

INSTITUTIONS AND NATIONAL DEVELOPMENT IN NIGERIA: PERSPECTIVES ON THE ROLE OF THE RAW MATERIAL RESEARCH AND DEVELOPMENT COUNCIL

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Abstract

The world system not only typifies the web of relations between countries but also indicates the topologies of countries using developmental indices. As a developing economy, Nigeria is richly blessed with human and natural resource yet it has remained a mono-cultural economy with excessive dependence on oil. The galaxies of and availability of raw materials notwithstanding, the Nigerian state relies on the importation of industrial raw materials for her local industries which has not only affected the level of industrialization but has further put the Nigerian economy in a disadvantage position. In a bid to address the challenges and to promote local content, the Raw Material Research and Development Council (RMRDC) was established in 1978 to serve as a springboard and catalyst for promoting the research, development and utilization of raw material resources in Nigeria. Hence this paper is an attempt to interrogate the role and contributions of the Raw Material Research and Development Council in promoting economic growth and development in Nigeria. It is a desk research and it employs the institutional theory as its theoretical framework. It is the position of this paper that the Raw Material Research and Development Council has contributed in several ways in promoting economic growth and development in Nigeria. It also identifies poor funding, inadequate infrastructure, political interference, incessant strike by Nigerian University lecturers who are key partners of the RMRDC amongst others constitute major limitations to the organization. In the final

analysis the paper recommends amongst others the need to encourage research and development by ensuring adequate funding of the RMRDC

Key Words: National Development, Institutions, Research and Development, Economy

Introduction

The structure of the international system vis-à-vis international political economic relations reflects an interaction between countries of unequal developmental status. The countries of the northern hemisphere are mostly developed while those of the South are either developing or underdeveloped. Such status is not unconnected to the roles and functions of institutions. Nigeria is one of such state within the global South that has been grappling with the challenge of underdevelopment regardless of the numbers of institutions that have been put in place. Bearing in mind the development trajectories in Nigeria and the various efforts put in place by successive governments, Nigeria seems to be retrogressing. A country that is richly blessed with rich human and mineral resource yet rated the poverty capital of the world (Thisday News Paper, 2nd August, 2022). Peter and Shaibu (2020:592) rightly note that the Nigeria's situation "reflects the conception of the resource curse analogy and the prevailing paradox of plenty". Nigeria has always been a mono-cultural economy particularly after the discovery of oil in 1957 thereby relegating other raw materials and resources to the background. In an attempt to promote economic growth and development;

several policies, national plans and programmes were put in place. Some of these are the First National Development Plan (1962-1968), Second National Development Plan (1970-1974), the Third National Development Plan (1975-1980), and the Fourth National Development Plan (1981-1985).

Other development plans are the National Economic Empowerment and Development Strategy (NEEDS) which was described as Nigeria's plan for prosperity. It is a four-year medium-term plan for the period 2003 to 2007. NEEDS is a federal government plan, which also expected the states and local governments to have their counterpart plans- the State Economic Empowerment and Development Strategy (SEEDS) and the Local Government Economic Empowerment and Development Strategy (LEEDS) respectively (Marcellus, 2009).

It is a statement of fact that Nigeria is richly blessed with human and natural resource yet the availability of such raw materials for industrial use is inadequate. The shortage of raw materials has always been and it is still a major challenge that characterised the manufacturing and industrial sectors. With the experiences of the economic recession in Nigeria in the 1980s, the most intractable constraint of the manufacturing sector is the shortage of industrial raw materials. Consequently, the introduction of the Structural Adjustment Programme (SAP) and the abolition of the Import Licensing in 1986 compelled the industrialists to learn to survive in a semi-deregulated economy (Imoisili, 1988, p.7).

The gloomy period for the manufacturing sector started in 1981 which heralded the end of the oil boom. The Central Bank of Nigeria (1981) also reports that petroleum which alone accounted for approximately 99 percent of the value - added in mining in 1972 shrunk to mere 78.5 percent of the mining index in 1981. This sudden decline led to the acute scarcity of foreign exchange to procure imported raw material inputs by the manufacturing enterprises. In a quick response to this foreign exchange crisis, the Federal Government in addition to the strict control of the allocation of available foreign exchange

through appropriate monetary policy guidelines, set up a local sourcing of raw materials ("backward integration") policy and promulgated a decree establishing the Raw Materials Research and Development Council (RMRDC) (Okoye, 1996).

In the light of the emerging deficiencies of Nigeria's manufacturing sector discussed above, emphasis of industrial development strategy shifted towards the promotion of the use of locally available industrial raw materials. This shift was meant to tackle the problem of falling industrial capacity utilisation, given the binding constraint imposed by the prevailing low import capacity. The first in the series of the steps needed for creating the necessary policy package for implementing the local sourcing strategy was taken in 1985 when the government announced a set of minimum targets for the local sourcing of raw materials for Nigerian industries with the added stipulation that these targets should be met within a five year compliance period (Femi, Ademola and Afolabi, 2002).

It is noteworthy, however, that some industries such as food, beverage and tobacco, have achieved a measure of success in sourcing their raw materials locally but the impact of this measure on the growth of the small-scale manufacturing subsector is yet to be investigated (Okoye, 1996). Worthy of note is the fact that the same prevailing conditions that led to the establishment of the RMRDC such as to the acute scarcity of foreign exchange to procure imported raw material inputs by the manufacturing enterprises, economic recession and poor infrastructural development vis a vis its impact and implications for industrialization have characterised the period under study.

What has really changed as far as the developmental trajectories of Nigeria and the availability of raw materials for industrial purposes is concerned? Though several industrial sectors have improve in local contents, after about forty years of establishing the RMRDC, the adoption of the local resource sourcing policy, import restrictions of some raw materials and denial of forex (foreign exchange) on the importations of some material by the Central Bank of Nigeria, the economy of

Nigeria is still over dependent on oil and the development index of Nigeria is poor.

It is based on the foregoing that this work attempts to examine the roles and contributions of the RMRDC as an institutional framework in the promotion of economic growth and development in Nigeria.

Conceptual Clarification

Concept of Institution: The meaning of the concept of ‘institution’ is a hot topic in various disciplines. Generally speaking institutions refer to man-made rules that govern human Behaviour (Keizer, 2007). To the North (2009), institutions are composed of formal rules created by human beings such as statute law, common law, and regulations; informal constraints such as conventions, norms of behaviour and self-imposed codes of conduct; and the enforcement characteristics of both. Institutions are systems of social (i.e. man-made and nonphysical) factors that are exogenous to each individual whose behaviour they influence. They consist of rules, norms, beliefs and (potentially) organizations and “provide individuals with the cognitive, coordinative, normative, and informational micro-foundations of behaviour as they enable, guide, and motivate them to follow specific behaviour” (Greif, 2006).

Research and Development: Bellu (2011) viewed development as an “event constituting a new stage in a changing situation”. He stresses the multi-dimensional nature of development. Seers (1979) defined development by posing certain questions such as; what has been happening to poverty, unemployment and inequality. Research is the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data. Research is oriented towards the discovering of the relationships that exist among the phenomena of the world in which we live (Osuala, 2001).

Without research, development efforts would be baseless. Different forms of research may be conducted according to existing needs and expected results. The more rigorous the research design and careful execution the more

accurate and reliable are the results (Sseyewa, 2012). Research and Development (R&D) is the term commonly used to describe the activities undertaken by firms and other entities such as individual entrepreneurs in order to create new or improved products and processes. The broadest meaning of the term covers activities from basic scientific research performed in universities and laboratories all the way to testing and refining products before commercial sale or use (Hall, 2006).

Research and Development (R&D) refers to “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications” (OECD, 2002).

Theoretical Framework

This paper adopts the Institutional Theory. One of the oldest concerns of political science and public administration is the study of government institutions since political life generally revolves around them. These institutions include legislatures, executives and judiciary; and public policy is authoritatively formulated and executed by them. Traditionally, the institutional approach concentrates on describing the more formal and legal aspects of government institutions: their formal structure, legal powers, procedural rules, and functions. Formal relationships with other institutions might also be considered, such as legislative-executive relations (Anyebe, 2018). The central claim of institutional theory or institutionalism is that whether institutions matter in public policy process or not and over the years it has been seen that the institutions do matter in policy process and the main concern is how it matters. ‘From institutional perspective policymaking can be observed as a process which is guided along previously beaten tracks by institutional structure – a process in which individual choices are influenced by structures rather than outcome’ (Hendriks, 1999, p. 67).

Government is in the business of forming its environments, not adapting to it. Public administration is driven by societal visions and political projects. Therefore

organizations that handle public affairs should be 'conceptualized as institutions rather than as instruments' (Brunsson and Olsen, 1997: 20). Institutional theory focuses on institution and how they matter in policymaking, so the most general way of explaining how institutions affect policy output is by seeing how the institutions (explained through various trends) empower and constrain actors in policymaking (March and Olsen, 2008, p. 3). There are four main stages of policy cycle involving agenda-setting stage; policy formulation or adoption; policy implementation and policy evaluation (Knill and Tosun, 2012, p. 9).

Institutionalism, with its emphasis on the formal or structural aspects of institutions can nonetheless be usefully employed in policy analysis. An institution is, in part, a set of regularised patterns of human behaviour that persist over time and perform some significant social function. It is their differing patterns of behaviour that usually distinguish courts from legislatures, from administrative agencies, and so on. These regularised patterns of behaviour, which are usually called rules or structures, can affect decision-making and the content of public policy. Rules and structural arrangements are usually not neutral in their effects; rather, they tend to favour some interest in society over others and some policy results over others (Aneye, 2018).

Scott (1995:33, 2001:48) asserts that:

Institutions are social structures that have attained a high degree of resilience. (They) are composed of cultural-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life. Institutions are transmitted by various types of carriers, including symbolic systems, relational systems, routines, and facts. Institutions operate at different levels of jurisdiction, from the world system to localized interpersonal relationships. Institutions by definition connote stability but are subject to change processes, both incremental and discontinuous.

The importance of institutional theory in understanding policy process cannot be denied by any means. The policy process will not proceed without the action of the institutions of the government which institutionalism argues for. The actors involved in institutions also play an important role in shaping the institutions as actors' action reflects the outcome from the institutions. There is need of combination of various institutionalisms in the agenda-setting stage and in policy implantation as every institutionalism has distinct meaning of institutions and own means of solving the issues (Mahmud, 2017).

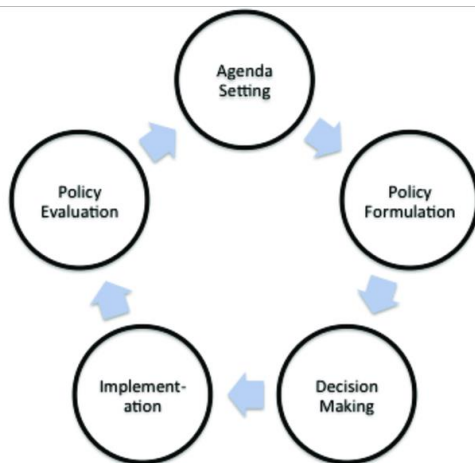
The underlying logic of rational choice institutionalism is that institutions are arrangements of rules and incentives, and the members of the institutions behave in response to those basic components of institutional structure. Unlike individuals in normative institutionalism the preferences of the occupants of these structures do not have their preferences modified by membership in the institution (Guy, 2000). The argument of Historical institutionalism is that the policy and structural choices made at the inception of the institution will have a persistent influence over its behaviour for the remainder of its existence (Steinmo, Thelen and Longstreth, 1992). This idea of "path dependency" is the central explanatory principle for the historical institutionalists, although they are also very interested in the ideas that help to shape and to sustain the directions of policy (Hall, 1986; King, 1996).

Although the logic of path dependence and persistence are central to the historical institutionalism, developments in this approach have tended to include change more effectively. Historical institutionalism did include a means for large-scale change—the concept of "punctuated equilibrium (Jean-Claude, 2011). Historical institutionalism considers that outcomes of public policies do not just reflect the preferences or interests of the strongest social forces. They are also channelled by existing and past arrangements. Policy choices made in the past shape choices made today. Political and administrative organizations, conventions and procedures

regulating the relationships between economic actors and the state, are therefore path-dependent (Jean-Claude, 2011).

In the view of Sanchawa (2015), the following are the basic tenets of the institutional theory:

- i. Public policy is determined by government institutions which give policy legitimacy
- ii. Government universally applies policy to all citizens and societies and monopolises the use of force in applying policy
- iii. The legislature, executives and judiciary branches of government are examples of institutions that give legitimacy
- iv. Public policies are institutional output. Public policy is authoritatively determined, implemented and enforced by these institutions (Sanchawa, 2015)



Source: Brisbois (2016).

Critique

Institutional theory in political science has made great advances in recent years, but also has a number of significant theoretical and methodological problems. The most important of these problems is the generally static nature of institutional explanations. Also, there is a nagging problem of the difficulties in measuring institutional variables in other than simplistic, nominal categories (Guy, 2000). Institutionalist approach is more static and formalistic (Anyebe, 2018). Potentially the most important impediment to a more central position for institutionalism is that the term means so many

things to different scholars, and that some of the alternative approaches are not only different but even contradictory (Hall and Taylor, 1996; Kato, 1995).

The relevance of the institutionalist theory as a framework for analysing this work cannot be overemphasised for obvious reasons. The advantage of using it is in its emphasis on addressing issues from holistic and interdisciplinary perspective, rather than treating the issues under consideration in isolation to other factors. It is a comprehensive approach to the study of public policies, governance and institutions of governance vis-à-vis the nature of and policy making processes. The survival and effective management of every state is determined by the nature and content of her public policy. Since public policies are designed and targeted at addressing specific challenges of the state, the establishment of the RMRDC becomes germane.

The RMRDC is not just an institutional mechanism but a product of public policy designed to address national developmental concerns that borders around the research and promotion of local contents in terms of resource availability so as to promote industrialization, reduce over reliance on imported raw materials thereby promoting economic growth and development. Institutional approach emphasises the inter-play between politics, economics, societies and the web of relations between these variables. The establishment of the RMRDC was a response to the need of the Nigerian state haven identified the challenges posed by the excessive reliance on imported raw material regardless of the abundance of and the fact that Nigerian is blessed with numerous materials

Raw Material Research and Development Council

The establishment of the Raw Materials Research and Development Council (RMRDC) was in response to the clarion call by the private sector for government intervention on the over reliance on imports by Nigeria Manufacturing industry for the supply of its raw materials, processing equipment and spare parts. The Federal Government, in collaboration with the Manufacturers Association of Nigeria (MAN)

and other stakeholders convened, a National Workshop on Raw Materials for Nigerian industries in July 1983. The outcome of the workshop led to the formulation of a policy for the establishment of RMRDC by Decree (Now Act) No.39 of December 17, 1987 to develop local raw materials and co-ordinate research efforts especially in relation to raw materials acquisition, exploitation, conservation and development (RMRDC, 2015). The Raw Material Research and Development Council was established to promote the development and utilization of Nigeria's industrial raw material. It also provides information that would enable the formulation of appropriate policies for domestic raw materials exploitation, development, utilization and investment (NEPC, 2018)

RMRDC was established by the RMRDC Act, originally promulgated into law by Decree 39 of 1987 and presently cited as RMRDC Act, CAP R.3 Laws of the Federation of Nigeria, 2004. RMRDC was established at a time when dwindling foreign exchange earnings from petroleum was expended to import raw materials and products which were available or could be competitively produced in Nigeria. It commenced operation in Lagos on February 10, 1988. Currently, RMRDC operates from its corporate Headquarters in Abuja with coordinating offices in the thirty six (36) states and the Federal Capital Territory (FCT). RMRDC is today, Nigeria's focal point for the development and utilization of the nation's vast industrial raw materials resources, thus facilitating the establishment of new resource-based industries which in turn provide new job opportunities and contribute to the nation's Gross Domestic Product (GDP) (RMRDC, 2022).

The mandates of the Council as embodied in Act 39 of 1987 are as follows:

- i. To draw up policy guidelines and action programmes on raw materials acquisition, exploitation and development;
- ii. To review from time to time, raw materials resources availability and utilization, with a view to advising the

- Federal Government on the strategic implication of depletion, conservation or stock-piling of such resources;
- iii. To advise on adaptation of machinery and process for raw materials utilization;
- iv. To encourage publicity of research findings and other information relevant to local sourcing of industries;
- v. To encourage the growth of implant research and development capabilities;
- vi. To advise on and device awards or systems for industries that achieve any break-through or make innovations and inventions;
- vii. To organize workshops, symposia and seminars designed to enlighten people on new developments and solutions discovered from time to time; and,
- viii. To consider and advise on special research grants for specific objectives and any other issues capable of enhancing the objectives of the Council.

Function and Services Provided by Raw Material Research and Development Council

The RMRDC as an institution performs several function and services in relations to its mandate. Policy advisory role, raw material local content development, research and development, entrepreneurship cluster development initiatives, technology development and upgrade, workshops, conferences and seminars, Consultancy and Business Investment Services, Capacity Building and Skills Acquisition Training. RMRDC offers policy advisory services to government on raw materials exploitation, stockpiling and deletion as well as on tariff matters as they relate to raw materials import and export, The Council encourages local content development in boosting of high quality and disease resistant varieties of agricultural raw materials, farm inputs, design and development of technology for value addition to raw materials as well as local contents awards to individuals and company that utilizes very high percentage of local raw materials in production (RMRDC, 2022).

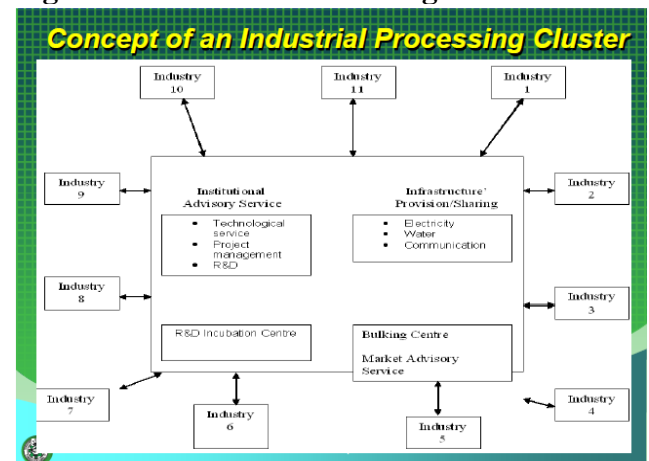
Apart from helping the development of viable entrepreneurs, RMRDC applies the triple helix in facilitating the emergence of raw materials processing cluster and in providing equipment of common facilities in addition to injecting science, technology and innovativeness into existing clusters. Clusters are geographic concentrations of interconnected companies specialized suppliers, service providers, firms in related industries, and associated institutions, service enterprises and marketing outfits in particular fields that compete but also cooperate (Porter, 1998).

Cluster as a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of clusters ranges from a region, a state, or even a single city to span nearby or neighbouring countries (Teshome, 2008). Clusters are based on common technologies or know how, commodity or service linkages, competitive advantages etc (Msuya, 2008). Cluster development has been recognized as one of the most suitable approaches for the development of Micro, Small and Medium Enterprises (MSME) sector across the globe. The MSME sector contributes substantially to the economy of any nation in terms of its share of manufacturing GDP as well as in employment generation. Business clusters had been a natural phenomenon until induced development of clusters occurred through policy interventions. The need for clustering arises from the demand for achieving critical mass and economies of scale besides creating good infrastructure to meet market demand, gaining access to technology and creating brand (Onwualu, 2013).

However, geographic concentration is no longer the sole critical success factor to cluster development. Collaboration and knowledge sharing practices among companies within a cluster as well as with the local network that surrounds the cluster play an equally important role in the effectiveness and success of cluster development. Through the network, a cluster generates knowledge of current global trends, which will help in assessing the validity

of the cluster's actions and support new product development (Larmers, 2013).

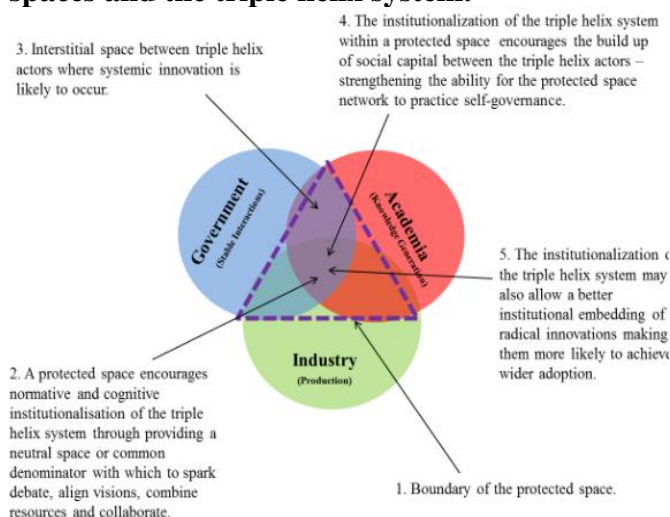
Figure 1: Industrial Processing Clusters



Source: Onwualu, (2010).

The triple helix concept was first introduced by Etzkowitz & Leydesdorff (1995) with the recognition that to transition to a knowledge society, a hybridisation of university, government and industry would need to provide a systemic framework for the effective generation, diffusion and use of knowledge. This would require the blurring and overlapping of traditional government-university-industry boundaries (Etzkowitz 2008). The institutional overlaps create an interstitial space where innovation is more likely to occur. Furthermore, by offering government a more collaborative role within the network, a triple helix system would serve to enhance multi-level reflexivity between policy makers and policy implementers and hence strengthen a government's ability to introduce, adapt or remove shielding, nurturing and empowering policies. Perhaps more importantly, a triple helix system can be implemented at any level of the economy and society, thus opening the door for a more decentralised networked and evolutionary form of governance that would make protected spaces effective mechanisms for transition to circular economy (Barrie, et al, 2017).

Figure 2: Visualization of the benefits created through the synergy between protected spaces and the triple helix system.



Source: Barrie, J., Zawdie, G., & João, E. (2017).

As seen from the triple helix above, the academia is a critical component of every society and research is the fulcrum around which innovation occurs hence the RMRDC in collaboration with individual researchers, tertiary and research institutions carry out R&Ds in relevant areas of need in the sectors of Manufacturers Association of Nigeria (MAN). RMRDC also uses its laboratory at the African University of Science and Technology (AUST) to research and character. In cases where necessary, a pilot stage is attained to rouse the interest of investors for commercialization, as well as sourcing for funds to deliver on this area of its mandate. According to Kayode, et al, (2002), there also exist special incentives for encouraging domestic industries to engage in research and development activities for the improvement of their products and production processes. Included in these incentives are the following:

- i. tax relief of up to 120 percent of expenses on research and development, provided that such research and development activities are carried out in Nigeria and are connected with a business from which income or profit is derived;

- ii. tax relief of up to 140 percent of expenses on research and development on local raw materials; and
- iii. The abolition, in 1991, of excess profit tax for companies with the expectation that all firms which used to pay this tax would channel the amount into the development and use of local raw materials.

The Council is in the business of designing and developing technology for processing raw materials into products. RMRDC also carries out upgrade and optimization of indigenous/ traditional process technology in order to reduce drudgery, improve aesthetics and increase production capacity. This may include catalytic model plants, pilot plants as well as Joint Venture Company (JVC) with individuals, state government and other stakeholders.

As part of its mandates, the Council carries out workshops, seminars and conferences to discuss topical issues on raw materials, prospects and challenges with a view to gathering stakeholders opinion and devising strategies to deal with issues of policy, raw materials sourcing and utilization, technology for value addition and challenges faced by stakeholders amongst other.

Achievements and Contributions of the Raw Materials Research and Development Council

In line with the mandate and missions of the RMRDC a lot of achievements have been recorded particularly in relations to programmes and project implementations. This section will contain both broad achievements and specifics achievements.

Strategies were adopted to attract investors to resource-based investment opportunities in all parts of the country. Many tools were employed for this purpose. RMRDC pioneered the establishment of some factories in Nigeria. Among these factories were the Phosphate Beneficiation Plant, Sokoto and Talc Processing Plant, Kagara, Niger State. These investments had a catalytic effect because similar factories

were subsequently established in the States. The Council also established the Raw Materials Resource and Information Centres (formerly known as Raw Materials Display Centres) in all the States and the FCT to display raw materials in Nigeria with particular emphasis on what is available in the respective States (RMRDC, 2020).

Huge foreign exchange expenditure to import raw materials and semi-finished products available in Nigeria was a big challenge. RMRDC took up this challenge by developing a policy to strategically replace imported raw materials with local alternatives. This programme which was referred to as the Local Raw Materials Content Development Programme was previously known as Raw Materials Deletion Programme. A schedule for deletion of specific raw materials from the country's import list was developed in collaboration with key stakeholders such as Manufacturers Association of Nigeria (MAN) and Central Bank of Nigeria (CBN) (RMRDC, 2020).

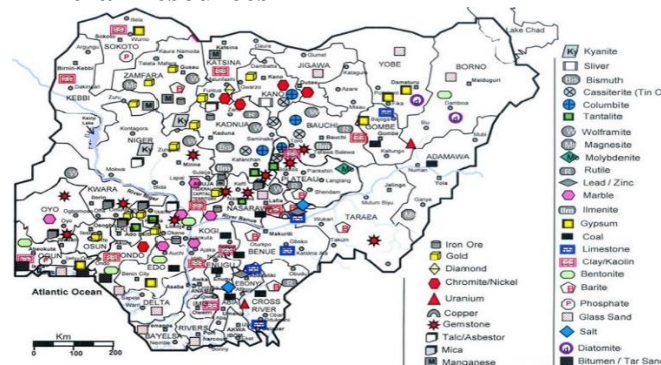
Nigeria enthusiastically embraced an import-substitution-industrialization strategy in the early 1960s. In pursuit of this chosen path to industrial development, a progressively more protective import regime, based on a system of high and escalating tariffs, import licensing and prohibitions, was used to insulate most of the domestic import-competing manufacturing activities from foreign competition. This phase of Nigeria's industrialization experience coincides broadly with the period during which the manufacturing and processing activities in the consumer goods sub-sector grew rapidly (Kayode, et. al, 2002).

RMRDC nurtured thriving relationships with many international organizations and joined government efforts on bilateral cooperation. This approach was used to facilitate collaboration and to share experience on the development and utilization of raw materials. These efforts resulted in technical assistance on many projects as well as training opportunities for Council's staff. The Council was made the Secretariat of the Action Committee on Raw Materials (ACRM), a project of the Group of 77 countries and China

under the auspices of the United Nations. RMRDC was also the Regional Focal Point for Africa for the World Association of Industrial and Technological Research Organizations (WAITRO) with headquarters in Germany (RMRDC, 2020).

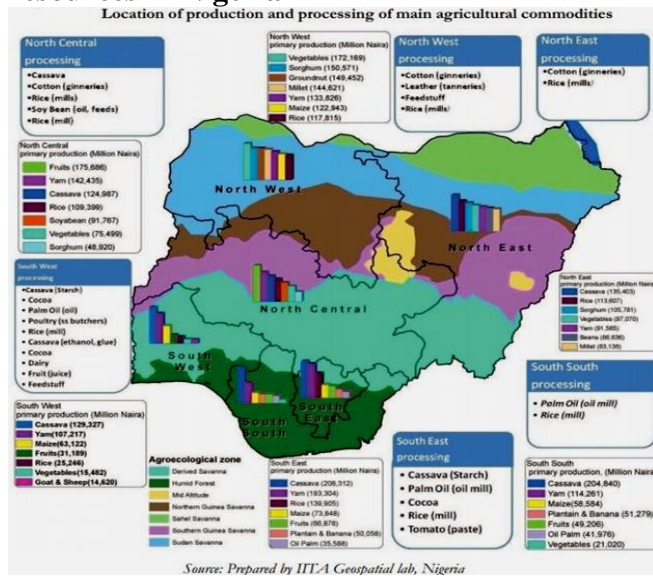
The development of the raw material map of Nigeria is a major achievement of the RMRDC. The map is a one stop shop as far as data of raw materials in Nigeria is concerned. It is the first ever raw material map in Nigeria and it encompasses the 774 local government areas in Nigeria. RMRDC utilized data from its surveys to build this map. This map is not only of importance to Nigeria but to more to industries and for many manufacturing investments in Nigeria. In addition to the above the RMRDC developed a GIS-Based Raw Materials Information System. The aim of the GIS-based software designed by the Council is to develop digital maps of available raw materials in Nigeria and update the existing raw materials database with attributes to reflect current occurrence and geographical disposal (RMRDC, 2020). The RMRDC has also developed a mineral map using Global Positioning System (GPS) Coordinates. The map contains the exact locations of solid minerals for investors.

Fig. 1.0 Map of Nigeria Showing Location of Mineral Resources



Source: RMRDC, (2020).

Figure 6: Map indicating agricultural resources in Nigeria



The Raw Materials Information System (RMIS) is an achievement by the RMRDC. It is a technological and digitalised data bank for raw materials in Nigeria. The report of the Committee on RMRDC Achievements From 1988-2020 maintain thus:

Raw Materials information System was a project assisted by the United Nations Development Programme (UNDP). This data bank is regularly upgraded and updated. Currently, data on the raw materials available in all the 774 Local Government Areas have been identified and captured in the databank. Respective state governments have utilized the data to stimulate the establishment of SMEs in the States. RMIS generates massive technical information on local sourcing of raw materials, processing technology, equipment selection, new products formulation/development, efficiency, and enhancement of indigenous R&D activities, standardization, testing and quality control, productivity. This data bank formed the platform for housing data that emanated from the numerous surveys conducted by RMRDC (RMRDC, 2020:18).

The RMRDC has also collaborated with the Nigerian Customs Service in terms of data sharing. RMRDC-NCS (Nigeria Custom Service) Collaboration on ASYCUDA

Software. This interface with Automated System of Custom Data (ASYCUDA) software of the NCS was designed to facilitate data exchange and sharing of import/export statistics information resources on raw materials and intermediate products in Nigeria using ASYCUDA Software. RMRDC provided and completed installation of all the hardware requirements for establishment of connectivity between both organizations (RMRDC, 2020).

The RMRDC has also enhance her relationship and partnership with several research institutions as a way of promoting R&D. it is important to note that in collaboration with Obafemi Awolowo University (OAU) Ile-Ife and Star Auto Ltd Lagos developed an automotive brake pad using Palm Kernel Shell (PKS) as friction material, which is environmentally friendly as against conventional asbestos- based brake pad that is carcinogenic. This is against the backdrop of the fact that the local manufacturers of brake bad closed down since they were unable to import the needed raw materials and spare parts. The PKS has been proven by Standards Organization Nigeria (SON) as meeting the requirement. The technology has been since patented. Web offset ink is one major ink used in Nigeria for printing especially by the print media. It is usually called print ink. The RMRDC report (2020) indicates that Nigeria spends more than 1 billion naira annually on the importation of Web-off set ink, about 182 metric tonnes of web offset ink is consumed annually by the news print industry alone.

The reports further claimed that: In order to develop the ink locally and save scarce foreign exchange being used to import the ink, RMRDC in collaboration with Cresol Nigeria limited, Lagos produced web-off set ink using 80% local raw materials. The industrial testing was carried out and the result showed that the locally produced ink was comparable to imported brands. The ink can also be used to produce master batch, an important raw material in the manufacture of paint (RMRDC, 2020:31).

Another area of achievement by the RMRDC is the development of Caustic Soda and Precipitated Calcium Carbonate (PCC). The report of the committee on the achievements of RMRDC (2020) claimed that:

Caustic soda, also called sodium hydroxide is an important chemical raw material in textiles, soap and petroleum industries. PCC is used in the pharmaceutical, rubber, plastics, paint, paper and adhesive industries. In 2015, 219,391MT of sodium hydroxide was imported at the cost of ₦0.4 billion and 32,938MT of PCC at the cost of ₦1.9 billion. In order to address this import gap, Council developed a pilot plant with a production capacity of 250kg/day caustic soda and 158 kg/day PCC. The plant was commissioned by the Honourable Minister of Science and Technology in 2017(RMRDC, 2020:34).

Talc is a major raw material in many industries, notably cosmetics, pharmaceutical and rubber. Despite the demand there was no local production of this vital raw material. In an effort to reverse this trend, RMRDC, in collaboration with Sheda Science and Technology Complex (SHESTCO), developed a process technology for the production of pharmaceutical and industrial grade talc. The result from industrial evaluation of the processed talc from Isanlu deposit in Kogi State showed that the fifteen (15) parameters evaluated indicated promising results (RMRDC, 2020). Adhesives are used by many industries including paper, wood, textiles, chemical, food and pharmaceutical. In order to reduce its importation and address the challenge of low viscosity, tack and wettability as identified by the industry, Council in collaboration with Sheda Science and Technology Complex, (SHETSCO) Abuja and the envelop sub-sector of pulp and paper industry developed an adhesive with the right specifications. The adhesive produced went through industrial testing (RMRDC, 2020).

Titanium dioxide, a pigment used in paint manufacture, is in high demand in the country. However, it is being imported to the tune of about \$7.1m per annum. This necessitated the development of calcined kaolin as a partial

substitute to titanium dioxide in paint formulation. This resulted in 20% substitution of titanium dioxide with calcined kaolin. Two major deposits were found to have excellent characteristics for the production of fine calcined kaolin. The calcined kaolin produced were tested by a paint manufacturer and found to be comparable to the imported titanium dioxide. In an effort to commercialise the technology, Council designed and fabricated a calciner for the production of the calcined kaolin (RMRDC, 2020).

The global demand for castor oil was estimated at 6.7 million tonnes while supply was 3.6 million tonnes leaving a gap of 3.1 million tonnes. Nigeria has the capacity to produce castor oil as this seed can be cultivated in all states of the Federation. In 2011, about 338,168MT of castor oil worth ₦129,440,000 was imported. Nigeria is the largest producer of cassava globally with an estimated annual production of 59 million tonnes in 2017 (IITA 2017). However, the bulk of cassava produced (90%) is consumed locally as food (Gari, Lafun, Akpu), with little left (10%) for industrial processing into flour, starch, chips and pellets and less than 1% for export. Globally, cassava products export stood at an estimated value of \$2.19 billion in 2017 (Otekurin and Sawicka, 2019).

Data from National Bureau of Statistics (NBS) revealed that Nigeria's import of essential oils and resin oils increased from 27,000MT (valued at ₦11.58 billion) in 2005 to 94,210MT (valued at ₦49.17 billion) in 2011. To address the problem of low exploitation of local aromatic plant resources and reduce levels of importations of essential oils, RMRDC partnered with the National Research Institute for Chemical Technology, Zaria and the Federal Polytechnic, Nasarawa to develop 1.0-1.5 liters/batch essential oil plants.

In appraising the RMRDC, the Chairman, Senate Committee on Science and Technology, Uche Lilian Ekwunife maintained thus:

I am reliably informed that the *kilishi* project is one of the innovations of the Council and designed to upgrade indigenous process

technology. It is no longer news that *kilishi* is fast becoming an international delicacy originating from Nigeria. For the purposes of meeting international food safety standards and acceptability, the Council designed a technology to address the issues of hygiene and proper packaging as well as improving the shelf life of the product (BluePrint, June, 16th 2020).

She further claimed that the Council has recorded immense achievements when she itemised the following:

Achievement of the Council in terms of development of pharmaceutical grade starch from wild yam tuber; development of lovastatin from local mushroom specie to address issues of cholesterol; development of caustic soda and precipitated calcium carbonate for the pharmaceutical, paint, cosmetics and other allied industries; development of anti-fungal and anti-diabetic drug; development of phytomedicine for the treatment of tuberculosis (TB); development of automotive brake pad; development of gypsum scrubber for POP and cement manufacturing; development of flash dryer for high quality cassava flour; development of waterborne paints from the blends of natural rubber latex (NR-L) and polyvinyl acetate (PVAc) as binder and development of ethanol, glucose syrup and cattle feeds from sweet sorghum, and a host of others of which *kilishi* is only one of them (BluePrint, June, 16th 2020).

Specific Achievements:

The following core programmes and projects were successfully implemented:

- A. Strengthening the information generation and dissemination capacity of the Council through:
 - i. Information generation and documentation of the raw materials resources of Nigeria.
 - ii. Agricultural commodity survey (cassava, cotton, cocoa, groundnut, gum, maize, rubber,

oil palm, soyabean, cashew, castor, ginger, mango, citrus fruits, pineapple, rice, sugar-cane and sorghum).

- iii. Solid minerals survey (bentonites, barytes, kaolin, gypsum, feldspar, talc, limestone and phosphate)
 - iv. Inventory of machinery and equipment fabricators in Nigeria.
 - v. Formation of Multi-disciplinary Task Force on survey of industrial sub-sectors of Manufacturers Association of Nigeria, highlighting industrial performance, capacity utilization and local content in manufacturing (i.e percentage local sourcing of inputs).
 - vi. Publication of Journal of Raw Materials Research (4 editions have been published within the period).
 - vii. Dissemination of research findings and industrial study reports through release of Council's publications worth over N25million to the public, including tertiary institutions, research institutions and organized private sector (OPS) and multinational companies (MNC).
 - viii. Sponsorship of an ethno-botanical survey/identification and documentation of medicinal plants for exploitation and development of traditional medicine in Nigeria.
- B. Restructuring and upgrading the Raw materials Information System (RMIS) as it relates to the following:**
- i. Development of raw material profiles.
 - ii. Development of profiles of processing industries, fabricators, survey of agro-industries, inventory of experts/resource persons and investment profiles.

- iii. Strengthened and expanded the RMRDC Local Area Network (LAN) and Wide Area Network (WAN) to link key public institutions such as Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), Nigerian Investment Promotion Commission (NIPC), Manufacturers Association of Nigeria (MAN).
- iv. Upgraded the RMRDC Website to make it more efficient, content and information-driven, and enhanced technology content.
- v. Sustained the provision of V-SAT (Internet) facilities to some Research Institutes for enhancement of research activities and dissemination of information on research findings.
- ii. Provide all specific mineralization information easily allowing prospectors to check every part of a database and research on the more relative factors or criteria.
- iii. Computerize the traditional method for making map overlays for mineral resource assessment.
- iv. Combine various types of spatial analysis methods to achieve integrated mineral assessment and also create computer-aided prospecting maps that will be hosted on the RMRDC website.

Promoted the completion of wood seasoning kiln for wood treatment in the furniture industry. Promoted resource-based investments in raw materials development and utilization including:

- v. Upgrading of Talc processing plant Kagara, Niger State.
- vi. Establishment of 1,000 litre capacity Milk Collection Centre in Paikon-Kore, FCT, Abuja.
- vii. Pursuing completion and/or transfer of the following to private sector: fruit juice processing plant, kaolin processing plant, phosphate processing plant, soda ash plant, cocoa processing plant
- viii. Feasibility studies/promotion of different public and private sector organizations for:
- ix. Kaolin processing for Anambra state government
- x. Resuscitation of palm oil mill Kogi state government
- xi. Integrated farming project for a private farm in kwara state
- xii. Mini dairy plant.
- xiii. Alka-chlorin chemical plant, Ogun state (RMRDC, 2015).

In addition to the above achievements, the RMRDC has recorded remarkable success in the following areas:

Development of a GIS-Based Raw Materials Information System

The aim of the project is to digitally map available raw materials in Nigeria and update the existing raw materials database with attributes to reflect current occurrence and geographical disposal. GIS has become an indispensable tool for minerals assessment in developed countries. The Council is leveraging this technology to make a change in the methodology of mineral resource assessment. The GIS-Based Raw Materials Information Database will achieve the following:

- i. Effectively manage geo-scientific data from geology, geophysics, geochemistry, mineral resources and remote sensing especially spatial data from geo-scientific maps in the GIS-based mineral resource assessment.

- i. Championed the harmonization of RMRDC-net with the Public Service Network (PSnet) to form a backbone of the National Data Centre for Science and Technology (NADCEST).
- ii. Promoted the local production of chemicals and reagents by NARICT, Zaria for secondary schools in Nigeria for enhancement of learning in science.
- iii. Supported the upgrading of research facilities in research institutes, universities and polytechnics in the country.
- iv. Institutional support to Federal Ministry of Science and Technology (FMST) and its research institutes by expanding RMRDC V-SAT facility to accommodate the Ministry and the Research Institutes for the purpose of coordination of research activities in Nigeria.
- v. Supported projects on exploitation, development and utilization of natural resources using innovative processes such as biotechnology and genetic engineering (RMRDC, 2015).

Challenges of the RMRDC

Like most institutions in Nigeria, the RMRDC regardless of its efforts and contributions to the Nigeria economy has suffered several setbacks because of several limitations. The challenges of the RMRDC could be classified into economic, political, and logistical limitations.

The economic challenges of the RMRDC border around capital and funds to effectively live up to its mandate. The institution is poorly funded and in some instances funds allocated to the Council are either not realised or released late thereby affecting programme implementation. The mandates of the RMRDC is highly capital intensive and in the event where there is poor budgetary allocation and late release of funds, projects and programmes will be affected. The challenges to the implementation of Council's activities are diverse in nature but the most critical is the issue of sustainable funding as

institutional performance is directly related to the level of funding and timely release of funds. The Council receives a quarterly statutory allocation of one percent import surcharge, which accounts for its main revenue sources. In addition to this, the Council occasionally generates revenue internally which is very meagre to sustain significant programmes of the Council (RMRDC, 2009).

Shading light on the mandate, expectations and the constrain of the RMRDC, Tribune newspaper of Jun 23, 2020 claimed that:

To be sure, the limitations of the RMRDC only mirror the Nigerian experience. The council's mandate includes research into and development of raw materials very much like what is being done in Silicon Valley and Stanford University, but it has been apparently hampered in its duties. Without doubt, the council is operating very much like similar Nigerian institutions that serve merely as points of salary payments for underemployed citizens. Such institutions have lofty goals and objectives but are handicapped by finance, infrastructure, equipment, and of course a political leadership bereft of vision and mission (Tribune, Jun 23, 2020).

Elsewhere, such institutions lead their respective societies in products development based on research. But in Nigeria, socioeconomic realities foreclose such a feat. For instance, the national shortage in power generation is certainly a disincentive to research, production and industrialisation. It may indeed be easy and convenient to despise and criticise the RMRDC for its inability to live up to its statutory mandate, but that can only amount to turning a blind eye to the normative patterns of the Nigerian society (Tribune, Jun 23, 2020).

Another challenge of the RMRDC is the fact that the number of agencies that it collaborates with to achieve its mandate are too much. More often than note, there are cases of inter-agency rivalry either form selfish reasons or because of the lack of clear distinctions in their responsibilities. For instance, the mandate of the RMRDC is closely related to the mandate

of the Federal Ministry of Agriculture and Rural Development (FMARD) Nigerian Export Promotion Council (NEPC) and even the Nigerian Content Development and Monitoring Board (NCDMB).

Because of the strategic importance R&D, the RMRDC partners with Research institutes as its major collaborators. However, the current state of most research institution in Nigeria is also a major challenge towards the realization of the mandate of the RMRDC for several obvious reasons. Most research institutes in Nigeria are in very poor state in terms of their infrastructures, laboratories, and even the quality of man-power. The epileptic power supply and the dilapidated research tools have made innovation and research brake through new impossible. The rate of labour crisis within research institutes also constitutes a major threat to research and development.

Although poor state of engineering infrastructure in Nigeria is a major challenge confronting not only the RMRDC but also local fabricators. This makes it difficult for local fabricators to produce machine to standard and quality. In relations to this is the challenge of compliance by industries and manufacturers to the local content policy. Knowing that the RMRDC is not a law enforcement agent and lacks the powers to arrest or seal companies and manufacturers for noncompliance, the local content policy suffered some setbacks. It is also important to note that the scope of responsibility of the RMRDC is too wide that it is impossible to holistic achieve success in the areas stipulated in its mandate.

Conclusion and the way forward

There is no gainsaying the fact that the developmental trajectories of Nigeria is one that indicates a state that is grappling with the reality of been unable to effectively and efficiently harness her raw material to propel industrial growth and development. The over reliance on imported raw materials for local industries has also not helped the Nigerian state for achieving the needed level of economic growth and development. Over the years government has initiated several policies to spur national development. However, most of these policies

suffer the challenge of implementation. The establishment of the Raw Material Research and Development Council was geared towards addressing the excessive dependence on the importation of raw materials need for industrial use and the manufacturing sector. Since its establishment, the RMRDC has in one way or the other achieved some degree of successes using her strategic implementation plans and involvement in Research and Development.

It is however important to recommend that there is need for better funding of RMRDC if it must live up to its mandate. R&D is only possible with adequate funding. The Nigerian state also needs to ensure that synergy exists between R&D institutions and local industries so as to ensure the effective utilization of research innovations and outcomes. Improvement in basic infrastructure is also germane if the RMRDC must achieve its objectives.

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