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THEORETICAL REVIEW OF MANUFACTURING RESEARCH AND INNOVATION: SOURCE OF A SOCIETY WITH AN UNCERTAIN FUTURE

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Abstract: *The objective of this paper is to do theoretically review of the manufacturing Research and innovation: our source of a society with an uncertain future. Production Transformations or Processes are classified into two: namely, services and industry. With services, no tangible end-products are produced. Services include transportation, communication, entertainment, art, consultancy, administration and education. In an industry, tangible end- products and bye-Products are produced. Examples include Extractive Industry, Generic Industry, processing Industry, Assembling, Bye-product, Waste Product, Integrated, and Construction Industries. Extractive Industry is one that brings about some sort of mechanical separation, leaching process or decantation, pisciculture, fishery including extraction of crabs, lobsters, from the high seas, marine products etc. Industry is one in which the raw material is from the mother earth but is subjected to chemical processes to get the products. There are three broad classifications via Analytical e.g. refining of Crude Petroleum to get fuel, gas, kerosene etc, synthetic and conditioning. Analytic means breaking down the material from the mother earth into simpler products. For example from the mother earth, we get crude oil which is located at different temperature (fractional distillation) to get different products. Petrol, for many machines uses, Kerosene for cooking and Diesel for powering many vehicles. Tar ((bitumen) is used in tarring road. Petroleum, kerosene, diesel and tar are the various products got from the fractional distillation of crude oil. In a synthetic Processing Industry, two or more materials are mixed together to get the end product. In the conditioning processing industry, the condition of the material is improved to get better products. A manufacturing industry is one in which a lot of labour in the form of mechanical work is to be put in to get the end product. Such classifications of manufacturing industry include primary, secondary, and tertiary manufacturing industries. The primary manufacturing industry is the first step of transforming by way of excessive labour. Examples of primary manufacturing includes, iron and steel industry (Blast furnace) and Foundry. In Manufacturing Research there is another search or a cursory look on a manufacturing phenomenon of interest since Innovation is a new way of doing things. Uncertainty means that one is not sure of the outcomes form the various events.*

Keywords: *Theoretical Review, Manufacturing Research, Innovation, Society, Uncertain Future*

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INTRODUCTION

The primary manufacturing industry is the first step of transforming by way of excessive labour. Examples of primary manufacturing industry include iron and steel industry (Blast Furnace), and Foundry. Iron ore provides iron, (Fe_3O_4 or Fe_2O_3). Limestone is a refining agent. It refines iron at high temperature. There are usually two undesirable elements, sulphur and phosphorus whose percentages have to be reduced. Limestone reacts with these elements to form scum or slag, coke gives the energy (heat and temperature). This reaction occurs at the temperature of 1800^0C before the liquid metal is got. This liquid collects in trough and it (pig iron) is allowed to solidify (Unyimadu, 2007). Steel plant is the model of manufacturing industry. In a steel plat model type of manufacturing ore world of usage such as:

- *Casting* takes the container. Iron ore must be heated to a high temperature, so it melts to a liquid and is poured in the container and allowed to solidify (Agbadudu, 2007).
- *Forging* is blacksmithing. The material is heated to a high temperature until it becomes plastic and hammered to the shape required. All types of machining involve removal of extra material by a cutting tool. The rolling mill of Aladja steel plant is at Jos. This is a political consideration but has the advantage of diversification. Finishing operation may or may not be required but adds to the quality of the product. Aesthetics must be considered as it must be appealing to the customer. So it must have a very nice surface finish (Banjoki, 2007).
- *Protection* – This is an increase in the physical life. The basic disease of steel is rusting (a process of oxidation) – coating. Corrosion is slightly different from rusting. Rusting is oxidization while corrosion is anodisation or a wearing away process because of exposure to water. To guard against this, the industry must provide coating through electroplating conditioning improves the life. With the heated or treatment of the material it becomes harder and tougher. It increases the hardness so they won't wear away, and increases the toughness, so they won't break (Unyimadu, 2007).
- *Assembling*: Here all the items are imported and just assembled. Examples will include, the volkswagen. The Bye-product can be sold as such or sent to another

industry for processing where it is called a bye-product industry. There are no wastes these days of recycling and re-usage, integrated – series – parallel system e.g. Integrated Steel Construction Industry – end are roads, buildings, bridges, etc (Banjoko, 2007).

In research of the nature, the steps of linear description of the Research Process is need to discuss as it include problem definition, development of the research approach, development of fieldwork and data collection, data preparation and analysis and report preparation and presentation. The process culminates on the method to go about solving the problem called method, have to gather the data, prepare it, analyse and interpret it and write and present the report of findings (Asika, 2009). Once again, the objective of this paper is to do a Theoretical Review of Manufacturing Research and Innovation. Our source of a society with an uncertain future.

HISTORY OF MANUFACTURING MANAGEMENT

According to Skinner (1985), there are five periods of industrial history that stand in the development of manufacturing management. The periods are as following:

1780 – 1850 Manufacturing leaders as technology capitalists.

1850 – 1890 Manufacturing leaders as architects of mass production.

1890 – 1920 Manufacturing management moves down in the organization

1920 – 1960 Manufacturing management refines its skills in controlling and stabilizing

1960 – 1980 Shaking the foundation of industrial management.

During the early years of the industrial Revolution, production began to shift from low-volume activity to larger-scale operations. Although the scale of these early operations was large, the machinery was not particularly complex and production operations were rigid. The management of these operations remained essentially in the hands of top management with the aid of overseers. Working considerations during this period were often abysmal. The major trust of the industrial Revolution took place in the second 40-year period from 1850 – 1890. During this period, the concepts of mass production and the assembly line were born. Since coal could be efficiently transported, plants could be located in a larger variety of locations. The plant foreman had enormous power and influence during this period (Unyimadu and Ugwu, 2008).

According to Skimmer, the job of production manager actually came into being in the period 1890 – 1920. Manufacturing processes became too complex to be handled by top-management personnel any longer. With this complexity came the need for scientific management techniques. Frederick Taylor (often called the father of industrial engineering) is generally credited with being the originator of the concept of scientific management. Most of the scientific management techniques introduced around the turn of the century involved merely breaking a task down into its various components. These techniques are probably less scientific than just orderly. With the new levels of complexity, the single plant foreman could no longer coordinate the demands of producing a varied product line and changing production schedules. The age of the specialist was upon as (Nahmias, 2001).

The enormous worldwide depression that took place in the 1930s notwithstanding, in many ways the period 1920 – 1960 can be considered a golden age for the development of industry, in the United States. By 1960, the United States was preeminent economic power in the world. With the growth of the labour movement, working conditions had improved enormously. True scientific methods started finding their way in to the factory. Mathematical models for learning, inventory control, quality control, production scheduling, and project management gained acceptance by the user community. Top management often came through the ranks of production professionals during this period (Skimmer, 1985).

Since 1960, many American companies have relinquished their domination of certain markets. Products that were traditionally produced in the United States are now imported from Germany, Japan, and the Far East. Many products are produced more cheaply and with higher quality overseas. Furthermore, management-employee relations are often better in foreign companies. Quality circles introduced in Japan, allowed employees to input opinions about product development and production procedures. Far more sophisticated scientific production methods have been adopted in Japan than in other countries. For example, there are many more robots and modern flexible manufacturing systems in Japan than in United States (Nahmias, 2001).

MANUFACTURING MATTERS

A question that is being debuted and has been debuted by economists for the past 20 years is the importance of a strong manufacturing base. The decline of manufacturing

domestically has led to a shift in jobs from the manufacturing sector to the service sector. Because there are major disparities in labor costs in different parts of the world, there are strong incentives for American firms to locate volume manufacturing facilities overseas to reduce labour costs. Is a strong manufacturing have important for the health of the economy? (Skimmer, 1986).

There is no question that a larger portion of manufactured goods come from over-seas. Skimmer (1986), using Department of Commerce data, show that from the period 1972 to 1986 imports in eight major industries increased significantly as a percentage of the total U.S. market and exports in these same industries decreased significantly. (The industries are automobiles, chemicals, aircraft, consumer electronics, machine tools, semiconductors (including computers and office equipment), steel, and textiles). This shows that manufacturing in these industries moved offshore at a rapid pace. Is this a cause for concern? (Nahmias, 2001).

An argument put forth by several scholars (e.g. Daniel Bell) is that we are simply evolving from an industrial to a service economy. In this view, the three stages of economic revolution are (1) agrarian, (2) industrial, and (3) service. In the early years of our country, we were primarily an agrarian economy. With the industrial revolution, a large portion of the labour force shifted from agriculture to manufacturing. In recent years it seems that there is less interest in manufacturing. These scholars would argue that we are merely entering the third stage of the revolutionary process moving from an industrial economy to a service economy. It is comforting to think that the American economy is healthy and simply evolving from an industrial to a service economy. (Skimmer 1986).

Based on U.S. Department of Commercial data, agriculture has sustained, over the long term, the highest rate of productivity increase of any sector. By utilizing new technologies, agriculture has been able to sustain growth while communing fewer labour hours. Hence, the figures simply do not bear out the argument that our economy has shifted from an agricultural one to an industrial one. The argument that the economy is undergoing natural stages of evolution is simply not borne out by the facts. It is believed that all sectors of the economy – agricultural, manufacturing, and service – are important and that domestic economic well-being depends upon properly linking the activities of these sectors (Skimmer, 1986).

The return on innovations will be lost if new products are abandoned after development. The payoff for R & D can come only when the product is produced and sold. If manufacturing is taken offshore, then the rent on innovation cannot be recaptured. Furthermore, manufacturing naturally leads to innovation. It will be difficult for the United States to retain its position as a leader in innovation if it loses its position as a leader in manufacturing. That manufacturing naturally leads to innovation is perhaps best illustrated by the Japanese experience in the video market. After Japan had captured the lion's share of the world market for television, the next major innovation in consumer video technology, the video cassette recorder, was developed in Japan, not the United States. Virtually all VCRs solid today are manufactured in Asia. It is difficult to support the argument that we can shift easily from an industrial economy to a service economy. Many services exist to support manufacturing. If manufacturing activities shift to foreign soil, it is likely that the services that complement manufacturing will suffer (Nahmias, 2001).

THE CLASSICAL VIEW OF OPERATIONS STRATEGY

The traditional view of manufacturing strategy was put forward by Wickham Skimmer of the Harvard Business School and enhanced by several researchers, mostly from Harvard as well. The traditional view treats most strategic issues in the context of a single plant rather than the entire firm. While the classical view might be considered a bit old-fashioned, the issues are still important and relevant. Classical operations strategy thinking relates to the issues; as: (1) Time horizon (2) Focus (3) Evaluation (4) Consistency (Nahmias, 2001).

TIME HORIZON

Time horizon refers to the length of time required for the strategy to have an effect. A natural classification here is to separate decisions into short, medium, and long-range decisions. Short-term operations decisions may have an impact that can be measured in days or even hours. These include decisions regarding purchasing, production and personnel scheduling, policies for control of quality and maintenance functions, short-term inventory control issues, production schedules, and so forth. It is short-term decisions of this type that concern the operations mange, and they are the primary focus of this text (Nahmias, 2001).

Time horizons affect the impact of decisions, the uncertainties surrounding those decisions. Short time horizons involve many decisions, each of whose impact may be small, but

cumulatively make a difference. For example, managers at The Cap stores restock shelves every day. The manger phones orders into the DC (distribution center) that generally are delivered the following day (assuming the DC is in stock on requested items). The manager relies on sales data and personal judgment to select the mix of items to reorder. Mistakes mean that items may out of stock, resulting in lost sales and irate customers, or not sell, resulting in wasted shelf space (Unyimadu and Ugwu, 2008).

FOCUS

The notion of focus in manufacturing strategy was first considered by Skimmer (1986). He defined the five key characteristics of the focus factory as follows:

1) *Process technologies:* A natural means of focusing the operations of one plant of factory is by the process employed. Management should limit new unproven process technologies to one per factory and keep the number of different nature process technologies to a level that the plant manager can oversee efficiently.
2) *Market demands:* The marketplace often determines the focus of a product or line of products produced at a factory. Typical areas in which the market dictates plant focus are
   (i) *Price:* There is evidence that he American consumer is more price conscious than many overseas consumers. Price has always been a key product differentiation factor in the United States.
   (ii) *Lead time:* Products not protected y patents must be produced and distributed quickly in order to reach the market place before those of competitors.
   (iii) *Reliability:* Reliability specifications differ by market segment, often for identical products. As an example, consider a company producing a line of integrated circuits that are sold toa variety of different customers. One uses them in refrigerators and another in heart-lung machines. The reliability specifications are likely to be for greater for the heart-lung machine.
3) *Product volumes:* The production volumes within a single plant should be similar so that plant tooling, materials-handling systems, and production lines are neither under-nor over utilized.

4) *Quality level:* The level of quality of products produced in a single plant should be similar so that the firm can establish a consistent quality control standard. Quality standards are the result of several factors the statistical control techniques used, the monitoring procedures, and the workers' training, procedures, and attitudes.
5) *Manufacturing tasks:* The productivity of a plant producing a broad line of different products will suffer from disruptions that result from frequent setups and restructuring of the production lines. When management limits the number of distinct manufacturing tasks at one location, workers can concentrate on perfecting existing processes (Unyimadu and Ugwu (2008).

It should be noted that many firms successfully serve several diverse markets simultaneously. One example is Yamaha. Yamaha has established itself as a high-quality manufacturer of products as diverse as stereo equipment, musical instruments (including hand instruments, pianos, and digital synthesizers), and sports equipment. However, focused factories are certainly preferred even for firms that have a broad product line (Nahmias, 2001).

EVALUATION

There are several dimensions along which one can evaluate production/operations strategy. Here are the most significant:

1) *Cost:* Where pricing is a key to market differentiation and competiveness, a major means of strategy evaluation is the most of products delivered to the customer. Direct costs of production include costs of materials, equipment, and labour. Costs of distribution involve inventory carrying costs, particularly inventory in the pipeline, transportation, and distribution costs. Cost of plant and process overhead also must be factored into the cost calculation. Overhead costs of new processes may be the most difficult to evaluate because of the uncertainties of both the process reliability and the useful lifetime (Skimmer, 1986).
2) *Quality:* In markets where product quality is a major determinant of product success in the marketplace, or high reliability is required to meet product specifications, strategy should be evaluated along the quality dimension. For example, product quality is the primary means of evaluating manufacturing performance in Japan (Nathmias, 2001).

3) *Profitability:* Ultimately, it is the profitability of a product line that determines the sues of the strategy undertaken to produce and to sell it. However, as noted above, short-term profit maximization could be a poor strategy for the firm if it entails reductions in the involvement in new capacity and technology. If the time horizon associated with the evaluation of any particular strategy is not correct, top management could be making poor decisions. (Unyimadu and Ugwu, 2008).
4) *Customer satisfaction:* Successful firms have come to realize that ultimate success is achieved only by maintaining a satisfied and loyal customer base. This means that the customer must not only be satisfied with a product when purchased, but must have confidence that the firm will stand behind its guarantees by supplying efficient and cost-effective service after a sale is made. (Nahmias, 2001).

CONSISTENCY

It is often the case that rather than having a single consistent strategy for manufacturing, the strategy is simply the composite of all company policies that affect manufacturing. Personnel and wage policies should be designed to encourage efficiency and improve productivity. Inventory control, scheduling, and production plans are geared toward minimizing production costs and improving measures such as worker idle time, work-in-process inventory, and production lead times. Process design is geared toward producing high-quality products. The problem is that each of these individual goals may be optimizing a different objective. (Nahmias, 2001).

Skimmer (1986) cities a number of causes for the common inconsistencies that are observed in most firms. These include the following:

1) *Professionalism in the plant:* The number of different job titles and job functions has increased while the scope of many of these jobs has narrowed. Professionals in different areas have a stake in making themselves look god, and hence seek to maximize their personal contributions
2) *Product Proliferation:* As the number of distinct products grows, retaining a consistent set of goals within the plant is more different. Skimmer (1986) opined, why do firms increase the size of the product line produced at one plant is more difficult. Why do firms increase the size of the product line produced at one plant? Avoid capture to conclusion that, one sure way of decreasing the investment in new

capacity is imply to produce new products in old plants, meaning reducing overhead in management point of view, though but, could also result in poor quality and inefficient production control.

STRATEGIC INITIATIVES

Reengineering the Business Process

Seemingly on schedule, every few years a hot new production control method or management technique comes along, almost always described by a three-word acronym. While it is easy to be skeptical, by and large, the methods are sound and can have substantial value to corporations when implemented intelligently. Business process reengineering (BPR) caught on after the publications of the book by Hammer and Champy (1993). BPR I not a specific technique, such as MRP, or a production-planning concept like JIT. Rather, it is the idea that entrenched business processes can be changed and can be improved. The process is one of questioning why things are done a certain way, and not accepting the answer, because that's the way we do it (Nahmias, 2001).

Just-in-Time

Just-in-time (JIT) is a manufacturing process on one hand and a broad-based operations strategy on the other. However, JIT (or lean production, as it is also known) is a philosophy that includes treatment of inventory in the plant, relationships with suppliers, and distribution strategies. The core of the philosophy is to eliminate waste. This is accomplished by efficient scheduling of incoming orders. Work-in-process inventories, and finished goods inventories (Unyimadu and Ugwu, 2008).

JIT is an outgrowth of the kanban system introduced by Toyota. Kanban is a Japanese word meaning card or ticket. Originally, kanban cards were the only means of implementing JIT. The kanban system was introduced by Toyota to reduce excess work-in-process (WIP) inventories. Today, JI is more ambitious. Both quality control systems and relationships with suppliers are part of an integrated JIT system. JIT systems can be implemented in ways other than using kanban cards. Integrating JIT philosophies with sophisticated information systems makes information transfer faster. (Nahmias, 2001).

Time-Based Competition

Professor Terry Hill of the London School of Business has proposed an interesting way to look at competitive factors. He classifies them into two tpes: qualifiers and order winners.

A product not possessing a qualifying factor is eliminated from consideration. The order winner is the factor that determines who gets the sale among the field of qualifiers. Two factors about which we hear a great deal are quality and time to market. In the past decade, the Japanese and Germans gained a loyal following among U.S. consumers by producing quality products. American firms are catching up on the quality dimension. It is seen that successful U.S.-based companies have been able to produce products that match the defect rates of foreign competitors (Skinner, 1986)

Introduction to Social Research

Plant (2006) is a book about the sociology of the social research process. Most books about the social research process are textbooks on method. The social history of Plant (2006) is told in the appendix; here its intellectual background is relevant. The research experience of the author, conversant with other people about theirs and the reading of methodological appendices all showed that there are practical social contingencies in the doing of empirical research that have consequences for its progress and outcome. Everyone who has done any research knows this already, but somehow it has generally stayed at the level of gossip, anecdote and the folklore f research units. Perhaps this may be partially explained by the feeling that such divergences from the normative philosophical picture of pure scientific method should not be publicly admitted; perhaps also there is a more respectable feeling that it is intellectually parochial to study oneself. The comment on such attitudes, would be firstly that there is no reason to assume that social research is ethnographically less interesting, or theoretically less relevant, than other work situations, and, secondly, that in so far as methodological norms are valued there is a special need to study the circumstances that make it easy or difficult to follow them.

What has been attempted in this study is a detailed empirical investigation of the nature of the process of doing social research, it causes and its consequences. The purpose is threefold: to satisfy a simple ethnographic curiosity; to provide data and suggest interpretations that may help to advance theory in such areas as the sociology of work and of education; and to suggest sociologically realistic prescriptions for the conduct of successful research which may supplement the usual methods-textbook formulae, which tend to ignore the social factors in research (Jackson and Marsden, 2002).

The social weakness of the study reported here is that it has very little to say about the character and quality of the publications of the social researchers whose work was investigated; in a sense the dependent variable is missing. There are practical reasons for this. One of them is that some of the projects studied have not yet reached publication, and a few of them never will. Another is that to have given proper attention to the publications two would been to embark on a whole separate study, and would have taken very much longer. A third is that one of the main points of interest of such a study would have been to judge the intellectual success of the works, in order relate this to the manner in which they had been done, and to devise an acceptable criterion of success that represented more than personal judgement would be a task of enormous difficult. These difficulties have been skirted b discussing results only in terms of whether research was completed at all, whether it was completed on time, and whether it reached publication in some form or not. The main focus, however, is n process rather than product; more as Platt (2006) regret the omissions, they must be justified by the need to focus on a manageable problem area. If this line of research were to be developed further, it is very much to be hoped that it might prove possible to find ways of kinking the research process with the nature of its eventual product; there are a variety of interesting lines along which publications might be classified (Pugh, 2002).

An Era of Transformation

Given the perspective of how opportunities emerge, it is important to recognize that we are now in an era of transformation. Only a few years ago, entrepreneurship was a vague term occasionally used to explain bursts of economic activity. Today, the popular term entrepreneur occurs in television commercials, corporate annual reports, and political speeches. This transformation has had serious implications for business education and the way in which success is defined in the minds of young adults (Holt, 2006).

Before World War II, young people defined success in terms of decent job with reasonable wages. After the war, they defined success as having corporate careers. During the past few years, more youthful graduates have been intrigued with independent business ventures. The average age of entrepreneurs who start new ventures is dropping, with more people in their 20s taking the entrepreneurial plunge. This trend is strongly evidenced by the extraordinary growth of the Association of Collegiate Entrepreneurs (AC), founded in

1984 by a group of university students in a Boston pizza parlor. By 1991, ACE had attracted nearly 4,000 college students and more than 600 successful entrepreneurs still in their early 20s. The association has also established an honour roll called the ACE 100, representing millionaire members who, in order to qualify, must have at least $2 million in annual sales and still be under 30 years of age; those at the top, however, have extraordinary sales (Drucker, 2001).

As we move toward the 21st century, it will be younger people who provide inspiration and innovation leadership. They are the entrepreneurs who will transform society. Just as in centuries past, in the 21st century is will be young entrepreneurs who determine the cadence for change (Tunsi, 2006).

The State of Infrastructural Factilites, and Operationsal Efficinecy of Manufacturing Industries in Kano Metroplis, Nigeria

The manufacturing sector of any economy plays a pivotal role in its developmental process. However, inspite of Federal Government of Nigeria's efforts to revitalize the sector, its growth has rather been on the decline; a situation that is considered worrisome and worthy of attention. There is a presumption that an improved business environment would most probably ginger the existing entrepreneurs to continue to invest and grow. Therefore, a good business environment would most likely attract investment which is pertinent to economic growth and development (Bamidele and Abubakar, 2019).

Organizational literature distinguishes between internal and external environments. Internal environment specifically focuses on the internal structure, culture and process of the enterprise; include organizational structure, managerial practices, incentive systems, friendly relationships and other organizational idiosyncrasies. However, it was noted that the external environment focuses on issues and conditions general outside the enterprise, some of which are beyond the control of the entrepreneur. These include government regulatory policies and bureaucratic practices, infrastructures, availability of operational resources such as finance, labour, machinery and raw materials, and the political climate. This research has attempted to probe into one aspect of the external factors i.e. infrastructures. Specifically, it is an investigation of how availability or otherwise of infrastructures has affected the operations of the manufacturing concerns in Kano metropolis (Uzowulu 2006).

Amongst the variety of problems facing the Nigeria's manufacturing industries are declining capacity utilization, the epileptic nature of power supply, lack of good road network, the near compete absence o rail services for the movement of raw materials and finished goods, irregular water supply, the dangerous nature of air travel and so on. There are some of the myriad of problems bedeviling the real sector, and the manufacturing industry in Kano is not an exception. If anything, its situation is not probably worse with more than half not being able cope with the dearth of infrastructural facilities (Dimowo, 2008).

For the manufacturing industries in Kano to survive and operate at optimal level given these deficiencies, it becomes pertinent to explore ways to overcome these obstacles to industrial growth and development. Remarkably, Nigeria has witnessed a consistent decline in productivity within the industrial sector. Capacity utilization, a measure of the intensity with which industries use ther production capacity has consistently been on the decline. Wherever there is human activity, it is reasonably assumed that there will be consumption, that is, the final use of goods and services to provide the required utility. Depending on the decision of any society on whether to product or not (which is largely based on such factors as availability of raw materials, the state of infrastructure, technological know-how, cost of effectiveness, developmental urge, and so on), consumption can largely be satisfied through two means i.e. either though production/manufacturing or by importing or buying those goods and or services from countries or other entities that engage in tier manufacture (Anyanwu et al, 2008).

In the 1970s and 1980s Kano had over 500 manufacturing firms in diversified industries, many of which operate on a very large scale but in some cases, they were subsidiaries of multinational corporations. However, as at 2006 there were no fewer than 120 manufacturing companies in Kano that are operating at less than 40% of their installed capacity. A very recently held informal interview with notable officials of Kano Chamber of Commerce Industry Mines and Agriculture (KACCIMA) revealed that well over 70 percent of about 2,000 of its members engaged in industrial production have for a long time shut down their plants while a fairly good proportion of those yet in business are comatose (Bamidele and Abubakar, 2009).

CONCLUSION

Production Transforms or Processes were classified into two aspects namely services and industry. With services no tangible end-products were produced. Services included

transportation, communication, entertainment, art, consultancy, administration and education. In an industry, tangible end-products and bye-products were produced. Examples include Extractive Industry, Generic Industry, Processing Industry, Assembling, Bye-product, Waste Product, Integrated and Construction Industries. Extractive Industry was one that brings about some sort of mechanical separation, leaching process or decantation, pisciculture, fishery including extraction of crabs, lobsters, from the high seas, marine products etc. Generic Industry was one that came from the mother earth but a lot of effort and time are required under the sun. Crops need attention. A pearl was a synthetic product but was now activated. Processing Industry was one in which the raw material is from the mother earth but is subjected to chemical processes to get the products. There were three broad classifications via Analytical e.g. refining of Crude Petroleum to get fuel, gas, kerosene etc, synthetic and conditioning. Analytic means breaking down the material from the mother earth into simpler products. For example from the mother earth, we got crude oil which was heated at different temperature (fractional distillation) to get different products. Petrol was the highest liquid and was an important chemical in many industries. Kerosene was used for cooking. Diesel was used in powering many vehicles. Tar (bitumen) was used in tarring roads, Petroleum, kerosene, diesel and tar were the various products got from the fractional distillation of crude oil. In a synthetic Processing Industry, two or more materials are mixed together to get the end product. For example three primary colours were blue, red and yellow. Secondary colours were got by mixing the primary colours in some proportions. Soda and fatty oils, fertilizers consisting of calcium, ammonium and nitrogen, cement, cosmetics, animal feeds were examples of mixtures. In the conditioning processing industry, the condition of the material was improved to get better products. For example, lumber is conditioned to get furniture; hide was conditioned through training to get leather. Manufacturing was an industry which was the most important as about 80% of the industries fall into this category. A manufacturing industry was one in which lot of labour in the form of mechanical work is to be put in to get the end product. Sub classifications of manufacturing industry include primary, secondary and tertiary manufacturing industries. The primary manufacturing industry was the first step of transforming by way of excessive labour. Examples of primary manufacturing including iron and steel industry (Blast furnace) and Foundry. In the Ajaokuta or Aladja Steel

Plants in Nigeria, the raw materials were iron ore, limestone and coke, the transform is a blast furnace and the end product was big iron. In Manufacturing Research there is another search or a cursory or careful look was taken on a manufacturing phenomenon of interest. Innovation was a new way of doing things. Uncertainty means that one was not sure of the outcomes form the various events. The objective of the paper was to do a Theoretical Review of Manufacturing Research Innovation: Our Source of a Society with an Uncertain Future.

Skinner gave five periods for the development of manufactory management to include 1750–1850 when manufacturing leaders ere technology capitalists, 1850 – 1890 when manufacturing leaders ere Architects of Mass Production, 1890 – 1920 when manufacturing management moved down in the organization and 1920 – 1960 when manufacturing stock is the Foundations of Industrial Management. From 1980 till date manufacturing has matured to have computer aided manufacturing and design. Today manufacturing has mattered so much that the World Bank now had a Development Indication like % contribution of Manufacturing, Industry excluding manufacturing and service to be Cross Domestic Product.

Nigeria outperformed the Group of 7 Industrialized countries in only 2 out of Five Development Indicators while South Africa outperformed in 2 and equaled them in one. So South Africa is regarded as an Emerging Economy, whose lessons should be emulated while Nigeria has not been. In the strategic initiatives, the Re-engineering, the Business process, just-in-Time Product and Time-Based Competition were handled among the myriad of infrastructural problems militating against manufacturing process in Nigeria.

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