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Engineering Businesses as A Panacea For Sustainable Industrial Development In Nigeria

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ABSTRACT:

The paper focused on the roles of engineering businesses as the basis for sustainable industrial development in Nigeria. A content analysis of the literature of engineering businesses and the three major operating functions of engineering businesses. The study provides also a systematic review of the engineering organization roles as well as sustainable industrial development. It is therefore concluded that engineering businesses operations lead to sustainable industrial development in Nigeria. Generally, we found that engineering businesses should be properly organized and administered so as to improve on the standard of engineering business in Nigeria for sustainable employment generation and improved rural and urban livelihood.

Keywords: Engineering, Businesses, sustainable development,industry, Industrial development.

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1. INTRODUCTION

Engineering businesses over time, the creation and development of new products, processes and substitution of new and cheaper materials in an existing product or service, better ways of marking or distribution of products and services [1],[2]. The three major operating functions of almost all engineering businesses are marketing, engineering and manufacturing. These functions are geared towards improving the existing methods of production and ensuring that the best possible methods are used on new productions, so as to satisfy customers maximally from the engineering businesses [3].

Structurally, industrial development consists of continuous generation and exploitation of series of technological innovations over time leading to engineering businesses. Industrial development has always been seen as the main engine for economic growth due to its large economic multiplier and technological opportunities. However, engineering businesses are in the construction and manufacturing sectors directly and indirectly responsible for a large share of overall environmental and economical pressures raising the concerns of economic sustainability of developing countries like Nigeria.

The achievement of sustainable industrial development in developing countries is one of the main objectives of an integration strategy in the domain of industrial policy. Interestingly, industry has already made considerable efforts in the overall economic development of developing and developed countries. That calls for an integrated approach to sustainable industrial development involving engineering businesses.

Arising from the background of the study, there is the need for a systematic review on the following areas including the conceptual issues of engineering businesses, the roles of responsible entrepreneurship and sustainable industrial development.

The role of engineering business for achieving sustainable industrial development in Nigeria.

2. CONCEPTUAL ISSUES:

Engineering Businesses

Engineering businesses are legally recognized businesses mainly concerned with engineering, manufacturing and marketing services which virtually contributes to the sustainable industrial development of any developing and developed countries. Engineering businesses are technologically innovated businesses with industrial production motives [5].
According to [6], engineering businesses are recognized industrial outfit with technologicalinnovations to create or produce new product/ service adding value to an existing products or services to satisfy clients needs as well as to run it profitably.
Engineering includes a wide variety of activities including engineering projects ranging from construction of huge dams to the design of tiny electronic circuits. Engineering businesses may help produce guided missiles, industrial Robots or artificial limbs or crutches for the physically handicapped. They developed complex scientific equipment to explore the reach of outer space and the depths of the ocean. They also plan electric power and water supply systems and do research to improve automobiles, television sets and other hospital consumables and consumer products.

Engineering Business Functions

The three major operating functions of almost all engineering businesses are marketing, engineering and manufacturing department.
Marketing of engineering businesses includes market research, product planning, sales promotion, advertising and direct sales contact with the customers.
Whereas engineering section of the business includes research, development, new product design and old product improvement to meet the needs of the customer.
While, manufacturing unit of engineering businesses consists of planning, ordering, scheduling, purchasing, fabricating, assembling and controlling the quality of the product to be delivered to the customer.
In order to fulfil the engineering charter of innovating, developing and designing saleable products and services at the required price and reliability. The engineering function should be structured so that the task for each of its activities can be made. If the enterprise is of sufficient size to require the full scope of engineering efforts, organizational units can be established to be responsible for each activity.

Engineering Business Organization:

Engineering business organization has six main operating units as shown in the chart below.

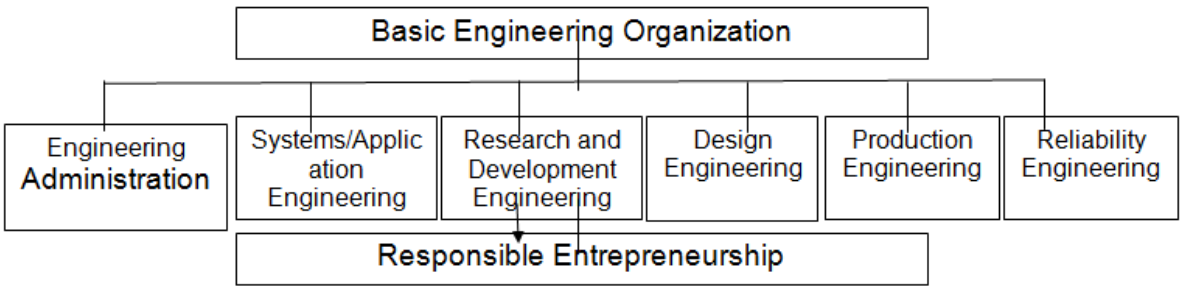

Figure 1: Basic Engineering Business Organization

a) Engineering Administration

Engineering administration also serves as the overall control unit which is responsible for engineering administrative matters including overall engineering manpower and indirect expenses forecasts and budgets, internal systems and procedures, personnel development, wage and salary administration, office facilities and Organizational planning, engineering standards, engineering reproduction services; blueprint and configuration control and engineering drawing release and status.
In the nutshell, engineering administration entails the efficient and effective planning, controlling and co-ordination of the standard utilization of both personnel and equipment for optimal productivity of the engineering business outfit.

b) Systems and/or Application Engineering

This is responsible for the establishment and application of overall systems specification to meet customer systems requirements or for application of company products to existing customer systems or products.

c) Research and Development Engineering

The unit is solely responsible for systematic research into basic scientific principles and concepts which may be applied to company products and the determination of the technical feasibility of such principles systems, concepts through production and development laboratory of a spring board improvement.

d) Design Engineering

This kind of the engineering unit is purely responsible for the reduction of the practice of development samples including standardized process and testing specifications, material specifications, part specifications and standardized module and assembling designs and drawings, design and drafting of specialized products outside the standardized line of the operating unit.

e) Production Engineering

Basically, Production Engineering is responsible for production and issuance of drawings, parts lists, and instructions to the manufacturing organization for the fabrication and assembly of products ordered by the customer, liaison engineering with the manufacturing, fabrication, assembly and testing organizations, and value and productivity engineering and cost reduction. According to Drucker [4] Entrepreneurs are innovators who create wealth out of innovation. In essence engineering business owners are technologically innovation oriented.

f) Reliability Engineering

This unit of the basic engineering business organization is responsible for development of reliable standards, determination of product reliability through in-house tests, quality control reports, field experience,determination of component part, sub-assembly reliabilities, and review of products design to assure maintenance of established reliability requirements.

3. RESPONSIBLE ENTREPRENEURSHIP

The basic six operating units of engineering business organization certainly integrated into a full action of responsible entrepreneurship which generates to sustainable industrial development.

Responsible Entrepreneurship therefore encapsulates the application of all responsible and integration strategy towards industrialization of a nation.

According to Stigler [7] industries are corporate entrepreneurs to identify and conduct technological oriented business.

The concept of responsible entrepreneurship forwarded by the united Nations as recognition of the business role for the accomplishment of sustainable development, means that companies can manage their operations in such a way as to enhance economic growth and increase competitiveness whilst ensuring environmental protection and promoting responsibility. Infact, major improvements in environmental performance have already been made by industrial companies and business in general.

4. SUSTAINABLE INDUSTRIAL DEVELOPMENT

Sustainable industrial development entails the considerable efforts in the environmental field, achievement of sustainable industrial development will require further substantial improvements in all three pillars including its environmental performance. Sustainable development in industrial policy thereby promoting environmental protection, competitiveness, innovation and employment. In the long term, sustainable industrial development can only be achieved through the integration of all three pillars of sustainable development-economic, environmental and social.

5. THE ROLE OF ENGINEERING BUSINESSES FOR ACHIEVING SUSTAINABLE INDUSTRIAL DEVELOPMENT IN NIGERIA.

The drive to industrialization in Nigeria cannot be over-emphasized. Engineers and Technicians/Technologists and that of entrepreneurs who are the power houses that drive the industrialization process. The efficiency and effectiveness with which the transformation occurs depends on the skill of the technical personnel who must in addition to others, cope with the following function and roles.

i. Continuous generation and exploitation of series of technological innovations over time, will create and develop new products, processes and substitution of new and cheaper materials, in an existing product or services, better ways of distributing products and services.
ii. Operate sophisticated machines as well as maintaining them efficiently.
iii. Determine the methods, trend, scale and rates of industrialization
iv. Organize the scale of output or production.
v. Engage in complex procurement activities in order to assemble what are often sources of materials necessary to have a product.
vi. Organize production, bringing together the factors of production to make goods and services always available to customers.
vii. Assist in the production, packaging and marketing/distributing of products and services.
viii. Controlling quality of products and services – (ie always maintain standards of products and services to meet up the requirements of Standard Organization of Nigeria), that is to ensure Quality Assurance.
ix. Organizing, accounting and controlling at all stages of industrialization, (ie Establishment, Development, Operations, Standards Maintenance, Profitability, Expansion/Growth).
x. Finally, cause always a quality engineering technology, innovation, product/service research, work-study approach as well as methods engineering to sustain a viable industrial development of the nation.

6. CONCLUSION AND RECOMMENDATIONS

Engineering businesses played an indispensable role in industrializing both developed and developing countries like Nigeria etc, if they should be properly organized and administered so as to improve on the standard of engineering businesses for sustainable employment and rural/urban livelihood. In the view of national economic improvement, engineering businesses should be adequately encouraged by Governments and other development agencies. For us to promote industrialization in nations, then students of engineering profession in higher institutions should be encouraged to imbibe an entrepreneurship culture.
The time is now to act that Nigeria engineers/engineering students must be taught how to identify engineering business opportunities and conduct such viable engineering businesses: Industrial Training Fund (ITF), Small and medium Enterprises Development Agency of Nigeria (SMEDAN), and Business Development Agencies should adequately fund the funding, and render the required technical advice to the potential engineering businesses and host of others.

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