

UNIVERSITY-INDUSTRY INTERFACE ACTIVITIES: AWARENESS OF SPONSORED RESEARCH AMONG NIGERIAN ACADEMICS

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Abstract

Due to the present poor economic conditions and the dwindling government funding of education, most universities all over the world have been making desperate attempts to generate funds from other sources. Involvement of industries in university research activities is one major proposal that has gained considerable publicity and success especially in the advanced countries. This study therefore assessed the level of awareness of this university-industry interface among scholars in Nigerian federal universities. It also determined the sources through which academics get information on it. A 68-item questionnaire called "Awareness of and sources of information on sponsored research among Nigerian academics (ASISRNAQ)" was administered on a sample of 563 academics in 13 Federal universities. Mean scores, z-test, and Analysis of Variance were used to seek answers to research questions and to test significant differences among the research variables at 0.05 significant level.

The result of the study indicated among others: that although academics in Nigerian Federal Universities are quite aware of industry sponsored research and the benefits associated with it, the level of their involvement in it is low. Direct contact and interaction among scholars and industrial organizations prove to be the most important source of information on sponsored research. Based on these findings, it was recommended among other things that both government and university authorities should develop increased awareness on sponsored research to encourage the involvement of lecturers in it so that they can generate substantial funds as is the case in many countries.

Key Words: Research, Academics, University, Industry, Interface

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1.0. Introduction

In the face of the present poor economic conditions, governments all over the world have been trying to cut back on their levels of funding for universities. Consequently, most universities have found themselves in a desperate search for ways to either make savings on their budgets, or to increase their funding from other sources. One proposal which is being widely canvassed and which has received considerable publicity in the popular press, especially in the advanced world, is for universities to capitalize on the skills and expertise contained in their academic staff by marketing them to the outside community. Such proposals have been given a number of names by different authors such as "Collaborative Research" (Campbell 1997; Rejean & Landry 1996); "Sponsored Research" (Williams and Lodger 1990); "University-Industry Interface" (Astrom & Frykland 1996) or "Contract Research", (Crawshaw 1985; Odegard, 1989; Nnabuo & Uche 1999). In this study, the terms "University-Industry Interface" and "Sponsored Research" are used interchangeably. Meaning will remain the same regardless of which term is used.

Etzkowitz (1983), in his study reveals that the idea of sponsored research may be traced back to nearly two hundred years before the beginning of the nineteenth century when chemists at some German universities began to undertake private work and established their own companies to market their intentions. Crawshaw (1985) opined that, with varying degrees of popularity, the concept has existed ever since in Britain, America and other developed nations. However, recent interest in the notion is a direct result of government cuts in the funding of the tertiary education sector, including research. For instance, Bach and Thornton (1983) argue that the decline in funding of medical research in the United States by the National Institutes of Health (NIH) made it imperative for universities to look to the private sector as a source of research funding. This is so, "especially for biomedical research which has considerable potential for commercial applications." Heagerty (1997) in his commentary on industry-sponsored research indicates that the dwindling

government research support has necessitated the universities in the UK to seek partnership with industry for commercial consideration. He is optimistic that if this is “carefully nurtured, university and sponsors may develop a successful symbiotic relation” which will help to augment the research activities and enhance other aspects of university development. Blumenstyk (1996) also reports that in Arizona, government has formulated new policy to encourage companies to put money into university research through contracts. Under the new policy, companies that sponsor research and pay the universities’ related costs for salaries, equipment, and other overhead can more easily own the inventions and patents that might result. This differs from higher education’s traditional approach in which universities own their research results and patents and charge fees for the rights to use the findings for commercial products. Astrom and Fryklund (1996) believe that this is because the costs in contract research cover all these. The Swedish government also makes frantic efforts to support university-industry collaboration in order to generate more funds for the university research activities.

Generally, a concern of many governments in the 1980s has been to shift some of the financial burden of higher education away from the public purse. Williams (1990), reporting on a theme of a recent study on higher educational development programme, observes similar developments in many other Western European countries. Williams (1990) quotes that “the first and most widespread motivation is the hope that the private sector can be a source of supplementary funding and thus relieve governments of some of the cost burden.” Apart from raising funds for university research, most of these government initiatives are to encourage university-industry partnership aimed at accelerating the development of new technologies and their adoption by industries. Thus, many writers and researchers such as Dike 1985, Abacha 1996, Alele-Williams 1991 Amiche 1997 and Enaohwo, 1980 have called upon universities in Nigeria to “engage in research themes with foreseeable commercial exploitability in order to attract sponsorship of such research by the industries.” Heagerty (1997) also believes that such sponsored re-

search activities have become a reality in the university system. He reveals that as far back as 1954, tobacco manufacturers gave the Medical Research Council in UK £250 000 for research and later sponsored health-education campaigns. But with the shift of emphasis from public to commercial funding, Heagerty expresses the concern that industrial interest, which is linked to profit creation, may not lead to 'balanced development.' Inevitably, it is difficult to reconcile the independent research aspirations of a department with the focused needs of a commercial sponsor. Nevertheless, increased emphasis is being placed on market-oriented research by the university system with the attendant drive towards exploitable ideas and the spawning of research incubators. Research proposals without relevance and commercial viability are disadvantaged or discouraged (Heagerty 1997). Research partnerships between universities and industry have come to stay even as awareness spreads.

Major sources of information on sponsored research are through interactions and close monitoring of research activities between the universities, industry and government. An aspect of this process is explained in the Encyclopaedia Britannica (1997:269) that, ...in principle university researchers are completely independent and free to investigate anything that interests them. In practice, many of them are anxious to keep in touch with industry and to focus their research effort on problems with practical applications.

Similarly Amaefule (1991:67), in a paper presented at a Nigerian National Petroleum Corporation Conference, suggests that most graduate programmes can be taught by people in industries who visit certain universities from time to time to give classes. This is because industrial scientists wish to maintain contact with advanced academic research. By so doing, there can be exchange of information and new areas for sponsorships can be notified and forwarded to the appropriate university. The result is a constant interchange between universities and industry. Industrialists suggest problems for university research and provide funds to support it while university staff acts as consultants and advisers to industries. Astrom &

Fryklund (1996) report on the situation in Sweden in support of these interactive activities between university and industry. According to them, "in the development of drugs in Sweden, for instance, universities are involved at all stages, from the original idea to testing of mechanisms and concept right through to phase-3 clinical trial." In fact, companies (e.g. pharmaceutical, biotechnology companies etc) are established in the vicinity of the universities to exploit the discoveries of innovations that emerge. Also, major companies have their sites or branches located very close to the universities. But in most cases the interactive network is characterized by informal rather than formal contacts because of the small population of the country. There are also formal links or arrangements, which help the flow of information on contract research in Sweden. For instance, as Astron & Fryklund highlight, a company might cooperate with an individual scholar or small group for a short-term experiment, or with a whole department or university for a long-term project under contract. An individual scholar can join a company's advisory board or be their consultant under the auspices of his/her university. Such scholars make sure that the information of new areas of contract is passed on to the institution. Another mechanism to get information is the funded research centre often directed by the company rather than the university, and set up to provide specific information and expertise in either applied or basic research that is commercially plausible.

Again, Swedish government has several initiatives that foster stronger links and information flow between universities and industry. For example, Astron and Fryklund (1996) explain that huge amount of funds are set aside in a special foundation for strategic research. Funds are also allocated to universities to form networks for specific programmes that ensure that programmes with specific relevance are exposed to the appropriate industry. Areas or sectors given preference are electronics, information technology and biotechnology. Funds are also provided to form a special foundation in each university with the charge to promote the industry/university interface. Furthermore, in the United States and in most Western

European countries, research contracts placed by government departments, originate from the decision of scientifically or technically oriented executive of the department that certain work should be done. This leads to the preparation of a specification work, which is then offered to industry, private research institutes and universities for competitive bidding.

2.0 The Problem

The level of awareness and sources of information on sponsored research in Nigerian universities are not yet well articulated and researched. This limits information on the extent to which one can highlight how this type of research helps in the augmentation of funding for higher education. The main concern of the present study is to investigate the level of awareness on sponsored research among academics in Nigerian universities. Another riddle that needs probing is the sources through which information on this type of research can be obtained.

3. 0 Methodology

The study was descriptive in nature and designed to assess the level of awareness of and sources of information on sponsored research in the Nigerian federal universities. It was also designed to assess the extent to which sponsored research awareness and its sources of information vary among the various categories universities and lecturers.

Using a simple ballot sampling technique the sample of 523 of senior lecturers and above were drawn from the population of 2400 lecturers who were of senior lecturers and above in the 13 universities sampled out of the 26 federal universities were used for the study. For the purpose of comparison, these universities were grouped into 1st, 2nd and 3rd generation universities according to the period they were established as follows:

Group1- the pre-colonial and post-independent era (universities established between 1948 and 1962)

Group 2-universities established during the oil boom era in the 1970s.

Group 3-universities established during the structural adjustment era in the 1980s.

The only instruments used for the study were questionnaire items, structured on both three-point Likert scale and option selection. These were developed to elicit information from the respondents on their level of awareness on sponsored research and sources. The data collected were analysed using mean scores while ANOVA and Z-test were used to test the differences among the universities and between professors and senior lecturers at 0.05 significant level.

4. 0 Results

The first major task of this study was to determine the level of awareness of the university system on sponsored research activities. The result of the data answering this question is presented in Table1.

TABLE 1: Mean Scores and Standard deviations of the Level of Awareness of Sponsored Research Activities by Groups of Universities

Groups of Universities	N (No of Respondents)	Mean Score	Standard Deviation
1 st Generation Universities	170	2.482	0.655
2 nd Generation Universities	203	2.640*	0.539
3 rd Generation Universities	190	2.605*	0.541

* = High mean scores

The mean score of respondents from the 3 categories of universities (1st, 2nd, and 3rd generation universities) as presented in table 1 above (2.640, 2.605 and 2.482) can be considered high judging by the fact that the maximum response score is 3 (for fully aware). These scores are therefore indicating that the various categories of

universities are reasonably aware of sponsored research activities. However, 2nd and 3rd generation universities appear to be more aware than the 1st generation universities judging by the difference in their mean scores.

Again the study investigated the major important sources of information on sponsored research activities by groups of universities. The result is presented in Table 2.

TABLE 2: Mean Scores and Standard Deviations of the Sources of Information on Sponsored Research by Groups of Universities.

Sources of Information		Mean Scores by Groups of Universities					
		1 st Generation		2 nd Generation		3 rd Generation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Through proposal by clients	2.359*	0.667	1.867	0.533	2.273*	0.533
2	Through proposal by academics	2.235*	0.772	2.296*	0.518	2.416*	0.659
3	Through NUC	1.400	0.537	1.207	0.406	1.947	0.847
4	Through adverts in the media	1.859	0.646	1.655	0.689	1.874	0.694
5	Through direct contact and inquiries from the company	2.677*	0.529	2.700*	0.520	2.442*	0.678

* = High Mean Score

The most important source of information on sponsored research as indicated by their mean scores in Table 2 is 'through direct contact and inquiries from the company' (Source e, see asterisked mean in table 2). 'Proposals by clients' and 'proposal by academics' are also important sources through which the various groups of universities get information on contract research (see source a & source b in table 2). Their relatively high mean score of 2.359 and 2.416 respectively proves this. Responses show that the National University

Commission (NUC) is not important in serving as a source of information on sponsored research as indicated by the low mean scores of the various groups of the universities. 'Adverts in media' scores reasonably high as a source of sponsored research for all universities.

The first hypothesis was tested to determine if significant differences exist among the 3 groups of universities on their level of awareness of sponsored research. The summary of ANOVA is presented in Table 3.

TABLE 3: ANOVA of the differences among the three Groups of universities on their level of awareness of sponsored research activities.

Source of Variance	df	Ss	Ms	F	p-value	Multiple comparison		
Between groups (major)	2	2.482	1.241	3.72	0.025*	Group 1 & 2	Group 1 & 3	Group 2 & 3
Within groups (error)	560	186.591	0.333			-0.2985 to -0.0176	-0.2655 to 0.0197	-0.1012 to 0.1715
Total	562	189.073						

= Significant

df = degree of freedom ss = sum of squares ms = mean squares
F = F-ratio P = the p-value, i.e. the probability value

As shown above, a one-way ANOVA at 95% confidence level yielded an F value of 3.72. The level at which this value is significant is 2.5% (see p value of 0.025 in Table 3). Consequently, this value is more significant at 5%. We therefore reject the null hypothesis that there is no significant difference and conclude that there is significant difference among the 3 groups of universities in their level of awareness of sponsored research. A multiple comparison test reveals that this significant difference exists only between

groups 1 & 2 (1st and 2nd generation universities). This is observable in the confidence interval for differences in their means as asterisked in Table 3 above.

More probing was carried out to examine if lecturers of different ranks significantly differ in their level of awareness of sponsored research activities. The Z-test result is presented in Table 4.

TABLE 4: Mean, S.D and Z-test of differences between Senior lecturers and Professors on their level of awareness of sponsored research activities

	Categories	N	Mean	SD	Z-cal.	p
1	SNR. Lecturers	364	2.467	0.604	-9.05057	0.0000*
2	Professor	116	2.871	0.337		

* = Significant

For the level of awareness, the senior lecturers scored a mean of 2.467 while the professors scored a mean of 2.871. This suggests that the professors are more aware than the senior lecturers. To determine the significance of the difference between these means the Z-test was carried out, which yielded a Z-ratio of -9.05057 and a corresponding p-value of 0.0000. This p-value is much lower than the 0.05 a-level of significance. Thus, the null hypothesis of no significance difference between the senior lecturers and the professors on their level of awareness of sponsored research is rejected. In arguably, professors are more aware than the senior lecturers of sponsored research. (See mean of 2.871 for professors and mean of 2.467 for senior lecturers in Table 4).

ANOVA and multiple comparison tests were equally carried out to determine if the various groups of universities differ in the sources of information on sponsored research. The result is presented in Table 5.

TABLE 5: ANOVA and Tukey's multiple comparison of the differences among the three Groups of universities on their sources of information on sponsored research activities.

							Multiple Comparison Results		
	Sources of information	Df	ss	Ms	F	p	Group 1 & 2	Group 1 & 3	Group 2 & 3
1	Through proposals by client	2	26.574	13.287	39.94	0.000**	0.3515 to 0.6322 *	-0.0574 to 0.2277	-0.5430 to 0.2704 *
2	Through proposal by academics	2	3.082	1.541	3.64	0.027*	-0.2186 to 0.0980	-0.3412 to -0.0197 *	-0.2739 to 0.0335
3	Through NUC	2	57.038	28.519	73.40	0.000**	0.0414 to 0.3448 *	-0.7014 to -0.3933 *	-0.8877 to -0.5932 *
4	Through adverts in media	2	5.826	2.913	6.34	0.002**	0.0387 to 0.3686 *	-0.1824 to 0.1527	-0.3787 to -0.0583 *
5	Through direct contact and inquiries	2	7.723	3.861	11.46	0.000**	-0.1643 to 0.1182	0.0969 to 0.3778 *	0.1202 to 0.3946 *

* = Significant

** = Highly Significant

As clearly indicated by the F value and p value, the various groups of universities differ significantly in the extent to which they get their information from the various sources. This significant level ranges between 0.1% and 2.7% (see p value of 0.000-0.027 in Table 5). The null hypothesis is therefore rejected. The conclusion is that there are very significant differences among the various groups of universities on the level to which they get their information on sponsored research from the various information sources. The Multiple Comparison Test reveals where such significant differences exist for each of the sources of information. These significant differences exist between group 1 and 2, i.e 1st and 2nd generation universities for information source 1, 3, & 4. That is through proposals sent by clients, through National University Commission (NUC) and through adverts in the media respectively. The differences are equally significant between 1st and 3rd generation universities for information through direct contract and inquiries from the company (see item 2, 3, and 5 in table 11) and between 2nd and 3rd generation

universities for information through direct contact and inquiries from the company (see asterisked Multiple Comparison confidence interval in Table 5).

5.0 Discussion and Implications

5.1. Level of awareness of sponsored research activities among university academics

This study reveals that the various categories of universities are reasonably aware of sponsored research. It has however been established through further analysis that very significant differences exist among the various groups of universities and categories of lecturers in their level of awareness. For example, 2nd & 3rd generation universities are more aware of sponsored research than 1st generation universities. Also, further probing revealed that significant differences exist between senior lecturers and professors in their level of awareness in sponsored research activities. Professors are generally more aware of contract research than senior lecturers.

The first discovery of the present study of reasonable awareness of contract research is in agreement with Etzkowitz (1983) who explained in his study that the idea of sponsored research has been traced back to two hundred years before the beginning of the nineteenth century. During this period chemists at some German universities started to engage in private works and then commercialised their intentions. Ever since, Crawshaw (1985) revealed that with varying degree of popularity, the concept of sponsored research has existed in Britain, America and other developed nations. It is not also surprising to find out that professors are more aware of sponsored research than senior lecturers. As Sessay (1982) and Uche (1995) also found out, the movement of a lecturer from a lower rank to a higher rank requires more research activities on the part of the lecturer. Research also promotes international recognition and sponsorship from industry (Odegard 1989; Bentley & Blackburn 1990). Although sponsored research has become a reality and is gaining more ground in the university system, an obvious shift from

public to commercial funding has made Heagerty (1997) to express some concerns. Heagerty argues that industrial interest linked to profit creation may not augur well for the university's traditional functions, which are not profit-oriented.

5.2 Sources of Information on sponsored research

The study also revealed that direct contact and inquiry with companies, proposals and media advertisements are among the major sources of information on sponsored research. Astron and Fryklund (1996), Encyclopaedia Britannica (1997) and Amaefule (1991) agree with this discovery of interactions and close monitoring of research activities between the universities, industry and government as the major sources of information on sponsored research. Both informal and formal links and contact characterize this interactive network where university academics and industry scientist form boards and relationships, and co-operation to relate to each other on any viable research. Furthermore, the description by Encyclopaedia Britannica (1997) is in line with the present work that Nigerian universities also harness information on research sponsorships through proposals from clients. In this case, research originates from the government or industry and universities are asked to bid in competition with others. It is also agreed that university scholars act as consultants and advisers and in most cases send proposals on viable areas of interest to a specific industry and may get sponsorship to carry out the study from the particular industry (Astron & Fryklund 1996).

It also reveals that National University Commission (NUC), which is a government arm that governs the affairs of Nigerian Federal universities, does not act as a source of information on sponsored research. This is a complete deviation from the situation in Sweden. As reported by Astron and Frykland (1996), the Swedish government supports initiatives that foster strong links and information flow between universities and industries. They explain that government sets aside huge amount of funds in special foundations for strategic research, Such funds are allocated to universities to form

networks for specific programmes thus making sure that the programme with specific relevance are exposed to the appropriate industry. This has helped in initiating sponsored research for the universities and in handling other matters of mutual interest to both universities, industry and society at large (Astron & Fryklund 1996).

In contrast, in Nigeria, even NUC, which is the overall administrator of the universities, does not form a source of information on industry-university interface research. This calls for a great concern and urgent reprimanding. The implication of this pity condition is for lecturers to get more involved in privately sponsored research than within university arrangement. This will be especially so if there is no indication of interest to motivate and encourage university lecturers. Indeed, carrying out research privately is more rewarding to them than through the university. The study also reveals that the older universities which are the 1st generation universities show less reliance on all the sources of information listed than the younger ones (2nd and 3rd generations). This discloses their conservative nature and self-centeredness in matters concerning sponsored research. This evidence was obvious in the field when the researchers observed nonchalant attitudes, pride and heavy secrecy that may not help build co-operation with other scholars in other universities. Also, the revelation of this study that 2nd and 3rd generations exhibit more awareness of contract research further buttress the fact that these older ones are dropping in interest in the general deplorable set up in our university system. While the younger generations have younger and vibrant scholars with greater stamina and vitality to work. Moreover, most of these ones were established during the Structural Adjustment Programme (SAP) era and so are more inclined to self-effort for raising fund to build the university. With Heagerty (1997) and Blumethal (1996), we believe that sponsored research through industry- university relationships has come to stay and its awareness and enhanced interactions between university academics and industry encourage a high level of involvement in it. For a long time, this will remain the most viable strategy for tackling

the problem of dwindling government support for higher education, in general and research in Nigerian universities, in particular (Nnabuo and Uche, 1999)

6.0 Conclusion and Recommendations

The Nigerian situation is a deplorable one. From all indications, the universities under study are quite aware of the existence of sponsored research and the urgent need to get involved in it. Yet, they are not motivated as their counterparts in other parts of the world. NUC seems not to understand its role in this aspect especially in the area of information sourcing. Governments in advanced world such as Sweden, Britain and USA encourage university-industry collaboration by establishing policies to back it up and by providing a conducive environment for it.

University involvement in sponsored research should therefore be highly encouraged by increasing its awareness and developing more information on it both by government and university authority so that they can generate substantial fund as obtains in other societies. Universities should also find a way of making this type of research attractive by providing encouraging conditions to make lecturers carry out sponsored research within the university. Government on its part should formulate a policy to encourage companies to put money to the university research and development through sponsorships. NUC should be made more relevant and active in this aspect especially in information sourcing because of its close supervision of all universities which positions it to know their capabilities in each area. Co-operation among scholars in all universities should be improved for them to work as a team to make a breakthrough and prove their worth to industries. More senior lecturers should be encouraged through better incentives and exposure to university-industry research activities in order to avail them the opportunity to participate in this type of research.

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