Original Article

Higher Education and the National System of Research and Innovation: The Case of the Republic Of Benin

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Received 04 August 2019; Accepted 11 August 2019; Published 11 September 2019

Abstract

The link between theory and practice is the key of development of the country and explain the copetitivness in the international market. In the context of republic of Benin; a lot of the result of researchers are not valorized because of the weakness of system of extension. This study try to identify the problem. The diagnostic analysis show that we have research institutions without linkage, weak financng in the research sector, without leadership actors. So; Benin's ability to be part of international economic competition will rely more and more on its capacity for innovation and research and the quality of education and training.

Keyword: ***High education; research and innovation; Extension results research***

JEL O32; P17; Q16; R38

1. Introduction

After nearly 50 years of independence, the development of Benin still faces many problems that scientific and technological research should provide solutions. The issue calls into question several structuring questions that are the non-adaptation of scientific and technological research to development needs, the institutional and organizational insufficiency, the inadequacy of human, material and financial resources adapted.

But, despite certain and significant efforts to establish a national research and innovation system, the Beninese research sector faces problems and constraints that keep the sector in a latent sluggishness. The non-existence, in Benin, of a law of orientation and law of financing of research in STI to establish an institutional and organizational framework undermines the functioning of the sector. The fragmentation of STI research structures in Benin that operate in a vacuum and whose supervisory position varies according to the configuration of successive governments

Scientific research has remained an appendage of higher education without the autonomy and visibility inherent in its strategic importance in the development of the country. This low visibility of the sector and the lack of a real research system in science, technology and innovation mean that Benin has difficulty in providing reliable and regular statistics that can provide information on the state of research in Benin.

However, the Republic of Benin has a scientific and technological potential both in terms of specialized research and training structures and in terms of qualified human resources. The number of schools and universities is increasing year by year, as are the number of researchers and research professors. These structures and men are a powerful potential to work towards finding effective and sustainable solutions to the development challenges facing the country.

The situation still poses serious problems of persistent coordination because of the non-clarification of the missions and attributions of the structures of execution, governance and financing. This internal inadequacy in terms of harmony for coherent coordination and governance of research and innovation has been felt at the level of sector ministries and other development sub-sectors such as health, education, etc.

In this situation of lack of mastery of the formal framework of research for innovation, Benin has not been able to capture and exploit its informal sector of research in full swing in order to make STI play its role of vector and propeller of sustainable development.

How to build a more operational research system framework between universities, companies, and different research-related departments? What role could universities play in this system to become a catalyst for development? This work tries to analyze the relations between knowledge and development. the current evolution of the research structure. and the resulting shortcomings, based on the innovation system, the university innovation system and its limitations. Finally, it proposes ^ avenues of analysis that

could make national universities, a catalyst system for research and knowledge for the country and for the region

2. The Beninese context of research

Located in West Africa between Nigeria in the East, Togo in the West, and bordered to the South by the Atlantic Ocean and to the North by Niger and Burkina Faso, Benin extends over an area of 114,763 km². According to the fourth General Census of Population and Housing (RGPH4), Benin's population is 10,008,749 inhabitants in 2013. With a sustained annual growth rate of 3.50%, the population could be estimated at horizon 2025 at about 15,123,696 inhabitants. It is relatively young (with 46.65% of people under 15) and still predominantly rural (55.4%) despite rapid urbanization of around 5% per year. The country is subdivided into twelve (12) departments, seventy-seven (77) communes and five hundred and forty-six (546) districts. The continuous growth of the population results from a high and constant fertility, a gradually decreasing mortality and a not insignificant migratory flow.

The growth rate of Benin's population (3.50%) is at the root of many challenges in terms of social demand (nutrition, education, health, employment, housing, urban management and the environment, etc.) and the availability of factors. of production. More than 52% of the population is under 18 years old. Life expectancy at birth is 63.84 years, slightly higher in urban areas (64.74%) compared to 61.88% in rural areas. The active population (15-64 years old) represents 50.5% of the total population. More than 44.6% of the population lives in urban areas compared to 55.4% in rural areas.

On the political front, the last ten years have been characterized by the continued implementation of the system of pluralist democracy, resulting from the conclusions of the Conference of the National Forces of the Nation, held in February 1990. This period offered a climate peace and favorable conditions for participatory management of national development. The proper functioning of the democratic system put in place has generated political stability favorable to development. This situation, while improving, has allowed Benin to strengthen its political integration both at the sub regional and international levels.

At the socio-economic level, the Beninese economy has experienced slow economic growth, slow and insufficient (3.8%) to cope with the social demand generated by high population growth. This imbalance between population growth and economic growth is leading to the development of an increasingly poor population. The economy is characterized by a predominant primary and tertiary sector and a secondary sector struggling to take off. It is part of several sub regional economic areas, including the West African Economic and Monetary Union (WAEMU) and the Economic Community of West African States (ECOWAS). Over the past decade, macroeconomic developments have been marked by a contrasting growth profile and an insufficient degree of openness to induce sustained growth.

In addition, the national environment remains strongly influenced by the marked international context, during the decade 2001-2010, by important changes following the adoption of new technologies in different economic activities, the development of foreign trade, rising oil prices and the economic and financial crisis. These developments offer opportunities, but also create obstacles to achieving development goals.

Overall, it should be noted that Benin's socio-economic indicators are still weak. The country aspires to strong and sustained economic growth to significantly reduce poverty but the global economic trend is part of a dynamic of regionalization and globalization where the only pillar on which the developing countries can base themselves is competitiveness.

3. Methodology

This study is the diagnostic and use literacy review in the research institutions, and twenty interviews of actors in the sector. All information's are translate and analyzed. So the study describe the tendency.

4. Theoretical frame

4.1- Recent performance in scientific research and innovation in Benin

4.1.1- Institutional Reforms in the Ministry of Higher Education and Scientific Research

Steps have been taken by Benin to make scientific research and innovation a real lever for national development. Indeed, to enable the IHR to play its role of development engine fully and effectively, in 2012 Benin created two major structures to support scientific research and innovation. The National Fund for Scientific Research and Technological Innovation (FNRSIT) created by Decree No. 2012-140 of 7 June 2012 has the mission "to ensure the financing of the national system of scientific research and innovation to make research a real lever for development in Benin ". The Beninese Agency for the Valorization of Research Results and Technological Innovation (ABeVRIT) created by Decree n ° 2012-139 of June 7, 2012 has for mission "to implement, the national strategy of technological and industrial development, in particular by the exploitation of the results of the research, in collaboration with the public and private structures and institutions concerned ". This agency is responsible for supporting economic and social development through the exploitation of research results.

The National Platform for Public-Private Partnership for Science, Technology and Innovation "(PNSTI) initiated since 2012 is a melting pot of exchanges between research structures, innovators and private sector structures that use the products scientific and technological research. The founding texts of the PNSTI were validated in 2015 and the creation decree is in the process of being adopted. The mission of PNSTI is to promote the public-private partnership for scientific and technological research for development.

The entry into activity of these two support structures since 2013 and the forthcoming operationalization of the platform are major actions for the IHR to contribute visibly and efficiently to the socio-economic development of the country.

The ongoing development of the new National Policy for Scientific Research and Innovation in the Republic of Benin and its 2025 Strategic Plan is also an important step towards making IHR a real driver of development. national.

4.1.2- Measures taken by Benin to develop endogenous capacities in research and development

Since 2013, the FNRSIT has started its activities. One of its activities listed as an attribution in the creation decree is to promote the implementation of a policy of capacity building of the research sector, by a support to the training of the human resources, the construction infrastructure and equipment of research structures. This activity will make available not only qualified human resources to the research structures, but also adequate infrastructure and equipment for efficient research activities. In addition, the activities of the Research Infrastructure

and Equipment Reinforcement Project (PRIER) initiated before the FNRSIT began operations are also an important activity in Benin aimed at developing endogenous research and development capabilities.

Since its inception, the fund has financed scientific research and innovation activities on resources allocated solely by the national budget. Among the major criteria for the selection of research projects and programs is the linkage of themes with the country's strategic development objectives drawn up by the Government. This linkage is reflected in the priority research programs defined by the National Council for Scientific and Technical Research (CNRST).

4.1.3- Measures taken by Benin to increase its capacity to acquire new technologies

The acquisition of new technologies is the key to technological and industrial development because it enables companies and industries to strengthen their competitiveness. This competitiveness is achieved through the improvement of the production capacity of usual goods or services or the development of new products or services.

To increase its capacity to acquire new technologies, Benin has given the Beninese Agency for the Valorisation of Research and Technological Innovation Results (ABeVRIT) the responsibility of mobilizing the necessary financing for innovation and technology transfer. from research centers to the companies that need them, the management of innovation support by creators and laboratories for the benefit of small and medium-sized enterprises (SMEs), small and medium-sized industries (SMIs) and organization of the technological watch, in particular by setting up observatories, incubators and networks for the diffusion of technology.

One of the agency's activities is updating and broadening companies' knowledge through a training policy designed to enable them to master the aspects related in particular to project management, technology evaluation, marketing, intellectual protection and industrial partnership. The implementation of these provisions contained in the ABeVRIT creation decree will increase the country's capacity to acquire new technologies for the benefit of its companies and industries.

The ongoing implementation at the University of Abomey-Calavi (UAC) of the Technology Transfer Promotion Center and the Specialized Enterprise Incubator Park (PISE) constitute concrete actions that demonstrate Benin's determination to increase its ability to acquire new technologies.

Measures taken in the area of communication and information and communication technologies

The measures undertaken in this sector are as follows:

- The deployment of a second submarine cable called CABLE ACE (submarine fiber optic cable) which was commissioned in October 2015, the purpose of which is to strengthen the Internet connection and ensure redundancy with the first SAT3 submarine cable;
- The establishment of an IXP exchange point to facilitate electronic exchanges in Benin;
- The creation of an incubation center for young entrepreneurs in ICT. The goal is to create the application development competency among youth who have received an ICT training base;
- The implementation of a project to develop ICT infrastructure thanks to funding from the EXIMBank of China. This project aims to ensure the extension of optical fiber throughout the country and the fiber optic marriage of the main cities of the country, including Cotonou, Parakou, Porto-Novo. This will make the internet accessible to all citizens;
- The establishment of the Beninese Agency for Universal Postal Communications Services. The objective here is to reduce the digital divide of electronic postal services between urban and rural areas;
- The establishment of the Beninese Agency for Information and Communication Technology. This will help support the public administration in the establishment of electronic governance;
- The establishment of the Regulatory Authority for Electronic Communications and the Post Office to ensure effective regulation of the sector by exercising regular controls on the functioning of companies created in the field of GSM. Thanks to this structure, the important resources are mobilized for the benefit of the State;
- The reforms at Benin Télécom SA that led to the creation of two new companies: Benin Télécom Service SA and Bénin Télécom Infrastructures SA Benin Télécom Service SA deals with customer services and Benin Télécom Infrastructures SA deals with basic infrastructure in the sector. The objective of its reforms is to improve people's access to the Internet of better quality at an affordable cost;
- Ongoing reforms at the post office for the multiplication of financial services and postal services and also the computerization of all post offices;
- Benin has been involved since 2014 in the process of switching from analogue terrestrial radio to digital radio broadcasting. Thus, a law on the transition to digital radio was passed in parliament and funding of about 35 billion FCFA was raised thanks to the support of the BOAD to support this process. By December 31, 2015, it is hoped that Benin will switch to digital radio broadcasting;
- Implementation of the Allo Service Public project to improve access to administrative information through the use of ICTs;
- The vote of the law 2014-14 of July 9th, 2014 relating to the electronic communications and the post office in the Republic of Benin envisaging a contribution of the GSM Companies to the financing of the research activities;

In addition, it is also envisaged the creation of a center of excellence in ICT. Reflections are continuing for finalization.

4.2- Existence of an institutional framework to support research

The institutional framework for scientific research and innovation in Benin can be grouped into five broad categories:

- Research governance and coordination structures: CNRST and DNRST;
- Public non-university research structures;
- The universities;
- Private research structures;
- Support structures for research.

4.2.1- Research governance and coordination structures

The research governance structures are the CNRST and the DNRST.

Created by Decree No. 2006-106 of 16 March 2006, the CNRST has the following functions:

- To define the national policy for scientific and technical research;
- Develop the strategic plan for the development of scientific and technical research;
- To ensure the coordination of the entire national scientific system;
- To monitor the implementation of the decisions of its deliberations.

The Council is chaired by the Minister in charge of scientific research and its permanent secretariat is provided by the National Director of Scientific and Technical Research.

As for the DNRST, it is an order of the Minister of Higher Education and Scientific Research dated August 2013 which defines, among other things, its mission and its attributions.

Its mission is "the design, coordination and monitoring of state policy on scientific research and innovation. It proposes the orientations in

Scientific research and innovation policy and mobilizes the means necessary for their implementation, in relation with the research and higher education institutions which are the operators."

4.2.2 Non-university public research structures

They include the Beninese Center for Scientific and Technical Research (CBRST) and its research institutes, the National Institute for Agricultural Research in Benin (INRAB) and the research centers of the other ministries that carry out research.

Under the supervision of the Ministry of Higher Education and Scientific Research, the CBRST's mission is: (i) to contribute to the promotion of scientific and technological research and innovation; (ii) to organize national structures for implementing research programs; (iii) monitor and evaluate annually the execution of programs and projects of research structures. Ten (10) institutes are the CBRST's operational research structures.

INRAB is an institution under the supervision of the Ministry of Agriculture, Livestock and Fisheries (MAEP) and its mission is to produce technologies for the rural world in harmony with the preservation of natural resources and to contribute to the advancement of science. It has six research centers spread over the national territory. Other public structures are under the supervision of the various ministries (Health, Environment, Town Planning and Housing, Development, Maternal and Primary Education, Energy and Mining ....)

4.2.3 Universities

Important link of the research, they regroup the public universities (UAC, UP, UAK, UPA, UPN, USAT-N) and the private universities. Public universities are full of laboratories, training and research units. Universities have three roles to see research, teaching and service namely the professional world made up of communities of industries

4.2.4 Private Research Structures

They concern NGOs operating in research, international research institutions, foreign research institutions.

- NGOs operating in the research sector
  They are a number who operate in the world of research. The database of the DNRST lists about twenty.
- International research institutions
  They are three (3) and contribute to the internalisation of science in Benin. these are: (i) Research Station of the International Institute of Tropical Agriculture (IITA-Benin); (ii) Africa Rice Center (AfricaRice); (iii) Bioversity International.
- Foreign research institutions

Two foreign institutions operate in Benin in research. It is the Research Institute for Development (IRD), a French public scientific and technological institution, and the Center for International Cooperation in Agronomic Research for Development (CIRAD), which is also a specialized French public institution in agronomic research applied to hot regions.

4.2.5 Support structures for research.

In 2012, two research support structures were created. It is the National Fund for Scientific Research and Technological Innovation (FNRSIT) and the Beninese Agency for the Valorization of Research Results and Technological Innovation (ABeVRIT). The National Fund for Scientific Research and Technological Innovation was by Decree No. 2012-140 of 7 June 2012. It is a CNRST instrument for resource mobilization and research funding in Benin. Its mission is "to ensure the financing of the national system of scientific research and innovation in order to make research a real lever for Benin's development".

As for the Beninese Agency for the Valorization of Research Results and Technological Innovation, it is created by decree n ° 2012-139 of June 7, 2012 and has for mission to implement, in collaboration with the structures and public institutions and concerned, the national strategy for technological and industrial development, in particular by exploiting the results of research.

In sum, the analysis of the institutional framework of scientific and technical research makes it possible to highlight the effort made by the Government of Benin in recent years through the setting up of support structures for research, notably the FNRSIT. and the ABeVRIT. But this effort must be pursued by the provision of resources to these structures so that they can play the roles that are theirs in the functioning of the scientific research system in Benin. (first of all, the low budget of these structures - not respecting the initial budget allocation)

The diagnosis has shown that there are a multitude of institutions that operate in scientific research. The analysis of the database available at the DNRST shows that there are at the level of: i) universities nearly 120 units, laboratories or research center; (ii) public non-university research facilities, some 60 centers or institutes, and nearly 25 research-based NGOs. This poses the problem of atomization of STI research structures; this can only make it difficult to coordinate activities and provide reliable statistics.

The institutional analysis above shows that the DNRST, coordinating structure of research, has only collaborative relations with all research structures; this reveals that no structural obligation binds them to the coordinating structure. It is true that to reinforce this collaboration, the decree concerning the powers and functioning of the DNRST has created a consultation committee between the DNRST, CBRST, FNRSIT and ABeVRIT. Even if this framework facilitates the consultation at the level of the structures of the ministry, it can not have a real impact on the system of the research, although from the legal point of view, the DNRST has today its legitimacy only of the ministry because created by the MESRS Order while all three other structures (CBRST, FNRSIT, ABeVRIT) have it from the government because created by Decree.

The institutional diagnosis clearly reveals a lack of partnership between STI research structures and the productive sector. It is true today that this void seems to be theoretically corrected with the belonging of the structures responsible for the productive system to the Boards of Administrations of the FNRSIT and the ABeVRIT. This is a step that needs to be strengthened because in order for the research to be adapted to the needs of the productive sector, it must be integrated into the system in order to take into account their concerns. (and the PNSTI ????)

4.3 Deficit of the level of investment in research and innovation

4.3.1- Human resources engaged in research and innovation

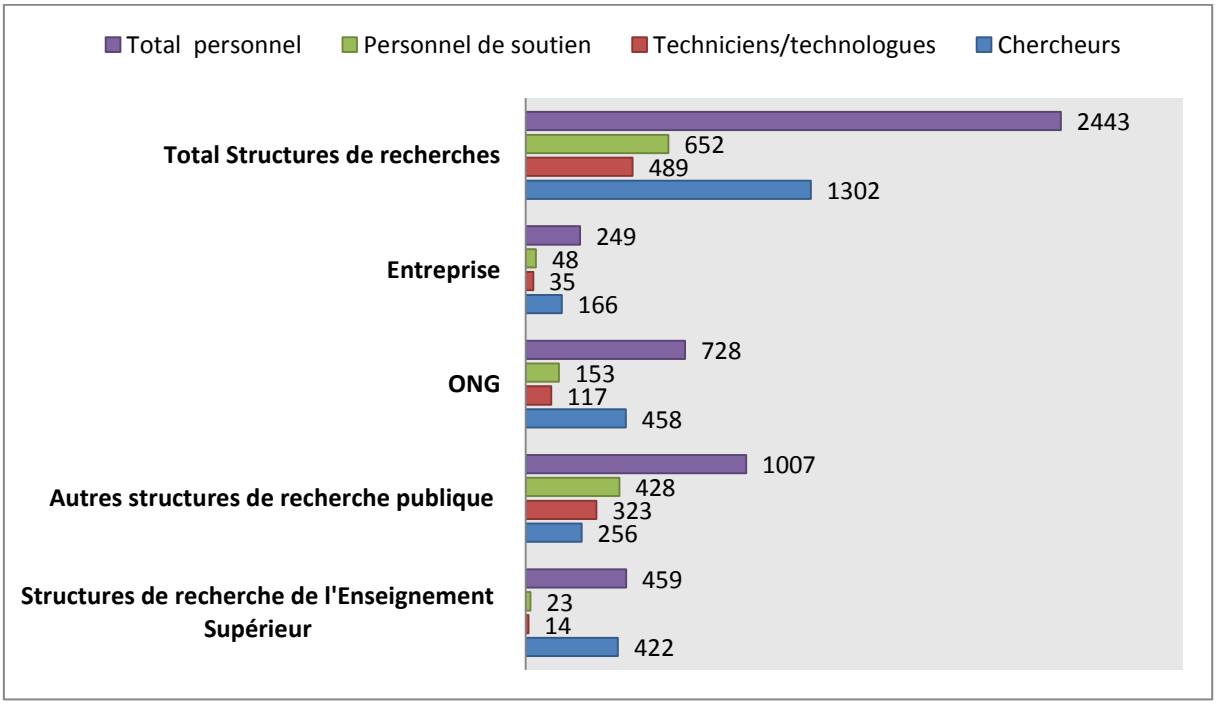
In Benin, there are about 2443 people in all categories engaged in research and innovation, ie 1442 Full-Time Equivalence (FTE). Within this population, there are 540 women, or 22.10% of the total workforce. This engaged staff comes from higher education research structures (18.8%), other public research organizations (41.2%), research NGOs (29.8%) and companies (10.8%). , 2%).

The gender analysis of the number of staff engaged in research and innovation, within each research structure, shows that companies hire more women than men in research. Indeed, the proportion of women engaged in research stands at 49.4% of the staff at the Enterprise level, 30.2% at the level of the public structures and 26.9% at the NGO level. But it should be noted that the number of women in public structures (221 women) is higher than that of NGOs (196 women) and enterprises (123 women).

The analysis of the types of human resources engaged in research and innovation in Benin, according to the graph below, reveals that there are more researchers (53.3%) than technicians / technologists (20%) and support staff (26.7%). Thus we count globally:

- At the level of researchers: 1302 people, 21% of whom are women in the higher education research structures (32%), other public structures (20%), NGOs (35%) and companies (13%). %).
- At the level of technicians / technologists: 489 people including 16.8% of women involved in higher education research structures (2.9%), other public structures (66.1%), NGOs (23.9%) and businesses (7.1%).
- At the level of support staff: 652 people, 28% of whom are involved in higher education research structures (3.5%), other public structures (65.6%), NGOs (23%), 5%) and businesses (7.4%).

The sex-specific analysis of the number of researchers within each research structure shows that the number of women involved in research is higher at the enterprise level (63.3%) than at the Public Structures (24.3%) and NGOs (18.8%). Thus companies hire more female researchers than men. This situation is not identical with the other categories of research actors. Indeed, NGOs employ more female technicians / technologists than men because the number of these women is higher at the level of NGOs (43.6%) than at the level of Public Structures (27.9%) and Businesses (20%). Regarding the situation of public structures, they hire more women as support staff than men because the number of these women is higher at the level of Public Structures (63.2%) than at the NGO level. (38.6%) and Enterprises (22.9%).



Graph 1: Structure of staff engaged in research and innovation in Benin

4.4. Financing research and innovation

The diagnostic analysis showed that funding for research and innovation activities from the budget did not exceed 1% of GDP. Compared to the National Budget, the research sector concentrates about 4% of the resources allocated to the Ministry of Higher Education and Scientific Research and less than 1% of the State's general budget.

In addition, the funding requirements for research and innovation will remain high, given the constraints of the budget, the limits of external financing (public aids and IDEs) and the lack of funding from banks that consider research. as a risky and low-profit activity in the short and medium term.

4.5. Profile of Beninese companies in research

Of the businesses linked to innovation, 87.2% belong to networks while 12.8% do not end up in any network.

The geographic market of sales of these companies varies. 48.8% sell their products in some departments of the country. 26.8% sell their product nationwide, 14.6% in the African market, 4.9% in Europe, 2.4% in Asia and 2.4% in the rest of the world. The majority of companies (75.6%) therefore sell the products in local and national markets. Less than a quarter of innovation-related companies sell in regional and international markets.

Product innovation (goods or services)

Of the firms involved in innovation, only 15.4% introduced new or significantly improved products to the market and 12.8% purchased new or significantly improved products from other companies and made exclusively cosmetic changes. .

Developments developed mainly by companies in 60% of cases jointly with other companies in 10% of cases, by adapting and modifying the goods and services of other companies in 10% of cases, and mainly by others in 20% of cases.

Under the 2011-2013 review period, the innovations put on the market in Benin come from national companies in 54.55% of the cases, 9.09% from the rest of Africa, 18.18% from Europe and 18.5% from Europe. , 18% of Asia.

The innovations of goods and services made, during the three years 2011 to 2013, were new in 50% of the cases on their market. These innovations are new in 88.9% of cases for companies compared to 11.1% of cases where they are not new.

Process innovation

The investigations revealed that 31.8% of innovating companies introduced novelties or significant improvements to their processes of manufacturing or producing goods or services; 36.4% have introduced new or significant improvements to your logistics, supply or distribution methods for raw materials, goods or services and 31.8% have introduced new or significant improvements to your support activities for your processes, such as maintenance systems or purchasing, accounting or computer operations.

These process changes are made mainly in 50% of cases by the companies, 8.3% of the changes are made by the company and jointly with others and 41.7% are made exclusively by other companies.

Among the process innovations recorded during the 2011-2013 period, 30.8% were new to the market for its goods.

Innovation activities in progress or discontinued

It should be noted that 89.7% of innovation activities initiated at the level of enterprises are coming to an end; only 10.3% of these activities are abandoned before completion. Also 12.8% of innovation activities were still in progress at the end of 2013.

Business engagement in innovation activities

During the 2011-2013 period, several companies engaged in innovation activities, of which 33.3% invested in intramural or internal research and experimental development (R & D), 20% in extramural or outsourced R & D and the rest in acquisition and training activities. With regard to acquisitions and training, it is found that 64.3% of companies engaged in innovation activities invest in the acquisition of machinery, equipment and materials, 15.4% in acquisition of software and 42.9% in the acquisition of other external knowledge. Also 46.7% of the companies surveyed declare to invest in training, 38.5% in the introduction of innovations on the market, 26.7% in design and 21.4% in other innovative activities.

Funding sources

Between 2011 and 2013, the resources used to finance innovation activities came mainly from the company's own resources (73.3%). External financing is very low. 6.70% of companies that invested resources in innovation activities reported having received support from the central government, 13.3% from support from National Funding Agencies and 6.7% from support from foreign governments and / or other foreign public sources (eg The European Commission). None of these companies has benefited from the support of their municipalities or departmental or local authorities.

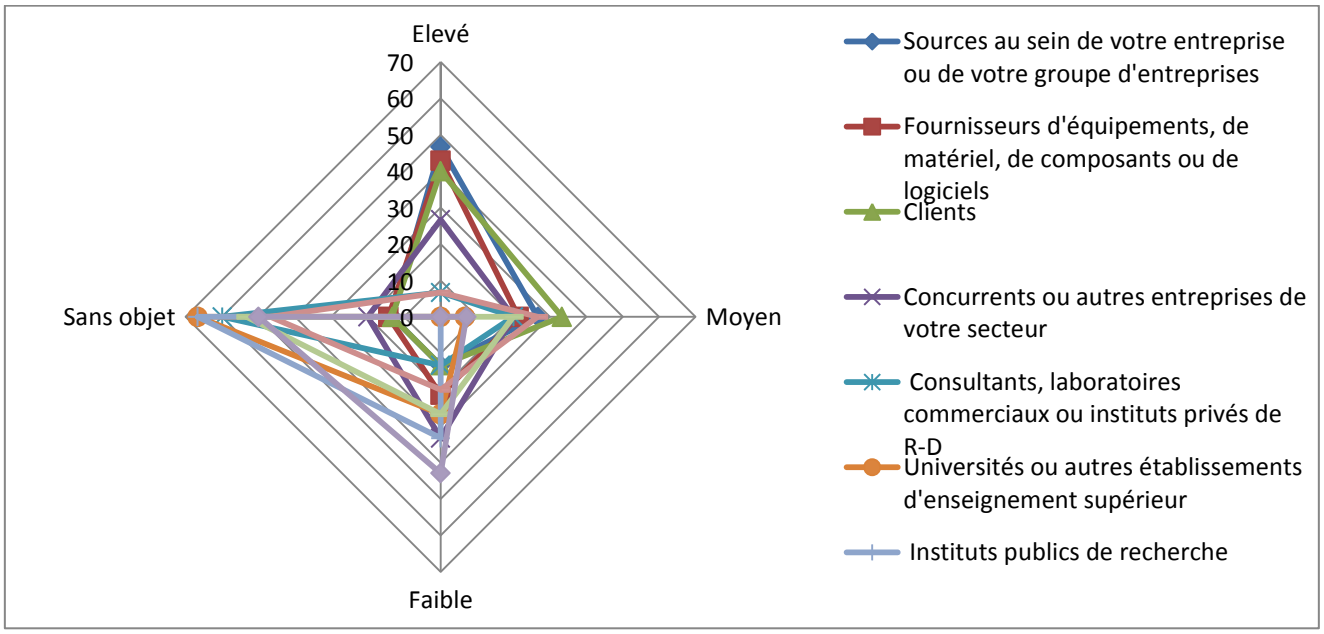
Importance of each of the sources of information

The investigations revealed that the main sources of information for innovative activities are, as indicated in the graph below, those established within companies or groups of companies, followed by those of customer assessments of products. and those from suppliers of equipment, hardware, components or software.

Indeed, among the most used sources of information, sources within companies or groups of companies are those cited by 46% of the companies surveyed. Those relating to suppliers of equipment, hardware, components or software are cited by 42.9% of the surveyed companies. The sources of information emanating from customer feedback on the products are cited by 40% of the companies surveyed.

The sources of secondary information used in the context of innovative activities are those of competitors or other companies in your sector, study reports of consultants, commercial laboratories or private R & D institutes, and those of conferences, trade fairs or e -positions.

Sources of information from public research institutes, universities or other institutions of higher education, professional and industrial associations and those resulting from scientific journals and professional and / or technical publications are used very little.



Graph 2: Sources of information of innovative activities

Type of cooperation partner and its location

Regarding the types of partner, cooperation and location, the investigations reveal that companies that carry out innovation activities cooperate with 50% of the other companies within their group in Benin, 25% of those who are in the rest of Africa and 25% in other countries of the world.

These companies partner with 50% of equipment, hardware, component or software suppliers from the rest of Africa, 25% from Europe and 25% from other suppliers around the world.

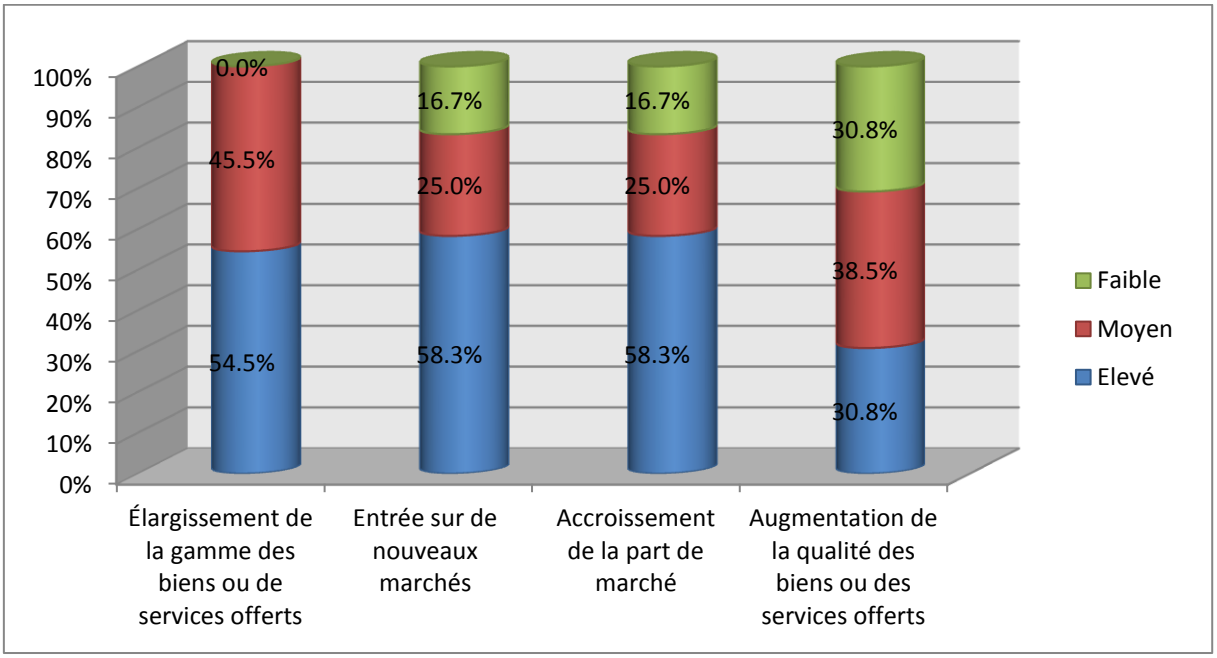
Also these companies are in partnership with the customers of which 75% of them are located in Benin and the others in Africa-Europe-Asia and / or United States. But it is noted that these companies are in partnership with their competitors or other companies in their sector of which 75% are in Benin and 25% in the rest of the world.

Regarding the partnerships of these companies with consultants, commercial laboratories or private R & D institutes, 75% of these are located in Benin and 25% in the rest of the world.

Finally, the companies surveyed declared to be in partnership with universities or other higher education institutions and public research institutes, one-third of which are in Benin, one-third in Europe and one-third in Asia.

Importance of results / effects on products

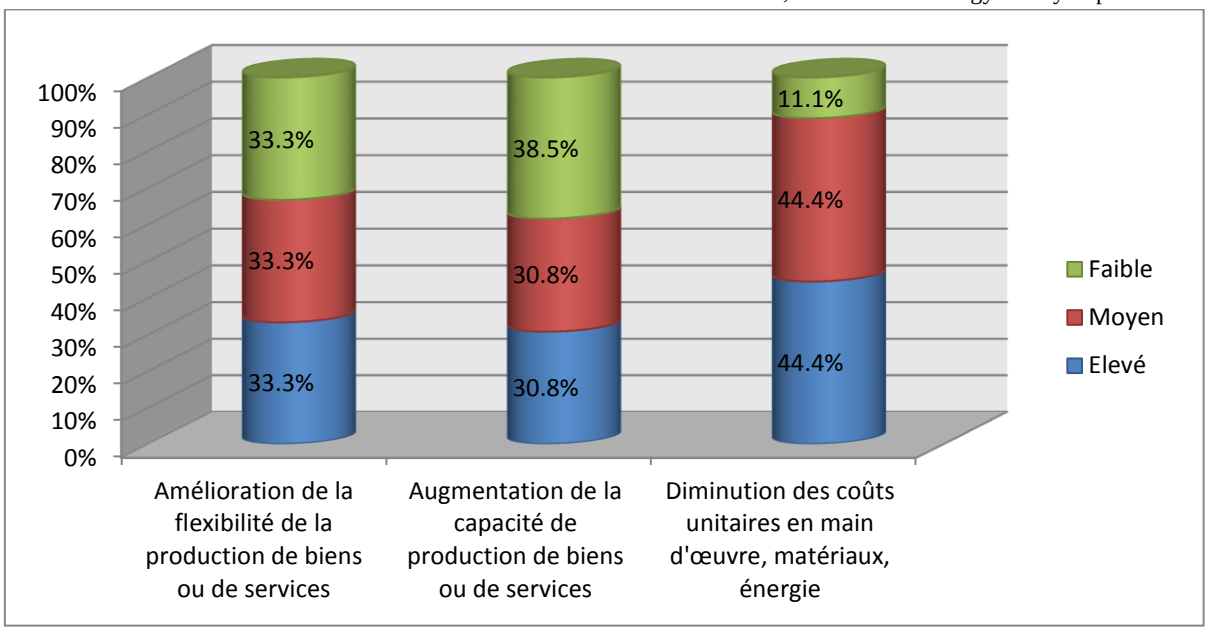
The innovative activities carried out by the innovative companies have proved to be very profitable for these actors. They had a very positive effect on expanding the range of goods or services offered, entering new markets and increasing market share. According to the graph below, the effect obtained on the products is very high in all the results, except for the average effect obtained in terms of the increase in the quality of the goods or services offered.



Graph 3: Importance of Results / Effects on Products

Significance of results / Effects on processes

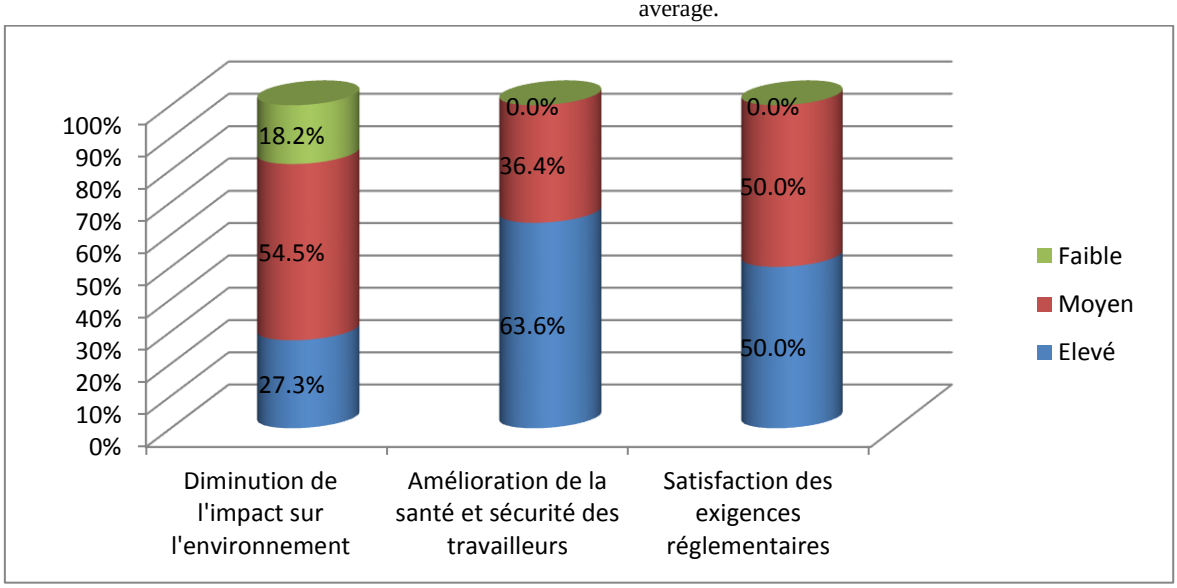
The results of the research carried out by the companies have slightly modified the quality of the production processes of the goods or services of these companies. However, there is an improvement in the flexibility of the production of goods or services, the increase of the production capacity of goods or services and the reduction of unit costs in labor, materials and energy. According to the graph below, the level of change is still average so not very significant but the effect on decreasing unit costs in labor, materials and energy is very important.



Graph 4: Importance of results / Effects on processes

Importance of results / Other effects

Other effects observed on the implementation of research results include reduced environmental impact, improved health and safety of workers, and the fulfillment of regulatory requirements. According to the graph below, the application of the results of research and innovation has had a very positive positive effect on the health and safety of workers. On the other hand, the effects obtained on the level of satisfaction of the regulatory requirements and the one of the reduction of the impact on the environment are average.



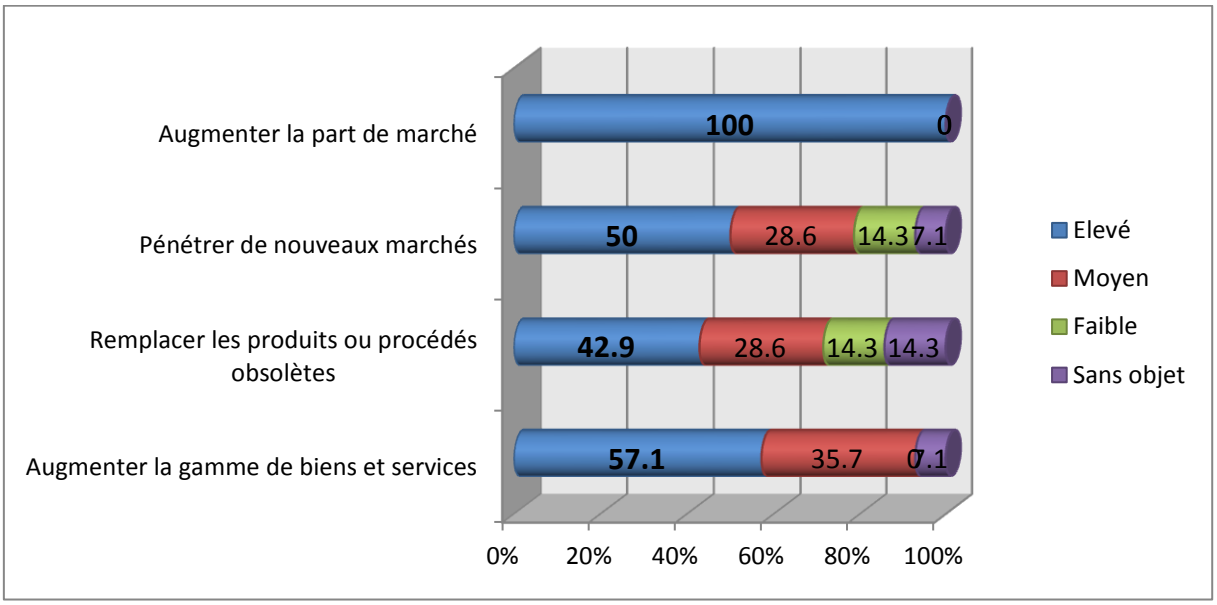
Graph 5: Importance of results / Other effects

Importance of the objectives pursued by companies

The main objective pursued by all innovative companies, according to the graph below, by investing in research and development is to increase the market share of their product. This is justified by the fact that the importance given to this objective by 100% of innovative companies is very high.

The secondary objectives pursued by innovative companies as important as they are are, among others, the increase of the range of goods and services provided and the penetration of their product in new markets because the importance granted by these companies to these objectives are average.

The observed tertiary objective pursued by innovative companies is the replacement of obsolete products or processes, as 42.9% of these companies place a very high importance on them.



Graph 6: Importance of objectives pursued by companies

Conclusion

This work has tried to analyze ways of improving university research as a catalyst for development at the regional level.

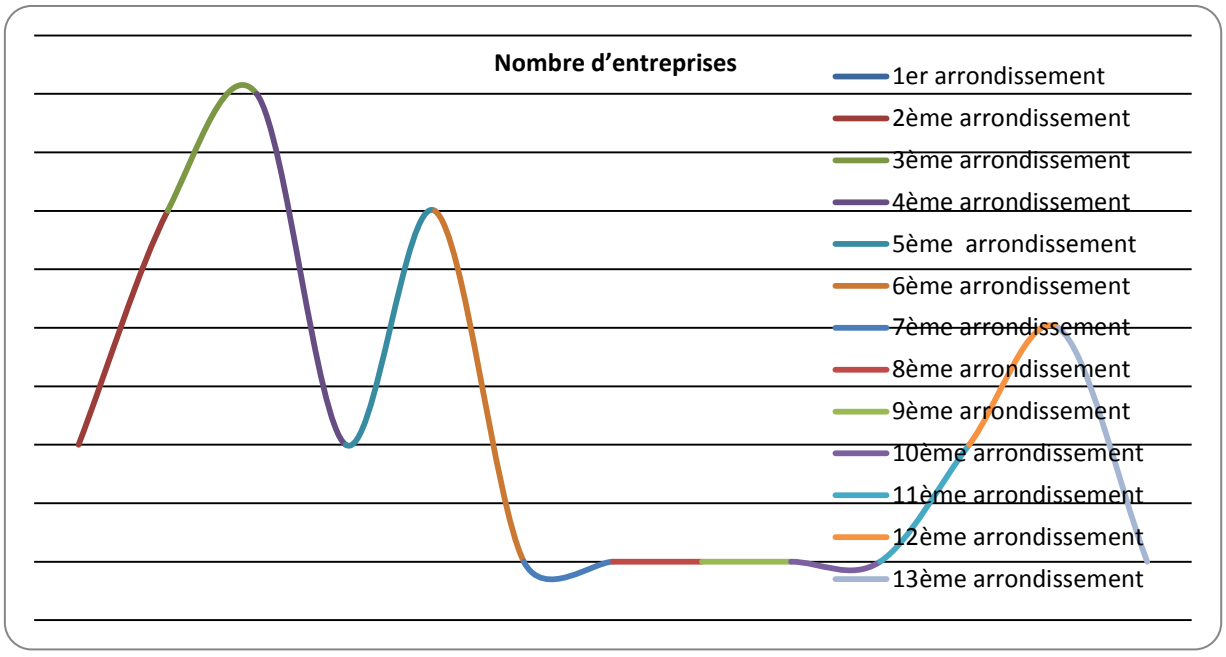
The main question to ask is "how to develop research and innovation quantitatively and qualitatively in an economic context in Benin where fiscal and financial room for maneuver are strongly constrained?

If Benin hopes to integrate into this global economic context, it is essential to understand that the economic competition of tomorrow will be a battle of creation and invention. Benin's ability to be part of international competition will rely more and more on its capacity for innovation and research and the quality of education and training.

On this basis, the development strategy of the research sector must improve the economic and socio-cultural performance of research and innovation. Specifically, you must:

• improve the efficiency of the research and innovation sector and increase the technical and organizational capacity of the sector. Thus, university research will strengthen multidisciplinarity to better meet the needs of knowledge and generate income for investment. This strategy would be followed by performance indicators from the universities and other structures that are in the system. Research must be considered in volume, reputation and income. Thus, take into account the research environment, and its influence in the environment, by creating model and competitive schools in the international image, ensure mobility between academics and researchers at the national level and in the world, know transferred the income from the industrial world in the research sector,

Chart Density of innovative companies by district in the coastal department



This graph shows the virility of companies on the territory. Some boroughs benefit more from locating innovative businesses than others like the second, fifth and twelfth districts. Other boroughs have none at all on their territory; this is the case of the sixth, seventh and ninth arrondissements. The inadequacy of innovative firms explains the weak link between university research and production company. The university as a catalyst for development requires reflections in this sense between theory and practice and also the application of research results within companies. .

These results also indicate a great inequality of concentration of research activities and their application.

Conclusion

The results show that the link between theory and practice is quite weak in the Beninese context. However, several research results are in progress and are not popularized due to lack of resources and training tools in extension.

It would be necessary to identify the types of results that are least valued in research, easily mobilized funding, investments in communication to reinforce this link between university and business, to return to methodological approaches, target groups, how target groups can contribute to the research they will benefit from. The beneficiary's participation in the research contributes to and facilitates the adoption of the results.

Also look for the causes of the low concentration of companies, and even better in the south, There is a very great inequality of distribution throughout the national territory. The analysis by sector aggravates the inequality because the majority come from the agricultural sector.

The university must define a policy of research and orientation in this direction which must be operationalized in the trategic documents and action plan. This action must take into account certain points such as the succession of the industrial sector which must rely on agricultural production, environmental and especially renewable energy.

Develop ITS to strengthen the partnership between the different actors of the research.

Enhance the research evaluation system to become more effective and efficient in order to foster the creation of programs or other convergent partnership activities between the two sectors in the public and private sectors.

To provide research according to demand on the market and following the technonology of industries.

Committees for intellectual interaction and collective decision-making.

University research must also be based on a governance policy

- The administrative management of research to support research activities. This part would manage human resources related to the research sector and improve the organizational process Funding

The analysis of the research sector as a catalyst for development is a process of construction between different actors at different stages.

In conclusion, it appears that the results of the research sector from the laboratory results can lead to major program routes at the national level. this would not be possible without the link between institutions, actors, a good system of institutional governance and coordination. A multidisciplinary approach and in different sectors organized at the national level then with an international vision would be put in place with a good communication system

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