Publication Patterns and Productivity of Academic Scientists: Case Study of University of Calabar, Calabar - Nigeria

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ABSTRACT

The paper investigated the level of scientific communication in Calabar, Nigeria. Data for the study was collected using questionnaire survey. Articles in learned journals constitute the primary medium of communication among research scientists surveyed. A total of 59 journals were used by respondents for their scientific publications. 12 (20.3%) of these were local journals compared to foreign journals 45 (76.2%). This implies low level of scientific communication within the country. The survey results also show that the major obstacle that militates against scientific research and publication is lack of facilities/equipment besides financial constraint. The paper recommends that relevant research facilities/equipment should be provided besides funding of scientific activities to enhance productivity and improve quality of the local scientific journals.

Keywords: Publication output, Productivity, Scientific communication, Journal article, Publication strategy.

INTRODUCTION

Communication is the transfer of information between at least two persons (Gracewaska-Vickery, 1976). It may be formal or informal. Scientific communication has evolved into assuming properties of a complex ecological system and is a major concern to the scientific community. The basic elements of scientific communication are scientific journals and the articles contained in them. The invention of the particular mechanism for the systematic publication of knowledge through journal articles may well have been the major event in the history of modern science (Fernandez and Saracevic, 1977). Thus, the essence of science is the publication of new knowledge, and scientific journals play dual role in the process of creating and diffusing that new knowledg: journals are both the means by which scientific community certifies to its body of accepted knowledge and the means by which scientists compete for prestige and recognition (Campanario, 1996).

Publication of new research findings is viewed with serious concern and importance, not only in scientific community but generally in the academia. A quality journal article does not only serve a scientist as a means of increasing his prestige, it is also a requirement for his career advancement. Consequently, publication is a key ingredient in a successful academic career - as it is used as indicator of academic productivity of a scientist(s) or group of scientists.

Productivity is often measured by counting the number of papers produced over a period (Bottle et al. 1994). It is a measure of publication output of scientists, research groups, institutions and countries. It has been observed

that, there is within the body of producers of scientific information considerable variability in productivity and thus a productive scientist is one who contributes at least one article per year; while the most productive scientists have five publications per year.

Publication is also used as an indicator to measure the progress and development of science, whether in global setting or within a country (such as Nigeria). Thus progress in science is essentially determined by the stimulating effects of information accumulation and transfer. The development of science can be viewed as a continuous process of information generation and communication. Hence dynamic characteristics of information flow together with the structural properties of the flow network in the society becomes indicative of the major thrusts of science progress as well as its rate of development.

Consequently, the rate of development in any field of science depends on intensity of information generation in that field and on the rate of stimulation or incitement both from within that discipline and from without, by contributors from other disciplines. In other words, the more scientific activity is taking place in a particular scientific field, such as physics, and the more these activities are stimulated by scientific work in other disciplines, the greater we can expect to be the rate of development of this discipline.

Fernandez and Saracevic (1977) examined and analysed journal articles published by Latin American physicists during a five year span between 1967-1971 and observed that the patterns found may be symptomatic of the stage of development of the countries involved. Bierbaum and Brooks (1995), and Dore et al (1996) had done much work on

publication patterns of scientists. In Dore et al (1996), a study of the publication patterns of 48 countries in 18 scientific (and related areas) over a 12 year period of 1981-1992 showed that Nigeria ranked 39th among the 48 countries under study. Thus Dore *et al* has therefore revealed the low productivity of Nigerian scientists in global perspective which correspondingly established comparatively very low state of scientific development.

Bottle *et al* (1994) have linked productivity to various factors such as age, subject of specialization, and economic indicators such as government expenditure on civil research and development, and stage of development of that country.

Besides, editorial boards and external referees or reviewers of scientific journals are said to have great influence and control of scientific publications. Editors of scientific journals perform a dual role, they control the flow of scientific information as well as individual scientists' access to channels of recognition; thus career advancement of scholars in academic world requires the positive response of journal editorial boards to the presentation of scientist's manuscript (Campanario, 1996).

OBJECTIVES OF THE STUDY

This study seeks to establish the formal communication patterns among Nigerian academic scientists and their publication strategy. The study also investigates the level of productivity of Nigerian scientists, explores factors militating against scientific research and publication, and offers corresponding solutions to these problems.

Research Questions

The following research questions were posed to guide this study:

1. What are the publication patterns and publication strategy of academic scientists in University of Calabar?
2. What is the level of academic productivity of these scientists?
3. What are the major factors militating against scientific research and publication in University of Calabar?

RESEARCH METHODOLOGY

In this present study, data was collected using questionnaire survey. The disadvantages of questionnaire survey in the study of this nature are apparent and the major one experienced during the study was response bias shown by the unwillingness of the non-productive scientists to fill the questionnaire. In terms of validation, the designed questionnaires were given to two experts to vet before they were finally administered to the respondents. A total of 50 questionnaires were distributed to all academic scientists from the posts of assistant lecturer to professor in the surveyed departments in faculty of

science, with distributions as follows: Physics (19), Chemistry (17) and Geology (14). Twenty four duly completed questionnaires were retrieved for analysis representing 48 percent response rate.

RESULTS AND DATA ANALYSIS

The data for the study were analysed using descriptive statistics: percentage, frequency, mean and standard deviation.

Publication Pattern

The results in Table 1 show that the medium predominantly used by the respondents for scientific publication is the journal article, with the total publication output of 319 (51.7%); conference paper trails second with 118 (19.1%) publications and thirdly by seminar/workshop paper with publication output of 72 (11.7%), then followed by monograph 70 (11.3%), book 27 (4.4%) and chapter in book 9 (1.5%) respectively. In terms of mean publication output calculated for the three most produced scientific elements (in parenthesis, Tables 1, 2 and 3), journal article receives 13.3, conference paper 4.9, seminar/workshop 3.0, monograph 2.9, book 0.5 and chapter in book 0.25 respectively.

Table 1, shows that mean publication output increases with professional rank of the respondents. Tables 2 and 3 show the relationship between mean publication outputs of the three most produced scientific elements (Journal, Conference paper and Seminar/Workshop) with age distribution and working experience of respondents respectively.

It is observed that (Table 2), publication output initially increases to a maximum and then decrease with age of the respondents. And the most productive age range of the respondents is between 46 and 55 years.

Table 3 show the variation of publication output of the respondents with their working experience. Apparently, the publication output also rises to a maximum and then declines with working experience. Thus the respondents are more active in research and publication between 16-25 years of their working experience.

Intercommunication

A total of 59 scientific journals were used by respondents for their publications. A breakdown shows that only 12 (20.34%) of these journals were local journals (i.e. published within the country), 2 (3.39%) were from Kenya (other Africa country) and 45 (76.27%) journals were American, European and Indian journals.

The respondents were asked to choose factors that influence their publication strategy. The results in Table 4, show that the prestige of the journal is the most considered factor and is closely followed by wide circulation of the journal, while the nature/place of research trails third. Others factors that influence the publication strategy according to the respondents include publisher's fee (which is a common practice among local journals), area of specialization or discipline of the research and time taken to

TABLE 1: Professional Ranks and Publication Output.

	No Res.	Jnl	Con	Sem	Bk	Cbk	Mon
Asst Lect	5	10 (2.0)	5 (1.0)	11 (2.2)	2	1	6
Lect (I/II)	8	41 (5.1)	21 (2.6)	14 (1.8)	9	1	4
Snr Lect	3	56 (18.7)	17 (5.7)	6 (2.0)	2	1	31
Reader	2	37 (18.5)	10 (5.0)	10 (5.0)	3	0	0
Prof	6	175 (29.2)	65 (10.8)	31 (5.2)	13	6	29
Total	24	319	118	72	29	9	70
Grand Total		617					

TABLE 2: Age Distribution and Publication Output of Respondents.

Age (Yr)	No. Res	Jnl	Con	Sem
Less than 36	7	36 (5.1)	16 (2.3)	6 (0.9)
36-40	5	26 (5.2)	7 (1.4)	16 (3.2)
41-45	2	16 (8.0)	15 (7.5)	6 (3.0)
46-50	3	86 (28.7)	28 (9.3)	20 (6.7)
51-55	4	115 (28.8)	31 (7.8)	13 (3.3)
Above 55	3	40 (13.3)	21 (7.0)	11 (3.6)

TABLE 3: Distribution of Publication Output with Working Experience of Respondents.

Work Exp (Yr)	No. Res	Jnl	Con	Sem
Less than 11	8	25 (3.2)	15 (1.9)	9 (1.3)
11-15	7	79 (11.3)	22 (3.1)	18 (2.6)
16-20	2	69 (34.5)	19 (9.5)	10 (5.0)
21-25	3	81 (27.0)	24 (8.0)	23 (7.7)
26-30	4	65 (16.3)	37 (9.3)	11 (2.8)
Above 30	Nil	Nil	Nil	Nil

TABLE 4: Factors influencing Choice of Journal for Publication

Factor	Total. Res.
Prestige of the Journal	14
Wide Circulation of the Journal	12
Nature/Place of Research	7
Other (Specify)	2

TABLE 5: Factors militating against research and publication

Factor	Respondent
Poor Research facilities/equipment	24
Financial constraint	20
Non availability of current scientific information	17
Poor power supply	14
Lack of motivation	9
Others (specify)	4

review submitted manuscripts by the Editorial Board.

Publication Rate

The results on the average rate of annual publication show that majority of the respondents 9 (37.5 %) published 3 papers annually then 6 (25.0%) each published 2 and 1 papers respectively.

Area of Specialization

Mean publication output and standard deviation were calculated for journal articles of the respondents in the three disciplines from Senior lecturer and above. The results show that chemistry has the highest mean publication output of 28.75 and the lowest standard deviation of 3.34. Then geology 23 (9.82) and physics 20.33 (5.25) respectively.

The respondents were asked to tick as appropriate factors that militate against scientific research and publication (Table 5). The results show that, lack of research facilities/equipment has been identified to be responsible for low scientific activities in Nigeria. Financial constraint and non-availability of current scientific information are other major variables that hinder scientific research and publication in the country.

DISCUSSION

The results of this study have shown that, the most acceptable medium for scientific communication is the scientific journal; since journal article is the primary source of communicating current research findings. The increase in the mean publication output with the professional rank, simply shows that career advancement of scientists is based on their increasing academic productivity. Productivity depends to a large extent on age and working experience, rising to a maximum and then declining with these variables. Thus there exists optimal period in terms of age (46-55 years) or working experience (16-25) in which scientist(s) is/are most productive. The decline in publication output after the optimal period may be attributable to declining interest in active research due to advancement in age or attainment of highest professional rank in academic career of the scientist(s).

This study supposes that, communication among group of scientists is essential for the development of science in Nigeria. The results of this study show that the number of local journals 12(20.34%) compare to that of foreign journals 45(76.27%) is low, and thus there is correspondingly low level of scientific communication among scientists within the country. The results also show dearth of "specialized' or "core" journals (such as journal of nuclear physics, journal of organic chemistry etc.) among the three disciplines understudy. Hence the pattern of communication among these scientists locally is int. rdisciplinary in nature.

Research scientists prefer to publish in their national (or local) journals to inform their own colleagues first of their results and fields of expertise (Luukkonen, 1992; Bottle *et al*, 1994). But this is not the status quo among Nigerian scientists with high publication strategy on foreign journals. This is attributable to the prestigious nature of these journals with high visibility and wider circulation. Besides, it is obvious that the management of Nigerian universities rate research articles in foreign journals higher than those from local journals during assessment of their academic staff. However, this observable trend is not favourable to the development of science in Nigeria, since scientific progress and development of any nation is dependent upon the number of quality journals established within the country.

It is only when the few existing local scientific journals (such as Nigerian journal of physics, journal of chemistry) are patronised, that there can be emergence of "core" or "specialised" journals in each of the scientific discipline in Nigeria. Consequently, the choice of journal's prestige as the predominant factor for scientific publications among Nigerian scientists should be reviewed towards developing the local ones.. However, due to the global increase in number of scientific manuscripts and national bias among referees/reviewers etc. of foreign journals, Nigerian younger scientists have arduous tasks of competing for journal space outside Nigeria. Thus the need to develop our local journals.

The progress and development of science need our collective efforts, the management of each Nigerian university should collaborate with appropriate government ministries/agencies to stimulate our scientists by funding of local journals as well as improving the quality of their research. Institutional research group(s) should be set up to encourage scientific research and publications.

CONCLUSION

Journal article has been the primary medium of scientific publication. Though Nigerian scientists are productive, there exists low level of scientific

communication within the country, as they preferably publish their research findings in foreign journals. Journal's prestige has been the predominant factor influencing publication strategy of Nigerian scientists. Thus neglecting the concept of a convergent interest on the part of authors and readers that proper audience for the reporting of scientific investigations be reached. In other words local readership of research conducted in Nigeria is not prioritised and encouraged. The quality of local journals can only be improved if they are patronised by quality scientists in the country; and this will correspondingly improve scientific progress and development in Nigeria.

The major obstacle militating against scientific research and publication is lack of research facilities/equipment in addition to financial constraint. Policy makers on science in Nigeria should improve on provision of scientific facilities/equipment and financial empowerment of our scientists for the country to move forward in scientific perspective. Publication of journal articles within the country should be encouraged by University administrations, by giving equal treatment or "weigh" to both local journal's articles and foreign ones.

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