicate using our phones, such as text, email, or talk.

Increases efficiency, lower costs
Technology makes it possible to perform everyday tasks faster, with less energy on our part. For instance, some people have a vacuum cleaning robot. Instead of spending 30 minutes vacuuming, they push a button and go do something else. That's efficiency.

What is disruptive technology?
A disruptive technology is one that displaces an established technology and shakes up the industry or a ground-breaking product that creates a completely new industry.

Globalization And Technology
Technology has huge impact on globalization enables companies of all sizes to do business with customers all over the world. In addition, businesses can establish satellite offices in practically any country no matter how remote as long as there is Internet access. The competition for providing Internet access to developing nations proliferates, enabling growth in areas previously deprived of business opportunities due to lack of communication devices. The other side of the coin is the international marketing of technology researched by George Washington University technology [8]. He makes an interesting observation about multinational countries engaged in international marketing of technology products. This practice has been coined as "technology exploitation".

Technology Innovation And Organizational Performance
The starting point of technological development, changes and innovations is always people. It is the people who create, initiate, use and manage ideas that are the bases and directions of technology. Identity theory provides a way of assessing individual relations to organizational objectives and national goals and enables us to understand human resource inspiration and readiness for technology innovation. The motivation the individual receives determines the extent of its identity and his readiness to innovate for organizational and national development. This theory to [9]
provides strategies intended to change beliefs, attitudes, values and structure of an organization so that they can better adapt to new technologies, market challenges and changes. It can also be used to plan intervention in organization process to increase organization effectiveness and health. Both [10]; [11] demonstrated the relationship between organizational development and managerial effectiveness. Organizational efficiency requires that somebody in the strategic position should feel the need for innovation and change. These include the need to:

**Change managerial strategy;**
- Make organizations more consistent with both individual needs and the changing needs of the environment;
- Change structure and roles;
- Change the motivation of the workforce;
- Make better planning;
- Improve inter-groups collaborations.

**METHODOLOGY**

The research design adopted in the study was survey. [10] Posits that a research design is part of methodology which serves as outline, a general arrangement or plan that address the problem of scientific inquiry. The design employed in any research undertaking is therefore determined substantially by the nature of the study: the study examined the effect of trend of technological changes on organizational performance of manufacturing firms in Enugu State. Three companies were used to represents manufacturing companies in Enugu State. Therefore a survey research design was adopted, hence it makes possible for structured questionnaire usage, formulation and testing of hypotheses.

**AREA OF THE STUDY**

The study was carried out in Enugu State using three manufacturing firms in Emene, Enugu area namely: Innoson Nigeria Ltd; Emenite Nigeria Ltd and AloAluminium Nigeria Ltd. Profits and employment generation were used as proxies for organizational performance (dependent variables of the firms, while rapid technological changes form the independent variables).

**POPULATION OF THE STUDY**

The population of the study was made up of 1,580 employees of the organizations understudy. They are as follows in Table 1 below:

**Table 1: Population of staff of manufacturing firms understudy**

<table>
<thead>
<tr>
<th>Firms</th>
<th>Management</th>
<th>Production</th>
<th>Marketing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innoson</td>
<td>50</td>
<td>250</td>
<td>300</td>
<td>600</td>
</tr>
<tr>
<td>Emenite</td>
<td>70</td>
<td>300</td>
<td>350</td>
<td>720</td>
</tr>
<tr>
<td>Alo</td>
<td>20</td>
<td>140</td>
<td>100</td>
<td>260</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>690</td>
<td>750</td>
<td>1,580</td>
</tr>
</tbody>
</table>

Source: Human Resource Development of Innoson, Emenite and Alo: 2018

**DETERMINATION OF SAMPLE SIZE**

On the bases of the population which we considered to be relatively large, but finite, a sample size was obtained using [8] which states as follows:

\[ n = \frac{N}{1 + N(e)^2} \]

Where
- \( n \) = Sample Size
- \( N \) = Total Population = 1,580
- \( e \) = Margin of error at 5%
- \( l \) = Constant

Therefore substituting into the formulae we obtained:

\[ n = \frac{1580}{1 + 1580 (0.05)^2} \]
= 1580
4.95
∴ n = 319

Based on the above sample size n = 319, the need to proportionally allocate the sample size to the various organizations, we adopted Bowleys proportional allocation formulae [4].

This States are follows:
\[ \text{nhj} = \frac{n \times \text{Njh}}{N} \]

Where
\( \text{nhj} \) = Population sample Size
\( n \) = Total sample size
\( \text{Njh} \) = Proportional population size
\( N \) = Total Population size

Hence we have

Innoson:
\[
\frac{319(600)}{1,580} = \frac{191,400}{1,580} = 121
\]

Emenite:
\[
\frac{319(720)}{1,580} = \frac{229,680}{1,580} = 145
\]

Alo Aluminum:
\[
\frac{319(260)}{1,580} = \frac{82,940}{1,580} = 53
\]

Therefore 121 + 145 + 53 = 319

Instrument for Data Collection

The main instrument used for data collection was structured questionnaires.

DATA PRESENTATION, ANALYSIS AND TEST OF HYPOTHESES

Data Presentation

Data is presented here in Table 2 based on Administration and return of rate of questionnaire.

Table 2: Administration and return rate of questionnaires

<table>
<thead>
<tr>
<th>S/N</th>
<th>Organization</th>
<th>Copies of Questionnaire Administered</th>
<th>Copies of Questionnaire Returned and Valid</th>
<th>Copies of Questionnaire not Returned or Invalid</th>
<th>Total valid percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Innoson</td>
<td>121</td>
<td>120</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>2</td>
<td>Emenite</td>
<td>145</td>
<td>143</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>Alo</td>
<td>53</td>
<td>52</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>319</td>
<td>315</td>
<td>4</td>
<td>99</td>
</tr>
</tbody>
</table>

Source: Researchers’ computation, 2018

Based on Table 2 above a total of 319 copies of structured questionnaire were administered and a total of 315 copies were returned and valid while only 4 copies were either not returned or invalid. The valid copies accounts for 99 percent of administered copies. Therefore analysis was based on the valid copies returned.

ANALYSIS OF DATA

The analysis of data was based on data obtained from Objectives One and Two. Objective One: Assess the extent rapid technological changes affect the profitability of the manufacturing firms in Enugu State. Table 3 below shows data on questions relating to rapid technological changes and profit of the firms.
Table 3: Administration and return rate of questionnaires

<table>
<thead>
<tr>
<th>S/N</th>
<th>Organization</th>
<th>Respondents</th>
<th>A</th>
<th>SA</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Innoson</td>
<td>50</td>
<td>35</td>
<td>3</td>
<td>20</td>
<td>12</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>2.</td>
<td>Emenite</td>
<td>60</td>
<td>45</td>
<td>2</td>
<td>20</td>
<td>16</td>
<td></td>
<td>143</td>
</tr>
<tr>
<td>3.</td>
<td>Alo</td>
<td>300</td>
<td>15</td>
<td>5</td>
<td>2</td>
<td>-</td>
<td></td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>140</td>
<td>95</td>
<td>10</td>
<td>42</td>
<td>28</td>
<td></td>
<td>315</td>
</tr>
</tbody>
</table>

Source: Field Study, 2018

Table 3 above shows that out of 315 valid respondents 140 and 95 respectively agreed and strongly agreed that the trend in rapid change in technology have contributed significantly to the profit of their organizations. This accounts for about 75 percent of the total response on the accounts of 75%. It is significantly positive, while 42 and 28 respondents disagree or strongly disagree on the significant contribution to profit by the trend in rapid changes in technology. This is 22 percent of the total respondents of 315. 22 percent is on negative and insignificant. The undecided are only 10 that accounts for 3 percent of the 315 respondent. By these therefore it is obvious that the trend in technological changes and the ability of the organizations to adapt to these changes yields positive result in the profitability of the organizations.

Table 4: The trend in rapid changes in technology have induced branches expansion of our firm, hence increase in new employee being recruited.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Organization</th>
<th>Respondents</th>
<th>A</th>
<th>SA</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Innoson</td>
<td>60</td>
<td>38</td>
<td>-</td>
<td>20</td>
<td>2</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>2.</td>
<td>Emenite</td>
<td>78</td>
<td>28</td>
<td>7</td>
<td>18</td>
<td>12</td>
<td></td>
<td>143</td>
</tr>
<tr>
<td>3.</td>
<td>Alo</td>
<td>25</td>
<td>20</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td></td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>163</td>
<td>86</td>
<td>8</td>
<td>43</td>
<td>15</td>
<td></td>
<td>315</td>
</tr>
</tbody>
</table>

Source: Field Study, 2018

Table 4 above shows that out 315 valid respondents 163 and 86 agreed and strongly agreed respectively that the trend in rapid changes in technology have induced branches expansion of the their firms thereby increasing the employment of new workers. These respondents make for 249 out 315 of the total respondents accounting for 79 percent of the total respondents. 79 percent is a positive and significant response to the study. However, 43 and 15 respondents respectively disagree and strongly disagree on the issue that the trend in rapid changes in technology induced branch expansion in employment generation. These numbered 58 in total accounting for 18 percent of the total respondents of 315. This indicates an insignificant and negative responses. The undecided is only 89 respondents also accounting for 3 percent of 315 respondents. By these therefore it is obvious that the trend in the rapid changes on technology have induced branch expansion and employment generation in the manufacturing firms in Enugu State.

TEST OF HYPOTHESES

In order to support or negative the field findings based on the respondents a t-test statistic was employed to test the formulated hypothesis i.e. one and two. In doing so, data obtained from Table 3 and 4 were utilized. In both, we applied 5 point likert scale ranking the table in order of magnitude (the smallest were
ranked 1 while the highest was ranked 5 as indicated in Table 5 below.

Table 5: Showing ranking of respondents obtained from Table 3.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Score (x)</th>
<th>Frequency (f)</th>
<th>Fx</th>
<th>(x-x)²</th>
<th>F(x-x)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreed (A)</td>
<td>5</td>
<td>140</td>
<td>700</td>
<td>0.9409</td>
<td>470</td>
</tr>
<tr>
<td>Strongly Agreed (SA)</td>
<td>4</td>
<td>95</td>
<td>380</td>
<td>0.0009</td>
<td>0.0036</td>
</tr>
<tr>
<td>Undecided (UD)</td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>9.1809</td>
<td>9.18</td>
</tr>
<tr>
<td>Disagree (DA)</td>
<td>3</td>
<td>42</td>
<td>126</td>
<td>1.0609</td>
<td>3.18</td>
</tr>
<tr>
<td>Strongly Disagree (SDA)</td>
<td>2</td>
<td>28</td>
<td>56</td>
<td>4.1209</td>
<td>8.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>315</td>
<td>1272</td>
<td>25.30</td>
</tr>
</tbody>
</table>

Mean \( \bar{x} = \frac{\sum fx}{\sum f} = \frac{1272}{315} = 4.03 \)

Population mean (\( \mu \)) = \( \frac{1+2+3+4+5}{n-1} = \frac{15}{5} = 3.0 \)

Sample variance (S²) = \( \frac{\sum f(x_i - \bar{x})^2}{n-1} = \frac{25.30}{315-1} = \frac{25.30}{314} = 0.081 \)

Sample standard deviation (S) = \( \sqrt{0.081} = 0.28 \)

Formulating the null and alternate hypotheses. Ho: \( \mu \leq 3.0 \) (accept null hypothesis if the calculated value of t is less than or equal to critical value from t-distribution table. Otherwise reject it and accept the alternate hypothesis \( H_1; \mu > 3.0 \). Therefore calculating the value of t.

\[ t(n-1) = \frac{x - \mu}{s/\sqrt{n}} = \frac{4.03 - 3.0}{0.28/\sqrt{315}} = \frac{1.03}{0.28/\sqrt{315}} = 65.29 \]

Calculated value = 65.29

Decision: Since calculated value (65.2) critical value \( t(1.645) \) we therefore accept the alternate hypothesis which states that trend in rapid technological changes have significantly contributed to the profit of the firms, based on this we reject the null hypothesis. By this therefore the test of hypothesis one supports the field study. Where 75 percent of the respondents also affirmed the hypothesis one.
Table 6: Showing ranking of respondents obtained from Table 4.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Score (x)</th>
<th>Frequency (f)</th>
<th>F(x)</th>
<th>(x-x)²</th>
<th>F(x-x)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreed (A)</td>
<td>5</td>
<td>163</td>
<td>815</td>
<td>0.6241</td>
<td>3.1205</td>
</tr>
<tr>
<td>Strongly Agreed</td>
<td>4</td>
<td>86</td>
<td>344</td>
<td>0.0441</td>
<td>0.1764</td>
</tr>
<tr>
<td>Undecided (UD)</td>
<td>1</td>
<td>8</td>
<td>8</td>
<td>10.3041</td>
<td>10.3041</td>
</tr>
<tr>
<td>Disagree (DA)</td>
<td>3</td>
<td>43</td>
<td>129</td>
<td>1.4641</td>
<td>4.3923</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>2</td>
<td>15</td>
<td>30</td>
<td>4.8841</td>
<td>9.7682</td>
</tr>
</tbody>
</table>

\[ \text{Mean } \bar{X} = \frac{\sum fx}{\sum f} = \frac{1326}{315} = 4.21 \]

Population mean (\( \mu \)) = \[ \frac{1+2+3+4+5}{5} = \frac{15}{5} = 3.0 \]

Sample variance (S²) = \[ \frac{\sum f(x_i - \bar{x})^2}{n-1} = \frac{27.76}{315-1} = \frac{27.76}{314} = 0.09 \]

Sample standard deviation (S) = \( \sqrt{0.09} = 0.3 \)

Formulating the null and alternate hypotheses. Ho: \( \mu \leq 3.0 \) (accept null hypothesis if the calculated value of t is less than or equal to critical value from t-distribution table. Otherwise reject it and accept the alternate hypothesis \( H_1: \mu > 3.0 \). Therefore calculating the value of t.

\[ t(n-1) = \frac{x - \mu}{s} \sqrt{n} = \frac{4.21 - 3.0}{0.3} \sqrt{315} = 1.21 \]

Calculated value \( t = 71.58 \)

Critical value \( t(315)(0.05) = 1.645 \)

**Decision:** Since calculated value \( t(71.58) > \text{critical value } t(1.645) \). We reject the null hypothesis and accept the alternative hypothesis which states that trend in rapid technological changes have positive and significant effect on employment generation of manufacturing firms in Enugu State. This is also supported by the field study. Where 75 percent of the respondents also affirmed the hypothesis two.

**SUMMARY OF FINDINGS**

Here the summary of findings was based on the objectives

1. The study revealed that the trend in rapid technological change have positively and significantly
contributed to the profit of the manufacturing firms Enugu State. This was based on 75 percent of respondents agreeing to this. 75 percent is a positive sign. While hypothesis t-calculated 65.29 > critical value t(1.645).

2. The study also shows that the trend in rapid technological changes have positive and significant effect on employment generations of manufacturing first in Enugu State. This is also supported by 79 percent of the respondents which indicates positive responses and test of hypotheses at t-calculated 71.58 > critical value t(1.645).

CONCLUSION

Based on the findings therefore, we conclude that the trend in technological changes have positive and significant effect on the organizational performance of manufacturing firms in Enugu. This is based on the study of Innoson Nigeria Ltd; Emenite Nigeria Ltd. And AloAluminium Nigeria Ltd. Using only profits and employment generations as measures of performance.

RECOMMENDATION

1. There is need to encourage staff of manufacturing firms on the trend of technological changes through straining (local and/or oversea). This is to enable them keep abreast of new ways of doing things and forestall breakdown in production system that may in turn impede on the profits of the firms.

2. Interrupted production system ensure employment generation as new hands may be needed, this contributes to national development. Idle hands is said to be devil’s workshop. If crime must be reduced government must encourage manufacturing firms to do well in their various industry hence generation needed jobs for the teaming unemployed Nigerians.

REFERENCES


