Information Resources Importance and Format Inclination of Science and Technology Researchers

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Abstract

This study examined important information resources and format inclination of information resources utilized by science and technology (S&T) researchers as they acquire information in the course of their projects. The study institute was *"Federal Institute of Industrial Research Oshodi (FIIRO) in Nigeria"*. The study employed the research design of mixed methods. Questionnaires were utilized for S&T researchers and interview engagements with professional librarians in order to collect data. One hundred and fourteen copies were received for the questionnaires distributed to S&T researchers. All the professional librarians (five) working in the institute's library were acceptably interviewed. The S&T researchers uncovered that the journal was the information resource most important to them. The preferred format for information resources was the combination of print and non-print resources. We recommend that both print and electronic versions of information resources should be provided for the researchers by the institute's administrators. Further studies are required on expansion and changes in S&T researchers' information resource preferences in order to adequately tackle their contemporary and prospective need for information.

Introduction

Science and technology (S&T) are nomenclatures that have been used alternately. Science as a field is rooted in its aspiration to search for knowledge because of what it was designed to achieve whereas technology has the intent of unravelling difficulty through inventions thereby bringing advancement to the existence of human beings. In its simplest description, technology is the real-world usage of science with its accompanying innovations. Preceding the domination by the British, the livelihood of the peoples of Nigeria was farming with the use of traditional

agriculture implements. These days, indisputably, S&T have overthrown conservative measures that caused backward shift and brought about great scientific and technological drives that have changed every facet of our national life. Chikwe, Ogidi & Nwachukwu (2015) posit that in modern Nigeria, we talk about commercialization of every innovation brought about by S&T with the combination of individual capital development making the fields of S&T essential agents in changing our country from an unadventurous to technologically advanced one. In spite of this, the Nigerian federal government has allocated less than the requisite budgetary standard for research and development depicting not enough financing of S&T and by and large actual inventions (Adenle, 2015). Idiegbeyan-Ose, Okoedion and Nwadioha (2014) have stated that S&T can only survive in an atmosphere of genuine research with research being the actual driving force behind S&T.

The UNESCO Institute for Statistics (2010) opine that research and new development that S&T researchers the world over bring, contribute an unquestionable part when it comes to novelty. These have become topical and have taken the forefront as they steer commercial evolution and easing of hardship in our society. Consecutively, private and public strategists can assist in extending the advantage of industrial inventions by way of guiding principles that will inspire progress in S&T sector. Nevertheless, Bogoro (2014) reiterated that circumstances in a developing society like Nigeria make scientific exploration very problematic. Thus, it remains very hard for the government to establish true-to-the-principle research institutions but what are available are civic institutions of higher learning just laying emphasis on education. According to Odia & Omofonmwan (2013), it should be noted that the limitations hampering technological development are many of which some of them are: (1) political unpredictability (2) lack of adequate funding of the sector (3) lack of political will by leaders at all government levels (4) absence of well-defined countrywide growth viewpoint (5) apathetic disposition of people towards S&T research (6) organizational concerns, and (7) problem of mentoring for upcoming scientists.

Regarding well-established S&T research in Nigeria, there exist non-educational research establishments and universities and polytechnics carrying out a number of research projects in many fields of study (Adeyinka, 2014; Excellence and Education Network, 2016; Yusuf, 2012). In terms of ownership, these research institutes are government owned (state or federal), privately owned or owned by international organizations. Yusuf (2012) talks about what differentiates Nigerian research organizations. Yusuf explains that it has to do with the directive under which they are formed that steers them to engaging in researches such as medical, biotechnological, agricultural, engineering, etc. The condition in a developing country like Nigeria naturally drives our civic research establishments with their researchers to engaging in thorough technological undertakings. The intent is to push the frontier of knowledge making timely discoveries that we can acclimatize locally for our advancement and ultimately export to other nations.

Odia & Omofonmwan (2013) restate that S&T researchers have to be provided with critical and trustworthy facts and figures in the form of information on their research entity. These will assist them to confidently go through every step of their research and in the end providing invaluable solutions to technological difficulties faced in our planet. Majorly, science and technology information have been provided by the special libraries (research libraries) of research institutes in Nigeria (Olaifa & Oyeniyi, 2014). Yusuf (2012) maintains that the provision of important information to researchers can only be achieved when a variety of

appropriate information resources are well accessed with which scientific evaluation becomes less demanding.

Agarwal (2011) describes an information resource as an information agent or transporter concerning either or both conventional/outmoded source (majorly print source) and electronic source. Chikwe et al. (2015) emphasize that the information resources needed for delivery of scientific communication to researchers in the libraries of various establishments have become inapt. The inaccessibility of pertinent information resources has become a main issue that S&T researchers face in tackling their need for information as they utilize information and this has to be resolved with libraries/information centers striving to close this gap (Idiegbeyan-Ose et al., 2014). Users of information tend to search for information that is identified by them to be contextually applicable to their situation and as a result they logically utilize available information resources within their reach and expertize (Wang, Sarkar & Shah, 2017; Nwachukwu, Abdulsalami & Salami, 2014; Agarwal, Xu & Poo, 2011). Msoffe & Ngulube (2017) have highlighted that users of information are more likely to access and use it if it is conveyed through a favored source. Also, Acheampong & Dzandu (2015) affirm that the means of getting the desired information by researchers is through well packaged sources of information presented in useful configuration or arrangement that is easy to work with. Hence, the relevance of the importance and format inclination of information resources are established if proper research is to be carried out by S&T researchers. It is imperative that important and preferred formats of information resources be provided to researchers for them to obtain information so as to achieve their research goal of coming up with technological innovations to lend their support in the evolving process of countrywide technological growth. Unfortunately, no study has been reported in the professional literature on the important and preferred format of information resources required by S&T researchers of the Federal Institute of Industrial Research Oshodi (FIIRO) in Nigeria. It is therefore relevant to conduct this research in order to bridge this gap.

This knowledge will help the planning process of relevant institutions and research libraries/information centers for the acquisition of relevant information resources with the aim of meeting the quest for information by S&T researchers to gratify their need(s). Consequently, our study is aimed at ascertaining the important information resources required by S&T researchers, the preferred format of information resources and determination of the motive(s) for preferring information resources format(s). The results of this article are extracted from the doctorate work titled *"information needs and information-seeking behavior of researchers of an industrial research institute in Nigeria"* (Makinde, 2018).

Contextual setting

The Federal Institute of Industrial Research Oshodi (FIIRO) in Nigeria was established in 1956. It is an establishment that operates under the supervision of the Federal Ministry of Science and Technology (FMST). It was created with the purpose of helping in intensifying the process of industrial development in Nigeria. This will be achieved by means of exploiting the nation's natural resources and promoting our homegrown manufacturing methods. There were a total of one hundred and seventy one science and technology (S&T) researchers carrying out research in S&T at FIIRO in various S&T fields as at the time of this study. Table 1 shows the S&T researchers and their departments in FIIRO.

Table 1
Science and technology researchers and departments

Departments	Science and technology researchers (No.)
Biotechnology	37
Chemical/Fiber/Environmental Technology	35
Food Technology	45
Planning/Technology Transfer/Information Management	4
Production/Analytical/Laboratory Management	19
Project Development/Design	31
Total	171

This paper focused on FIIRO because of its long standing tradition of carrying out S&T research in Nigeria. This point forward that FIIRO will have skilled researchers that can provide needed information. Consequently, this will help in addressing the gap that this paper seeks to bridge. FIIRO have done quite well by coming out with various research outputs in science and technology. Most of the outputs have been adopted by many entrepreneurs with excellent results being achieved. However, these laudable innovations of FIIRO cannot be attained if there is no provision of important and preferred format of information resources to researchers which can be delivered through the library of this organization.

The library of FIIRO was set up in 1957 and given the responsibility of providing information support for the activities of the institute hinged on research and development toward nationwide economic development. In order to achieve the stated mandate, multifarious information resources ranging from technological, administrative and economic ones were acquired and processed to make easy their accessibility and usage. Examples of information resources found in the institute's library include books, directories, journals, standards, research reports, seminal papers, abstracts, video recordings, and so on. At the heart of these information resources are five professional librarians attending to researchers' information needs.

Methodology

This paper employed mixed methods research (MMR) pattern which involved the mixture of quantitative and qualitative research approaches so that the research results can be triangulated (Kelle, Kühberger & Bernhard, 2019; Bangi, 2018; Neuman, 2014; Yeasmin & Rahman, 2012). With the adoption of survey method, a questionnaire was used to collect data from science and technology researchers whereas interviews were extensively conducted for the professional librarians. The questionnaire papers contained questions that revolved around information resources types and their importance, reference orders of information resources, formats of information resources and determination of the motives for preferring information resources formats. The interview papers summarily contained questions directed at the librarians to get facts on information resources provided by the library, evaluation of the library and suggestions on ways of improving library services.

The sampling techniques employed in the study were random and stratified probability sampling. The science and technology (S&T) researchers were put into sections based on the departments they belong in the establishment. The sections were Biotechnology, Chemical/Fiber/Environmental Technology, Food Technology, Planning/Technology Transfer/Information Management, Production/Analytical/Laboratory Management and

Project Development/Design. Judgement sampling was also employed as a non-probability sampling method in the study. This method was used because the professional librarians participating in the interview sessions who are experts are well acquitted with the S&T researchers in relation to their need for information. The judgements from these professional librarians will present a better view of the information resources possessed by the institute's library. It should be noted that the interviews with the knowledgeable librarians will bring out facts and basis of comparison with the results obtained from the questionnaires handed out to S&T researchers. This is to ensure that the results obtained from the study are comprehensive enough for applicable conclusions. At first, one hundred and sixty five S&T researchers were considered as the sample size because six Directors who were also part of the S&T researchers could not participate in the study. This was due to the challenges encountered in reaching out to them because of their strict work schedule. Eventually, one hundred and fourteen S&T researchers ended up submitting their questionnaires. This made the response rate to be 69.1 percent.

Five research assistants helped in the distribution and collection of the questionnaires. The interview sessions with the librarians were conscientiously executed by the project researcher. The study utilized Statistical Package for the Social Sciences (SPSS) in its analysis for the questionnaires. But, the analyses done in this paper were descriptive aspect of SPSS. This involved tabular presentation of results using frequencies, percentages and summations. In the end, data were drawn out from the tables with narrations. Interview results were also narratively done. Finally, results of both questionnaires and interviews were compared together and also with existing studies in order to draw workable conclusions.

Results and Discussion

Demographic information

Table 1 showed that our respondents came from six subdivisions of Federal Institute of Industrial Research Oshodi (FIIRO). The subdivisions were Biotechnology, Chemical/Fiber/Environmental Technology, Food Technology, Planning/Technology Transfer/Information Management, Production/Analytical/Laboratory Management and Project Development/Design. Out of the surveyed one hundred and fourteen science and technology (S&T) researchers who returned their questionnaires, a little above one quarter (26%) came from Food Technology (which was the highest) and a little above one fifth (22%) from Biotechnology (second highest). This was followed by Chemical/Fiber/Environmental Technology (18.4%), Project Development/Design (17.6%), Production / Analytical / Laboratory Management (12%) and Planning/Technology Transfer/Information Management (4%). It could be seen that 48% (approximately half of the respondents) came from the summation of Food Technology and Biotechnology respondents. As mentioned earlier, there were five professional librarians working in the institute's library.

Importance of information resources

An abridged table showing the importance of information resources is seen in Table 2. Table 2 shows the first seven information resources that were the most important and the last three information resources that were least important out of 18 information resources indicated by the respondents. The results show that in descending order, journal articles (105; 92.1%), Internet sources (94; 82.5%), knowledgeable persons in the field (88; 77.2%), review articles

(77; 67.5%), conference abstracts and proceedings (68; 59.6%), books (63; 55.3%) and professional meetings/workshops (57; 50.0%) were the most important information resources. Other important resources in order of importance were face to face conversation/discussions with colleagues and research reports/patents/facts sheets. Least important resources in descending order were emails/blogs/webinars/discussion forums, pamphlets/leaflets, technical reports, content pages, theses and dissertations, indexes and abstracts of journals, librarians/library staff, library catalogues and newsletters. Biotechnology researchers entirely indicated that journals were of great significance to them. Planning/Technology Transfer/Information Management respondents had the lowest in terms of very important rating of journal usage with 3 (75%) of the respondents indicating so. The results indicate that formal information resources were very important than informal information resources to the respondents. Out of the first seven rated information resources, five information resources were formal information resources. The results concur with Vilar, Juznic & Bartol (2012) and Bobick & Berard (2011) who showed that researchers intensively use formal resources but they also occasionally use informal resources at varying levels. The implication is that respondents in the surveyed institute considered research information from formal resources to be verifiable than unconfirmed information from informal resources.

The results of the study also agree with those of Chun, Yi, Park &Choi (2015) and Vilar et al. (2012) who stated that the journal article was the most important information resource used by science and technology researchers. However, Chun et al. (2015) reported that apart from the journal article being very important, researchers also considered very important the information resources - monographs and research reports. The study also concurs with Mugwisi, Ocholla & Mostert (2014). They reported just as our study that the greater part of the study researchers consider technical reports to be very important, followed by books, professional meetings and workshops. Contrariwise, during the interviews, the professional librarians reported that science and technology (S&T) researchers utilized books above all information resources.

These responses are inconsistent with the results of S&T researchers who indicated the journal to be the most important and therefore the most used information resource. The implication is that the professional librarians in the survey institute lacked a good understanding of information resource requirements of S&T researchers. It means that the library and its professional staff must establish a presence in researchers' work environments in order to know the sources of information and the information services that S&T researchers need so that they are made available in due course.

Table 2
Abridged table showing the importance of information resources N=114

Information resources	ΣF	%
Journal articles	105	92.1
Internet sources	94	82.5
Knowledgeable persons	88	77.2
Review articles	77	67.5
Conference abstracts and proceedings	68	59.6
Books	63	55.3
Professional meetings/workshops	57	50.0

Information resources	ΣF	%
Librarian/library staff	11	9.6
Library catalogues	10	8.8
Newsletters	7	6.1

* *Multiple responses received*
* *Increasing ΣF & % show increasing importance of information resources*

The respondents indicated that they utilize various sources of information when carrying out research as seen in Table 2. The results are in line with Pontis, Blandford, Greifeneder, Attalla and Neal (2015) and Hunt & Bakker (2018) who highlighted that numerous sources of information were used by researchers in the course of their research. Our results also concur with Pontis et al. (2015) who stated that users of information during a searching activity repeatedly turn to digital and manual sources of information. The librarians/library staff (11; 9.6%) and library catalogues (10; 8.8%) were information resources that respondents indicated as being among the least important information resources. This showed how poorly respondents utilized the institute's library and therefore a pointer to how the library itself was inadequately stocked with other sources of information. The result obtained in the study is consistent with Acheampong & Dzandu (2015) who cited occasional usage of information centers and libraries by researchers due to lack of adequate library facilities. The results from the questionnaires also agree with the conducted interviews with the librarians. In support, the librarians affirmed that a large amount of library compendium is not current, smallness of the library and as a result a new one is required, the Internet not being available for some time, datedness of library books and lack of electronic services provision in the library.

Reference order of information resources

The highest reference order consulted by science and technology (S&T) researchers when in need of information was the order Internet→personal collection→colleagues→library indicated by approximately two third (63%) of them. The second preferred reference order was Internet→colleagues→personal collection→library with 35%. The last preferred reference order was library→Internet→personal collection→colleagues represented by 2%. Two percent of the respondents that indicated library→Internet→personal collection→colleagues reference order came from Planning/Technology Transfer/Information Management with none of the respondents from other departments preferring this reference order. None of Planning/Technology Transfer/Information Management respondents indicated the reference order of Internet→colleagues→personal collection→library. The implication is that Planning/Technology Transfer/Information Management respondents as information extension agents strongly believe in the institution of the library as a conveyer of information to researchers and institute's clients. This role is similar to that of the library. The complete reference order of information resources is shown in Table 3. The implication of most respondents indicating the reference order of the Internet despite the institute's library lacking Internet connection shows that the respondents used alternative sources in the form of personally-provided Internet modems or Internet connection via mobile devices.

Table 3

Information resources reference order

Information resources reference order	FO		PRO		BIO		CHE		PR		PL		Total of F & %
	F	%	F	%	F	%	F	%	F	%	F	%	
Internet→personal collection→colleagues →library	19	63.3	13	65.0	15	60.0	14	66.7	9	64.3	2	50.0	72 (63.0)
Internet→colleagues →personal collection→library	11	36.7	7	35.0	10	40.0	7	33.3	5	35.7	0	0	40 (35.0)
Library→Internet→pe rsonal collection→colleagues	0	0	0	0	0	0	0	0	0	0	2	50.0	2 (2.0)
Total	30	100.0	20	100.0	25	100.0	21	100.0	14	100.0	4	100.0	114 (100.0)

*N=114,   FO=Food   Technology,   PRO=Project   Development/Design,   BIO=Biotechnology, CHE=Chemical/Fiber/Environmental Technology, PR=Production/Analytical/Laboratory Management, and PL=Planning/Technology Transfer/Information Management

The Internet was clearly favored by the S&T researchers as they seek for information as seen in the reference orders (Table 3). Firstly, the Internet was mentioned in the first two reference orders and second in the last reference order by the S&T researchers. Our results have a number of similarities with Sethi & Panda (2012) that disclosed that digital resources from the Internet were better desired within researchers in the disciplines of science. Additional research papers that corroborate these results include Sumadevi & Sampath-Kumar (2018), Adamou & Ntoka (2017), Rangaswamy, Manjunatha and Sampath-Kumar (2017) and Brown (2010). Sumadevi & Sampath-Kumar (2018), Adamou & Ntoka (2017) and Rangaswamy et al. (2017) in concurrence with the present study put forward that researchers are strong users of digital library resources as they recognize the basic benefit of a digital library and its flexibility in getting information. Substantiating this survey, Brown (2010) extensively reported the utilization of the Internet in accessing digital information resources such as conference papers and open access (OA) journals. This will enhance familiarity and certainly scientific studies utilization through the broadening of their availability further than they would have been normally read. Then again, they stressed that they are no replacement for the critiqued journals. This should also be noted by the librarians. Our results from S&T researchers refute stated responses from professional librarians who cited the Internet as the first point of call when information is required. The professional librarians reported lack of Internet connection, lack of information and communication technologies and lack of electronic databases in the library. Inconsistency lies from the results of S&T researchers which point to the information resource that appeared most in the reference orders in that it was not provided by the institute's library. This also points to inadequate facility provision in the library thus making information availability difficult.

Format inclination of information resources

The respondents indicated the format of the information resources they were more inclined to in gratifying their need for information as they source for reference resources and journals. Basically, there were two types of information source format – print and non-print. Table 4 shows that the greater part of S&T researchers (70.2%) favored the combination of print and non-print formats of reference resources and journals. Less than one fifth of the respondents (18.4%) favored only non-print whereas just a bit above one tenth of the respondents (11.4%) selected only print.

Table 4

Information resources format inclination

Information resources format inclination	FO		PRO		BIO		CHE		PR		PL		Summation of F & %
	F	%	F	%	F	%	F	%	F	%	F	%	
Only print copy	2	6.7	7	35.0	2	8.0	1	4.8	1	7.1	0	25.0	13 (11.4)
Only non-print copy	3	10.0	3	15.0	4	16.0	7	33.3	3	21.4	1	0	21 (18.4)
Both (print and non-print copy)	25	83.3	10	50.0	19	76.0	13	61.9	10	71.4	3	75.0	80 (70.2)
Total	30	100.0	20	100.0	25	100.0	21	100.0	14	100.0	4	100.0	114

*N=114, FO=Food Technology, PRO=Project Development/Design, BIO=Biotechnology, CHE=Chemical/Fiber/Environmental Technology, PR=Production/Analytical/Laboratory Management, and PL=Planning/Technology Transfer/Information Management

The greater part of the respondents favored the combination of print and non-print versions of reference resources and journals in contrast to only print and only non-print formats. These results appear to be consistent with Pooladian & Sotudeh (2015) who showed that the combination of print and database (digital) versions were better utilized as indicated by the study researchers. This simply shows that they preferred both print and non-print resources in carrying out their research as depicted in our study. Our study result is in complete agreement with the study of Brown in 2010 which demonstrated that despite the verity of the prevalence of electronic network in present-day world making easy different levels of communication, it has not ruled out the relevance of the print version. However, some studies present a different position. Acheampong and Dzandu in 2015 established the inclination toward electronic journal than print version which might be largely dependent on infrequent library utilization. The results are also in contrast with the survey study of Mishra (2016) where 65.4% of the respondents were researchers and their information resources selection differed from one researcher to another as a result of the nature of research activity. Printed sources were most preferred sources (51%), followed by 23% who favored online sources and 19% who chose web resources.

Motives for inclination of information resources formats

Science and technology researchers revealed the motives for favoring the formats of information resources as they gratify their need for information. More than two third (70.2%) of S&T researchers disclosed that the combination of print and non-print versions were to be trusted in suppling needed information. Obviously, this must have informed the choice of S&T researchers in Table 4 with the way they selected the usage of both electronic and print sources over electronic source only or print source only. Perusals ease with phone for non-print copy, device usage for non-print copy and convenience/cost effectiveness of electronic copies were all cited by 21 (18.4%) of the respondents. Higher coverage and information-access ease for non-print copy was cited by 15 (13.2%) of the respondents. The least motives indicated were availability of print copy without Internet access and bulkiness/expensiveness of print copies cited by 13 (11.4%) of S&T researchers. The complete motives for respondents' inclination toward information resources are clearly itemized in Table 5.

Table 5
Motives of inclination toward information resources

Motives	FO		PRO		BIO		CHE		PR		PL		Summation of F & %
	F	%	F	%	F	%	F	%	F	%	F	%	
Higher coverage and information-access ease for non-print copy	2	6.7	2	10.0	2	8.0	6	28.6	2	14.3	1	25.0	15 (13.2)
Availability of print copy without Internet access	2	6.7	7	35.0	2	8.0	1	4.8	1	7.1	0	0.0	13 (11.4)
Perusals ease with phone for non-print copy	3	10.0	3	15.0	4	16.0	7	33.3	3	21.4	1	25.0	21 (18.4)
Device usage for non-print copy, e.g. cellphone, tablets, etc.	3	10.0	3	15.0	4	16.0	7	33.3	3	21.4	1	25.0	21 (18.4)
Joint dependability of print and non-print copies	25	83.3	10	50.0	19	76.0	13	61.9	10	71.4	3	75.0	80 (70.2)
Convenience and cost effectiveness of electronic copies	3	10.0	3	15.0	4	16.0	7	33.3	3	21.4	1	25.0	21 (18.4)
Bulkiness and expensiveness of print copies	2	6.7	7	35.0	2	8.0	1	4.8	1	7.1	0	0.0	13 (11.4)

* Multiple responses received, N=114, FO=Food Technology, PRO=Project Development/Design, BIO=Biotechnology, CHE=Chemical/Fiber/Environmental Technology, PR=Production/Analytical/Laboratory Management, and PL=Planning/Technology Transfer/Information Management

The findings are in agreement with Ansari and Zuberi (2010) who indicated that majority of researchers use both electronic and printed resources because of the lack of facilities and that the use of the two sources gives a better assurance in respect of materials gathered for research. Also, University of West London (2018) in agreement put forward that many journals are available both in print and online but not all print journals have an e-version, and not all e-journals are available in print. In addition, sometimes an e-journal publisher will put extra content online that does not make it into the print version, or will put new content up online before it appears in print. Yamson, Appiah & Tsegah (2018) also reported that electronic and print sources have distinctive advantages and boundaries. Consequently, researchers need to be encouraged to use both in order to acquire more detailed and current updates in any area of study. They clarified that in this way, the two formats will bring about the gratification of S&T researchers under different circumstances in terms of their need for information.

Conclusion

Information resources importance and format inclination are imperative in determining how science and technology (S&T) researchers get the required information as they get on with their task of speeding up economic development. Our research paper uncovered that the combination

of formal and informal resources were duly accessed by S&T researchers. The study discovered that journals, Internet sources and knowledgeable persons in the field in this decreasing order were the extremely important information resources among the accessed ones. Surveyed S&T researchers uncovered that the favored reference resources and journals format to satisfy researchers' information needs were mixture of print and non-print copies. The motive given for the mixture of print and non-print copies was their dependability in the delivery of substantial information when they are used collectively during projects by researchers.

It is therefore recommended that the mixture of print and non-print versions of information resources especially journals should be provided for researchers by the management of the institute as quickly as possible to boost research activities. Manual and electronic submission of the completed researches done by the institute's researchers must be encouraged as a reasonable approach to library acquisition. In addition, there is the need of reskilling the professional librarians. This is to get them more enlightened in identifying multiple information sources that thoroughly cover topics being worked upon by researchers in order to satisfy researchers in both print and non-print information sources (complementing web-based resources with print resources).

Due to the contradictions observed in the study with respect to researchers' and librarians' perceptions of information source requirements in the institute, it is important to conduct quarterly survey using questionnaire administered by the librarians to the researchers in order to ascertain and update information sources needed by researchers. Lastly, the Internet must be resuscitated in order to promote electronic services at the institute's library.

Limitations and further research

It is conceivable that a number of limitations could have influenced the results obtained. First, the study is limited to science and technology (S&T) researchers of the Federal Institute of Industrial Research Oshodi (FIIRO), an establishment under the Federal Ministry of Science and Technology (FMST). Consequently, it may only be applicable to researchers under a similar organization and of related disciplines. Another possible source of limitation is the methodology employed. This will not permit the generalization of the results because more facts can still be gathered from interviewing S&T researchers and questionnaire administration to the professional librarians. Also, this study could have benefited from a wider range of interviews with the Directors and the Director General. However, these potential respondents were reluctant to cooperate with the researchers due to time and civil service rule constraints. Suggestions for further study include: the use of alternate methods for S&T researchers and professional librarians as previously stated, the study of other researchers in the various organizations under FMST for the purpose of comparing results and a study on expansion and changes in S&T researchers' information resource preferences.

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