

Issues on Inventions, Research and Development Outcomes and Patent Generation in Nigerian Universities

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Abstract

The Nigerian Universities Research and Development Fair was instituted to enable the universities showcase their inventions. Surveys of the first two of the fairs showed that radical and incremental product and/or process industrial, agro and information and communications technologies were displayed. About 17% of the inventions had been commercialised. Inadequate publicity and non-patenting among others were blamed for the non-commercialisation of the other inventions. Furthermore, most of the inventions could only satisfy local needs. The study concluded that there was inadequate knowledge about patent matters in Nigerian universities, and recommends that institutional framework to promote generation and patenting of the inventions be established in the institutions.

Keywords: Universities, inventions, patents, technology transfer

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1. Introduction

Universities traditionally serve the dual purposes of training students to develop high level manpower with creative abilities, and conduct researches directed at discovering new products and processes, thereby adding to the pool of knowledge. Being that research is a core activity of universities; a university can therefore be assessed by the number and quality of its research outputs, which are usually published in journals. However, since a new social demand of transferring technology to business sector was added to their mandates (OECD, 1998), universities had been patenting their inventions, rather than disclosing them in journals. Therefore, patents generation can be used to assess productivity of universities.

From two universities at independence in 1960, the number of universities that were admitting students to various programmes in Nigeria rose to 56 in 2004, and increased to 76 by 2006 (NUC, 2007). During the 2004/2005 academic session, these universities had a combined student population of 724,856. There had been several claims of inventions and the development of appropriate technologies that could benefit the local economy by Nigerian universities, polytechnics and public research institutes. However, several of these inventions have not been commercialised, and they remain in the confine of the institutions. Oyewale (2005) attributed the non-exploitation of these inventions to lack of information on their existence to industrialists. Patenting of the inventions could serve as an effective means of disseminating information about them, and at the same time encourage industrialists to invest on the inventions because they are under legal protection. In order to provide an avenue for Nigerian universities to publicise and showcase their inventions, the National Universities Commission (NUC), the umbrella organization that oversees the administration of university education in Nigeria organised the Nigerian Universities Research and Development Fair. The maiden edition of the fair was held in 2004 and the second in 2005.

This paper summarises the findings of the surveys titled “Nigerian Institutions Inventions and Patents”, which were conducted during the two fairs. The surveys covered researchers of the universities that participated in the fairs, and it highlights the types of research conducted by the respondents, the types and fields of the inventions on display, patenting of the inventions and their commercialisation.

2. Literature Review

University education started in Nigeria with the establishment of University College in Ibadan, Nigeria in 1948 (UI, 2007). Since her attainment of political independence, the Federal Government of Nigeria had established a total of 26 universities. Various state governments have also established another 30 universities, while 32 private universities had also been established (NUC, 2007). These universities run courses in the sciences, technology, humanities and the arts.

Because of their strategic roles in ensuring continuous availability of raw materials for her industrial firms, the British colonial government made the establishment of research institutes to predate that of universities. A network of research institutes called the West African Research Organisation, which conducted research and development (R&D) activities

especially, those that support the improvement of agricultural raw materials and animals were established during the colonial period. These include the Nigerian Institute for Oil-palm Research, which was established in 1939, and the Shika Research Station, which was established in 1928 (Idachaba, 1980).

Oyewale (2005) noted that Nigerian universities and research institutes had generated some inventions, but several of the inventions had not been commercialised. One of the problems identified by the study was poor technological entrepreneurial culture, i.e. the training of the mind for the urge to commercialize inventions that are based on technological R&D in Nigerian educational institutions and research institutes. Hence, the inventions remain unexploited. Similar conclusions were reached by the joint research of Nigerian Academy of Engineering and the Raw Materials Research and Development Council (NAE/RMRDC, 2005).

The absence of brokerage organisations such as Industrial Liaison and/or Technology Transfer Offices, which could publicise the R&D outputs among the industrial firms in the institutions/institutes, was also noted to have contributed to the non commercialisation of the inventions. A survey by PREST in 1989 found that 60 Industrial Liaison Offices were established in the United Kingdom universities within the preceding five years (Howells et al., 1998), while the law promoting technology transfer from universities that enabled Japanese universities to establish Technology Licensing Offices emphasised patents (Arai, 1999).

In order to address this information gap between industrialists and Nigerian institutions/institutes, the National Centre for Technology Management (NACETEM) was commissioned in 1994 to develop a database on these inventions and research results (Daniyan, 1997). The National Office for Technology Acquisition and Promotion (NOTAP) was later mandated to collate these inventions, patent them, and provide funds and relevant complementary information for their commercialisation (NOTAP, 1999). Furthermore, Nigeria's Federal Ministry of Science and Technology published profiles of some of the inventions/research results of research institutes under the supervision of the Ministry (Aliyu, 2004).

When a technology is newly generated, the invention can be legally protected from unauthorized industrial exploitation through patenting. Patents recognise the creativity of inventors and bestow them material rewards for their inventions, thereby providing them incentives to be more creative. The invention, which could be a product, a process, or material of an original scientific insight, may be brand new, but more often, it could be a combination of existing technologies (Hauser, 1998). Patent documents can serve as bridges between universities and research institutes and industrial firms, as they make the information readily available to prospective investors. However, for an invention to qualify for patenting, it must be novel, non-obvious and industrially applicable (Khan and Dernis, 2006).

The practice of patenting inventions that result from government-funded researches and their industrial exploitation vary from country to country. The patent can be held by the state, the institution/research institute, or the academic inventors. OECD (1998) noted that Bayh-Dole Act of 1980, which enabled academic institutions and small businesses to retain title to inventions resulting from federally-supported R&D, was an important factor for the seven fold

increase in university patents over a period of 20 years. In Cambridge University, ownership of intellectual properties rests with individual researchers, unless the contract governing the work in which the know-how is developed specifies otherwise (Jain and Triandis, 1990). So also, Swedish university researchers retain rights to patents that are based on their researches, and for which they apply (McQueen and Wallman, 1991).

Scheme of Service for Nigeria's Federal Research Institutes, Colleges of Agriculture and Allied Institutions (FGN, 2004) stipulates that all rights on inventions and patents are vested in the institution, whether the invention stems entirely from the inventor's duties or not. The rules also authorise the institutions to determine the share of any commercial proceeds to the inventor(s). The officer(s) is (are) allowed to apply to the institutions for an award, which may include accelerated promotion in respect of the invention, and is also entitled to be remunerated for reasonable expenses incurred in connection with the invention. Furthermore, the researcher is entitled to remuneration for the use of the invention by the institution

3. Methodology

As part of the government's policy to publicise the inventions of Nigerian universities, the Nigerian Universities Research and Development Fair was instituted by the NUC and all Nigerian universities were invited to bring forward and showcase their inventions. The maiden fair was held in Abuja, Nigeria's Federal Capital Territory in 2004, while the second fair was held in 2005. During each of the fairs, all participating universities were covered. One questionnaire each was administered on the team leader/researcher from each university. The questionnaire, which was aimed at eliciting information on their research activities, inventions, patent generation and commercialization of inventions were retrieved at the end of the fairs. Descriptive statistics were used to analyse the data generated from the survey.

4. Results and Discussions

4.1 Questionnaire Retrieval and Analysis

In 2004, 50 copies of questionnaire were distributed to team leaders/researchers of each participating institution. At the end of the 3-day fair, 41 (82%) copies of questionnaire were retrieved. In 2005, the same number of institutions participated at the fair, and 34 (68%) copies of questionnaire were retrieved at the expiration of data collection. All the 75 copies of questionnaire retrieved from the two fairs were analysed using frequency distribution tables. The results were interpreted and conclusions drawn from them. The percentages used in this report were based on the 75 respondents that filled and returned the questionnaires.

4.2 Types of research activities

The respondents indicated that they conduct both basic and applied researches (Table 1). The table shows that over 80% of the respondents were involved in both types of researches. In

addition, about 17% of the respondents conduct researches on regulatory issues, while about 45% conduct researches in the areas of scientific and technological (S&T) services. These show that researchers in Nigeria are involved in a wide range of research activities.

Table 1 TYPE OF RESEARCH ACTIVITIES OF NIGERIAN RESEARCHERS

TYPE OF RESEARCH	FREQUENCY*		TOTAL
	2004	2005	
Fundamental/Basic/Scientific Research	36 (34.62)	27 (33.33)	63 (23.89)
Applied Research	33 (31.73)	32 (39.51)	65 (28.32)
Regulatory Services	6 (5.77)	7 (8.64)	13 (6.25)
S&T Services	22 (21.15)	12 (14.82)	34 (10.62)
Others	7 (6.73)	3 (3.70)	10 (2.60)
TOTAL	104 (100.00)	81 (100.00)	185 (100.00)

Source: Field Survey, 2004, 2005

* Multiple Choices

Figures in parentheses are percentages

4.3 Types of inventions

Each of the universities that took part in the fairs displayed several inventions, but only one notable invention among them was described in the questionnaire that was filled. The classifications of the inventions are as shown in Figure 1. The figure shows that industrial technologies had the largest number, followed by agro technologies and Information and Communication Technology (ICT). The respondents further disclosed that about 30% of the inventions were Radical Product Inventions, 27% Radical Process Inventions, 24% Incremental Product Inventions, and 19% Incremental Process Inventions. The breakdown of the types of inventions is presented in Table 2.

4.4 Commercialisation of inventions

The study revealed that about 17% and 12% of the inventions on display in 2004 and 2005 respectively had been commercialised. These figures appear to be low. However, inadequate publicity of the inventions, especially to industrialists could be responsible for this. About 23% of the respondents indicated that the information relating to the inventions had been published in learned journals for their career advancement. Furthermore, about 15% of the inventions had also been presented at workshops and conferences. Technology Transfer Offices, which could mediate between the universities and industries are lacking in the

universities. Although as at 2004, 15 Technology Incubators have been established in Nigeria (NBTI, 2006), only about 9% of the respondents claimed to be relating with them in 2005.

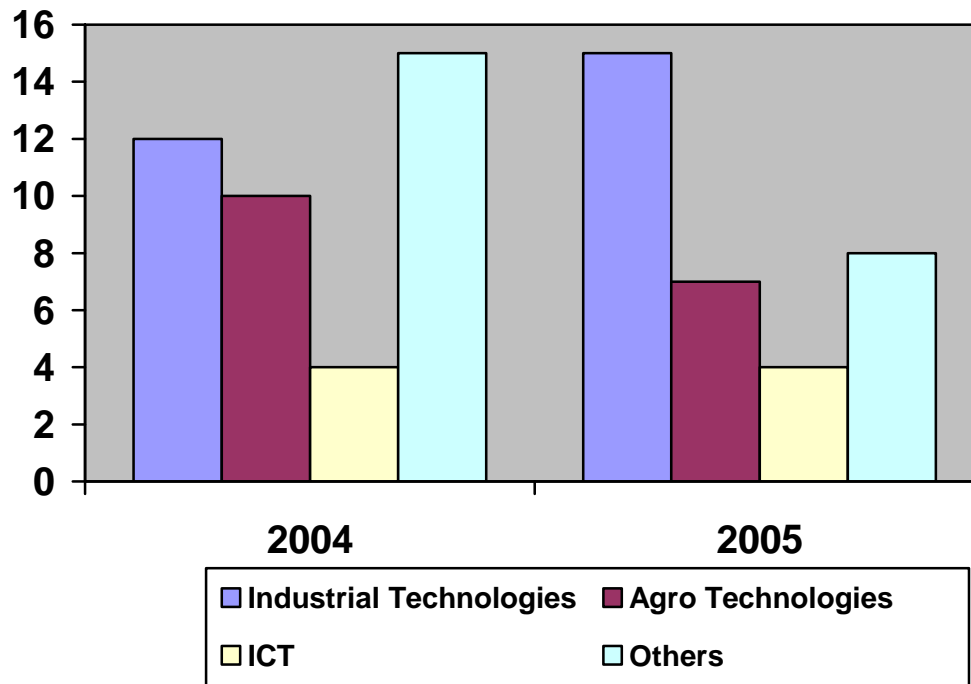


Figure 1 CLASSIFICATION OF INVENTIONS ON DISPLAY

Table 2 DISTRIBUTIONS OF TYPES OF INVENTIONS ON DISPLAY

TYPE OF INVENTION ON DISPLAY	FREQUENCY*		TOTAL
	2004	2005	
Radical Product	25 (29.76)	24 (31.17)	49 (30.43)
Radical Process	22 (26.19)	21 (27.27)	43 (26.71)
Incremental Product	20 (23.81)	18 (23.38)	38 (23.60)
Incremental Process	17 (20.24)	14 (18.18)	31 (19.26)
TOTAL	84 (100.00)	77 (100.00)	161 (100.00)

Source: Field Survey, 2004, 2005

* Multiple Choices

Figures in parentheses are percentages

4.5 Patenting of inventions

Patenting of inventions can complement the efforts of the inventors in publicising their inventions. However, patents were not popular among the respondents, as about 71% of 2004 respondents and 79% of 2005 declared that the inventions on display had not been patented. A recent study of the understanding of Nigerian researchers about patents matters (Oyewale et al., 2007) indicated that majority of Nigerian researchers did not patent their inventions for lack of understanding of the procedures of patenting. Besides, most of the inventions could only meet local needs. Hence, about 61% of 2004 respondents and 75% of 2005 claimed these inventions were not worth patenting.

About 73% of the researchers were ignorant of the position of the government on patents that are generated from government-funded researches. Furthermore, 24% of the researchers acknowledged their ignorance of the process of patenting. The study further revealed that contrary to the government policy of vesting the rights on inventions and patents in the institution where they are generated, about 39% of the respondents would prefer sole ownership by the researchers, while about 45% preferred joint ownership between researchers and institutions.

Patent-based statistics is sometimes used to reflect the inventive performance of universities, countries and firms. Widely accepted as patents are for measuring inventiveness in universities, their generation cannot give an adequate “index of inventive activity” in Nigerian universities. This is because Nigerian researchers still shun the idea of patenting their inventions. Besides, Nigerian universities did not have technology brokerage organisations such as Industrial Liaison and/or Technology Transfer Offices, which could apply for patents on behalf of the researchers. The absence of these offices and the poor technological entrepreneurial culture as earlier identified, constitute hindrances to patenting of inventions from the institutions.

5. Conclusions and Recommendations

Several inventions that address local problems in industrial, agro technology and ICT are developed in Nigerian universities yearly. Many of these inventions were not patented, neither were they commercialised. This is because most of the researchers were ignorant of issues relating to patenting and government rules on patent matters. The current government position on ownership of patents does not seem to encourage researchers to patent the inventions; rather it encourages them to publish information relating to their inventions in journals. Furthermore, the universities hardly interacted with Technology Incubators and did not have Technology Transfer Offices, which could assist the institutions with patenting and exploitation of their inventions.

It is therefore recommended that patent education should be promoted in Nigerian universities. The government should also reconsider her policy on patents generated in

public institutions, and give ownership and exploitation rights to researchers and the institutions. The researchers of the universities are also encouraged to interact with the Technology Incubators, with a view to exploiting their inventions. Furthermore, the government should consider opening Technology Transfer Offices in the universities.

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