

The Effect of Research and Development in Developing Countries: Nigeria's Perspective.

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ABSTRACT

Research as a vehicle for development cannot be overlooked. Looking through the history of mankind; research has identified as a single force that has added real and unquantifiable value to a population's standard of living. Therefore research and development (R&D) is an important tool for advancing knowledge, stimulating and promoting progress, as well as searching for and coordinating of scientific facts. This paper takes a critical look at the effect of research and development (R&D) on developing countries like Nigeria. It also encourages interests at research work in diverse area such as sciences, engineering, management, and humanities.

(Keywords: development, developing countries, R&D, research, technical progress)

INTRODUCTION

Over the years, researches in every field have been able to come out with tangible and substantial results, which have been able to positively change the quality and the standard of life. There have been a lot of differences in every facet of life between the Stone Age and the Computer Age. Rapid development is a result of meaningful and qualitative research. Therefore, a government that wants an improvement in the quality of the lives of its citizens should never relegate research to the background. It has been discovered that the importance of research has been enormous so that it cannot be neglected.

More works and development have been made as a result of the review of the previous works accomplished by others. This has gone a long way in making life more worth living and

comfortable not only for the researchers themselves but also for the general population. It is also pertinent to note at this point, that most research leads to development. Most developments therefore are a direct product of basic and applied research works.

BASIC PEDAGOGY

The Meaning of Research

Most people associate the word research with activities which are substantially removed from day to day life and which are pursued by outstanding, gifted persons with unusual levels of commitment. Research has been defined by many writers who are usually prompted to supply a definition about major concept they are discussing. However, all of them have a major focal point, which is investigation conducted to provide information for decision making.

According to Osuala (1987), research is simply the process of arriving at a dependable solution to a problem through the planned and systematic collection, analysis, and interpretation of data. That is to say, research is a systematic enquiry aimed at providing information to solve problems.

While Ifenowo (2004), defines research as a systematic acquisition, storage, and transmission of knowledge where knowledge is an activity that implies identifying describing and explaining social phenomenon. Putting all this and more together, research can be defined as a process or act of seeking information from diverse sources (media, library, people, etc.) in order to acquire some specific knowledge so as to improve on previously done work or for the betterment of work that has been previously actualized.

What is Development?

Development, on the other hand, is the application of the knowledge gathered from research carried out by researchers. It also means the action or process of developing or being developed. Continuous application of research works leads to a big boom in the developmental structure of a nation. A good example of development is the metamorphosis of valve (tube) into the use of transistor and chips (integrated circuits).

Another example is the Pentium series of computers, which ranges from Pentium 1 to Pentium 4. This example points out the fact that the advancements were made which led to the development and improvement of the Pentium series. As development is centered upon human abilities and creative facilities, socio-cultural factors are now recognized both as the determining factors and as ultimate result of development. This new approach, which is an essential prerequisite to national dignity is fundamental to any movement in favor of **ENDOGENOUS DEVELOPMENT**, that is a form of development generated from within, which is focused, first and foremost, on meeting the true needs and aspiration of people in order to ensure their genuine fulfillment (JCM, 1998).

However, true development can only emerge when science, technology, economics, and the environment become part of a culture or at least respect it. The formula often used could in this instance, be broadened in order to provide a definition of development, which could be as follows, "Development is a science –technology, economics, the environment, etc, in short, all human activity has become culture" (UNESCO, 1999).

TYPES OF RESEARCH

There are two main types of research:

- I. Purposed based research and
- II. Method based research

PURPOSED BASED RESEARCH

Purpose-based research can be classified into: basic research, action research and evaluation research (Oloyo, 2001).

Basic Research: It is a fundamental research which is concerned with the production of results or findings, which will lead the development of theories. It is interested in building theories, which lead to the advancement of the knowledge in the particular field. Thus, it is the original investigation undertaken in order to gain new scientific knowledge and understanding.

Applied Research: It is concerned with the usefulness of ideas or theories to practical situations. Applied research seeks to establish the application of given theory. It uses the finding of basic research to solve an identified practical problem.

Action Research: It is undertaken by a researcher who has noticed a problem within the environment. If the researcher steps out to find the cause of the problems, he is carrying out action research.

Evaluation Research: It provides useful information on the effectiveness or operation of a system.

METHOD-BASED RESEARCH

This type is made in terms of the method employed in the research. In this regard, method based research can be classified into: historical research, survey research, case study research, casual comparative research and experimental research.

PURPOSE OF RESEARCH

The basic purposes of research are:

- To provide useful information to management for decision making.
- To provides a basis upon which further investigation can be made. That is providing chances to widen already existing knowledge.
- To play an advisory role in decision-making process for Scientists. It is also used to acquire and analyze information and to make recommendation to the management as to how impending problem can be solved in the organization.

- To provides instrument for use as a competitive edge against competitor in form of knowledge about customer, which the company can use in developing marketing plans.
- To make deduction from observation, analysis of facts and figures as a means of providing answers to problems of interest.
- Analyze and interpret the results of present research with appropriate statistical method and their interpretation is done in the light of current state of knowledge of the subject matter.
- Prepare a report of the research.

RESEARCH METHODS AND PROCEDURE

Irrespective of field of study and the nature of research, a systematic or scientific approach is followed in the design and conduct of research in order to ensure validity of its outcome. Major steps highlighted below gives a general overview of the research procedure. The following steps represent the key elements of procedure for conducting research, which are:

- Define in clear terms the problem intended to be solved by the research: This will no doubt lead to formulation of a research question and statement of the tentative research objectives. An answer to the question provides a viable solution to the procedure.
- Critical evaluation of research problems: A review of pertinent literature provides information on current status of knowledge of the problem. Also, a researcher can browse the internet for additional information on the subject matter to access related research papers since nobody is an island of knowledge.
- State the research objective in the following forms:
 - Question to be answered
 - Hypothesis to be tested
 - Effect to be estimated
- Design and adopt appropriate research procedure for study: The procedure to be adopted depends largely on the nature of the research and also the field of study (i.e., historic, descriptive, correlation or experimental research and on the research objectives).
- Conduct the research work.

EFFECT OF RESEARCH ON NATIONAL DEVELOPMENT

Looking at the early developmental stage of the automobile industry and comparing it to the state of the industry today, we can see that there is a great deal of difference between automobiles today and those of the past. Through painstaking research, engineers in the automobile industry have been able to come up with both better and more effective body shapes and engines. This has been able to transform the automobile industry a great extent.

In the field of electronics and computers, the effect of research can never be over emphasized because it has led to so many inventions, which in turn has led to remarkable development. Scientists have been able to develop many other compact electronic components (transistors, resistors, etc.) which are very much smaller in size and more efficient than earlier components. They are smaller in size and can be packaged together to form integrated circuits (IC) which further increase in efficiency.

Research has also changed the face of telecommunications. Today we can talk about mobile telephones, satellite communication systems, wireless application, etc. All of these are a result of good research work.

Furthermore, in the world of medicine, researchers have made giant strides which have helped increase human life-expectancy. Over the years researchers in this field have been able to develop drugs and vaccines to combat the menace of killer disease such as malaria, cancer, tuberculosis, etc.

Moreover, researches have also made it possible to apply electronics and computers in the field of medicine. In developed countries, the application of electronics and computers is growing by leaps and bounds as a result of research efforts with the use of such state of art high-tech equipments in medicine, it is very easy to diagnose and treat

patient suffering from diseases without any side effect thereby, improving the quality of life. Therefore, if proper development is to be actualized, then research should be given a prominent place it deserves.

RESEARCH ACTIVITIES: A COMPARATIVE VIEW

India is one of the rare nations which has a large population (of about 1 billion) but does not worry about it. This is mainly because India has set-up deep rooted research structures to cope with it. The national survey on resources devoted to science and technology activities is undertaken biennially and comprehensive reports in this regard have been published since 1973. In the 1994-95 period, the number of R&D in-house units within India's industries totaled 1053 in the private sector and 171 in the public sector. In addition, there were 151 Scientific and Industries Research Organization (SIRO) units.

According to Okoye (2002), out of the total R&D expenditure, the central government contributed 75% and the share of the private sector was 16.4%; the remaining 8% was incurred by the state governments.

In terms of human resources, the Institute of Applied Manpower Research in India shows that the estimated stock of science and technology (S&T) personnel in 1996 was 6.31 million. This has been showing a remarkable increase over the years. The percentage share of engineering and technology personnel grew by 17% during the 1979-89 period (Okoye, 1998).

Some time ago, the Lagos Plan of Action on Economic Development in Africa (1980-2000) was approved in 1980 by the African Heads of State; thus committing themselves to reserving at least 1% of their annual budgets to the development of S&T (UNESCO, 1996). However, R&D remains in a sorry state in Nigeria (UNESCO, 1996). Nigeria devotes only 0.001% of her gross natural product (GNP) to R&D.

The developing countries typically dedicate from 1 to 2% of their gross domestic products (GDP). South Africa commits 1% of its GDP; Taiwan commits 1.7%; and Australia commits 11.3% of GDP, respectively (NUC,1995) so, we can now understand why some South East Asian Countries soaked in research activities are always coming out with breaking news in S&T.

SPECIFIC IMPACT OF R&D ON NATIONS

Encouraged by the breath-taking effort of China, India, Taiwan, and Singapore (among others) in R&D, America and Europe now out-source service jobs and off-shore factories and plants in these countries. India and Philippines are home to call-centers of some of America's largest companies such as IBM, American Express, and GE (Mac Donald, 2006).

China is rapidly emerging as the engine of growth in Asia and the nucleus of the region. She is the world's largest producer of such items as DVDs, microwave ovens, and television sets, India now produces more than 3 million college graduates a year – a far cry from America's 1.3 million and 2.9 million in all of Europe (Mac Donald, 2006).

In 2000, Indian software exports were about 6 billion dollars. By the end of 2004, they were estimated to have hit 16 billion dollars. In 2005, 200,000 American tax returns were prepared by graduate accountants in India. Indian experts in diverse fields today accomplishing what can best be described as miracles in many African nations.

The post war Korea is today a nation to emulate, especially by countries like Nigeria. Korea fought a civil war that spanned 3 years (1950-1953). Nigeria was ravaged by civil war that took place between 1967 and 1970. The former was more devastated by the hostility than the later. Schuller (1988) who visited Korea immediately after the war reports that "Not a single tree, shrub or other greenery graced the landscape.....all living vegetation had been consumed in order to preserve human life" yet Korea was rated 11th in the world in terms of economic size. She manufactures and exports large quantities of computers and electronics products; machinery, textiles, motor vehicles, ships and steel products what else can one say?

PROBLEMS OF RESEARCH AND DEVELOPMENT

It is a known fact that there are always factors that envisage problem in every section of life. Here are some problems working against R & D:

a. Duration of research: the practical rule is that programming of R&D activities should cover at least a period of three years; anything less would be unreasonable. If a major political event is

expected earlier than this, it is better to defer programming exercise.

- b. Institution constraints:
 - i. Budget frequency (i.e., shortage, misuse and embezzlement of funds.
 - ii. Change of government, hence R&D policy may be delayed due to political instability.
 - iii. Lack of planning and control centralization.
 - iv. Shortage of manpower.
 - v. Dates of administrative or financial decision, for international R&D programs.

SLOW RESEARCH DEVELOPMENT IN NIGERIA

While great studies have been executed in some functional area of technology in Nigeria, research as a separate area of discovery, function, and operation has experienced dismaying underdevelopment. The growth of R&D in Nigeria has been very slow due to the following reasons.

- First generation managers of Nigerian industries were not sufficiently educated and could not appreciate the value of research in industries.
- Multinational companies have always depended on their overseas mother companies for the supply of raw materials, technology, and human resources.
- Nigeria has always been a seller's market where all her industrial produce are sold with little or no competition.
- Social research, of which business research is part, has had its peculiar problem (s) in Nigerian Industries.

SOLUTION TO PROBLEMS OF RESEARCH AND DEVELOPMENT

The solution lies in improving on the problems identified above and further:

- a. Helping the society to understand the cause of the problem
- b. Offering suggestions for solving the problem
- c. Directing the society on the desirable path of peace
- d. Establishing stability, progress, and prosperity through public policies
- e. Forewarning the society about the implication of action or event to be taken.

CONCLUSION

Research has been identified as an important tool for development in every aspect of the human endeavor; however, it is evidently clear that the government and the private sector have not given proper attention to it as a vital tool for development.

Therefore a policy to encourage research in higher institutions, industrial, and other fields of learning should be put in place to make research an integral part of our lives. The benefit of entrenching R&D in our national psyche have been highlighted in this paper and measures useful for improving R&D status in Nigeria have been laid bare. Now is the time to wake up and stand tall, Giant of Africa!

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