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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 tcalculated 65.29 > critical value t-(1.645). Also trend in rapid technological changes have positive and significance 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 huge impact has 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 lack opportunities due to communication devices. Productions of goods and services in the world today have been greatly influenced by the physical application of systematic through forces different types technology. Technology in 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 work in specific manner.

ISSN: 2550-7931

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. [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 organization influences the quality and quantity of production of its goods or services. But despite this, technology is constant change prone to 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 undermine the contribution employees in managing technological change, the outcome of which are low profitability and performance. problem is that management cum employees may not be abreast and informed on the changes in the ever dynamic technological environment and thev may have not strategy effectively tackle this trend for increase 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 Therefore, task growth. the technological change in underdeveloped countries is difficult because the social set up in backward pre-industrial economies is not conducive technological improvements on any significant scale. The absence of proper technological change retards economic growth, reduces rate of profit

The inability of manufacturing firms to meet with the pace of technological changes leads to dropin revenue, profit and employment, hence contribution to national economic growth and development. justification therefore, is to create an integrated network of communication on the trend of changes in technology on daily basis for manufacturing firms.

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 the UDC's in (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 specialized technology software or 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 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 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 firms are required to register for the information with a tokenand 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 theworkers. The study is optimistic that choice to use these

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:

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

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.

 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 primary conducting business. The 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 be accommodated bv 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 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 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 services produced. goods and 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 emplovee. Technology, labour and are interconnected. capital 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. morale, lowered their productivity. conflict create that may 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. describes This he as reliability, affordability. maintenance. ease of leaving adaptability and tο From the foregoing it environment. entails that costs and suitability to productive system must be adhered to enable technology provide profit and employment for national development. REMELA 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 production within and outside the industry and it extends to customers, suppliers. vendors. research 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 nontechnical solution to their individual problems and organizational and efficiency increase their 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 must be seen to have performed.

In recent years, many organizations attempted have to manage their performance using the balanced methodology scorecard 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 Employee outreach); 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. development. technological technological achievement, 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 establish satellite offices 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 deprived of business previously opportunities lack due to communication devices. The other side coin is the international marketing of technology researched by Washington George 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 inspiration resource readiness for technology innovation. The motivation the individual receives determines the extent of its identity and readiness to innovate for national organizational and This development. 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 organization effectiveness and health. Both [10]; [11] demonstrated 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 represents manufacturing companies in State. Therefore Enugu a survev 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

Firms	Management	Production	Marketing	Total
Innoson	50	250	300	600
Emenite	70	300	350	720
Alo	20	140	100	260
Total	140	690	750	1,580

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%

1 = Constant

Therefore substituting into the formulae we obtained:

$$n = \frac{1580}{1 + 1580 (0.05)^2}$$

$$= 1580 4.95 \therefore \quad n = 319$$

Based on the above sample size n = 319 the need to proportionally allocate the sample size to the various organizations

based on the various population sizes, we adopted Bowleys proportional allocation formulae [4].

This States are follows:

 $\begin{array}{rcl}
 & n & Njh \\
 & N
\end{array}$

Where nhj = Population sample Size

n = Total sample size

Nhj = Proportional population size

N = Total Population size

Hence we have

319(600) 191,400 Innoson: 1,580 1,580 121 319(720) Emenite: 229,680 1,580 1,580 145 AloAluminum: 319(260) 82,940 1,580 1,580 53 Therefore 121 + 145 + 53319

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

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

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

	- 4 - 5 - 1 - 5 - 1 - 5 - 5 - 5 - 5 - 5 - 5							
S/N	Organization	Respondents					TOTAL	
		Α	SA	UD	DA	SDA		
1.	Innoson	50	35	3	20	12	120	
2.	Emenite	60	45	2	20	16	143	
3.	Alo	300	15	5	2	-	52	
	Total	140	95	10	42	28	315	

Source: Field Study, 2018

Table 3 above shows that out of 315 respondents 140 valid and respectively agreed and strongly agreed that the trend in rapid change in have contributed technology 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. is 22 percent of the total respondents of 315. 22 percent is on and insignificant. negative 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.

Objective Two: Determine the effect of rapid technological changes on employment generation of the manufacturing firms in Enugu State. Table 4 below shows data on question relating to rapid technological changes and employment generation of the firms.

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

S/N	Organization		Respondents				
		Α	SA	UD	DA	SDA	
1.	Innoson	60	38	-	20	2	120
2.	Emenite	78	28	7	18	12	143
3.	Alo	25	20	1	5	1	52
	Total	163	86	8	43	15	315

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 employment generation. 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 the manufacturing firms in Enugu State.

TEST OF HYPOTHESES

In order to support or negative the field findings based on the respondents a ttest 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.

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

Mean
$$\overline{X} = \frac{\Sigma fx}{\Sigma f} = \frac{1272}{315} = \underline{4.03}$$

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

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

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

Formulating the null and alternate hypotheses. Ho: ≤ 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 : μ > 3.0. Therefore calculating the value of t.

$$t(n-1) \quad \frac{x-\mu}{\frac{s}{\sqrt{n}}} = \frac{4.03-3.0}{\frac{0.28}{\sqrt{315}}}$$

$$= \frac{1.03}{\frac{0.28}{\sqrt{315}}} = \frac{1.03}{0.015776212} = 65.29$$

Calculated value = 65.29

Critical value t(315)(0.05) = 1.645

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 o	f resi	nondents	obtained	from	Table 4
Table 0.	DITOWITE	I GIINIII O	1 1 6 3	DOMECTICS	Obtailed	110111	I abic 4.

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Respondents	Score (x)	Frequency (f)	F(x)	$(x-x)^2$	$F(x-x)^2$				
Agreed (A)	5	163	815	0.6241	3.1205				
Strongly Agreed (SA)	4	86	344	0.0441	0.1764				
Undecided (UD)	1	8	8	10.3041	10.3041				
Disagree (DA)	3	43	129	1.4641	4.3923				
Strongly Disagree (SDA)	2	15	30	4.8841	9.7682				
		315	1326		27.76				

Mean
$$\overline{X} = \frac{\Sigma fx}{\Sigma f} = \frac{1326}{315} = \underline{4.21}$$

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

Sample variance (S²) =
$$\frac{\sum f(xi - \overline{x})^2}{n-1}$$

$$= \frac{27.76}{315 - 1} = \frac{27.76}{314} = \underline{0.09}$$

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

Formulating the null and alternate hypotheses. Ho: ≤ 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 : μ > 3.0. Therefore calculating the value of t.

$$t(n-1) \quad \frac{x-\mu}{\frac{s}{\sqrt{n}}} \quad = \quad \frac{4.21-3.0}{\frac{0.3}{\sqrt{315}}} \quad = \quad \frac{1.21}{0.016903085}$$

Calculated value t= 71.58

Critical value t(315)(0.05) = 1.645

Decision: Since calculated value t(71.58) > 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.

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