

# E-Collaboration for Research and Development- An Observation from Nigeria University

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## Abstract

This study assessed e-collaboration networks for research and development in two universities and a Science and Technology research institute in South western Nigeria. It investigated the sources of information available for S&T research activities, determined the extent of academia utilizing e-collaboration networks and examined the advantages of e-collaboration networks. As showed in this study, e-collaboration network strengthens research and support scientific and technological excellence through the integration of existing and emerging research activities and the exchange of knowledge. In today's knowledge economy, the World Wide Web remains the nucleus of information, knowledge and research for scholars across the globe. A total of 150 researchers were sampled across the three educational and research institutions by means of questionnaire administration. The analysis of data was done using descriptive statistics such as percentage distribution. Findings from the study revealed that:

About 77% of the researchers collaborate with research groups on the internet and this is done at least occasionally and in some situations very often. The major sources of information are the internet and other popular sources such as print and non-print media. The characteristics and advantages of S&T e-collaboration networks as shown in this study include reliability, timeliness, effectiveness, relevance and accessibility by a large audience. This study concluded that electronic collaboration networks in S&T research may be influenced by the purpose of the network, quality and alternative information sources and technology factor.

**Keywords:** e-Collaborations, Information, Science & Technology, Research & Development

## 1. Introduction

Research and development in science and technology leads to creation of new knowledge or addition to an existing body of knowledge. Improved knowledge always emanate from access to knowledge (Siyanbola et al, 2011). This means that the more the academia have access to information, the more productive they become. It is often said that the key to power is information, science and technology research in developing nations thrives on the information available to the people involved. Moreover, the main essence of R&D as highlighted in (Siyanbola et al 2011) is new products or improvement of existing products, new process development or improvement of existing processes and generation/creation of new knowledge, patents, copyrights and publications. Impact factor of any publication is an indication for quality invention and research outputs while patents, copyrights, and funding from companies are an indicator that those inventions have market value.

The most authentic source for creativity and innovation is information, a basic resource for learning and human thought, a key resources in creating more knowledgeable citizens and an important resource for national socio-economic development (Fari, 2010, Byerly and Brodie, 1999). Information and knowledge sharing is referred to as exchange of data, ideas, taught between a sender and receiver. The four primary information sharing design patterns are sharing information one to-one, one-to-many, many-to-many, and many-to one.

Many researchers have their definitions from their own point of view: knowledge sharing is an activity which knowledge from one person, team or institution transfer or spread to another team, group or institution (Lee, 2001), Knowledge sharing is the process that managed through various modes of communication and collaboration which distribute knowledge to members in the right time, place and form (D'Aspremont, Bhaffacharya & Grard-Varet, 1998).

The need for update information about current trends in research and development activities and their socioeconomic implications in various fields is as important as the work itself. A good platform to achieve this is via collaborations

Collaboration as defined by ( Huxham, 1996, Jordan Jr. and Michel, 2000 in Umit et al) means working-together. The term is often used when individuals or a group of people work together towards achieving a common aim. It is taken to imply a very positive form of working in alliance with others for some form of mutual benefit (Huxham, 1996).

The benefits of collaboration as put by Umit et al, 2004 in Lewis, 1990 is to increase quality of product i.e. output of research and development, enhance skill and knowledge and to reduce the risk of failure.

Collaborative networks promotes academic quality by ensuring undue replication of work and acquiring new ideas from the works of others in the same area of research. It also strengthen research and support scientific and technological excellence through the integration of existing and emerging research activities and the exchange of knowledge (European Commission, 2003)

Intellectual intercourse increases productivity (Abalaka, 1991) and the more the output of a research is communicated, the more the impact of that work on the society.

E-collaboration networks are the virtual platform available for various academic activities including teaching and research. The availability of the Internet allows web based systems for electronic collaborations and for effective communication and data centralization. Such Web sites can potentially be used to overcome several obstacles in research activities. Electronic collaboration in this context is not limited to the academia relating to the people of the same research interest, but also with others whose input might be needed in completing a set of task. The features of web allows rapid sharing of information and processing of data has made electronic collaborations easy. For instance, It serves as a means for collaborators to find partners with skills that can complement their work using the new web based tools such as researchgate.com, academia.edu, mynetresearch.com among others.

### **1.1 E-Collaborations and its Benefits**

E-collaboration technologies both in government organizations and private institutions have several benefits. The e-collaboration technologies provides solutions to government and private entities.

Implementation of e-collaboration systems helps in reducing cost and it is a benefit to the incorporation using them. It improves the capacity of the institution and boost work place efficiency and enhance decision-making processes. Easy access to information will also be a plus to the institution.

Effective knowledge sharing has been shown to lead to an institution's ability to retain the knowledge created by its members as well as their talent and expertise. Knowledge sharing can increase efficiency and save on work hours by ensuring that an institution learns from past experience and avoid duplication of effort (Teruya 2003, Weiss, 1999 in Hassandoust and Kazeroun, 2011). Knowledge sharing in knowledge institutions avoid replication of work , for instance, one lecturer / researcher working on a particular project topic and another doing the same somewhere else within the same institution, coming together and seeking for collaborators will reduce such happenings to the minimum. This phenomenon can save a lot of time and energy if appropriate methods of sharing knowledge being implemented; thus resulting in exploitation of the knowledge, which is commonly needed by multiple entities.

Saul and Zulu (1994) cautiously mention that electronic collaboration technology tools serves as a means to an end instead of an end in itself

Another rather important parameter, which will be effectively improved, is the transparency within the institution that will eventually benefit overall performance. Upon the implementation of these tools, taking advantage of advanced technologies, access to information will become much easier throughout the facility. Ushering toward the real time processing of data. The cheaper and more efficient access to the larger amount of information with larger and more advanced computers is good enough reasons to add to the number of pro technology followers (Gichoya, 2005).

### **1.2 Traditional association viz-a-viz e-collaboration**

The main weakness of traditional association is that it is predominately dependent on frequent face-to-face communication and thus is not encouraging to stimulating incorporation, especially when parties are located in different part of the world (Cheng, Love, Standing & Gharavi, 2006). Other than making use of traditional collaboration, an association should place emphasis on electronic collaboration (e-collaboration), which is referred to as collaboration through internet and online systems among a group of associated parties, particularly the use of communication and collaboration technologies to initiate and assist the sharing of resources especially across the world in order to improve associates' success (Gharavi, Love & Cheng, 2004; Lee-Kelley, Crossman & Cannings, 2004; Rutkowski *et al.*, 2002). Online collaboration is expected to facilitate the acquisition of knowledge from the parties involved. The mutual resources is usually intangible such as knowledge, information, ideas, and know-how.

M. Anandarajan and A. Anandarajan put it that the internet is that main conveyor of information, knowledge and research and they defined e-Research collaboration as when collaboration between researchers are conducted using the convergent synergy of web conferencing, real time collaboration technologies, instant messaging, shared online work spaces and interactive white boards through the internet.

This avenue can as well be used to foster collaboration between the knowledge institutions and the industry. The industry can come up with any area of interest while the academia picks it up from there to find solution to any of the problem from the industry.

The researcher observed that access to current information is the basis for any research activity and this will make the research output to be impactful on the society and thereby foster academic productivity.

This work defines the electronic collaborative networks as the intermediary available on the internet with which various researchers interact for knowledge sharing and also as a means to connect research outputs to the industry. This network will strengthen the academy- industry Relation and also improve national innovative

capabilities. We also examine the role of web as a an avenue to strengthen the tie between the academia and the industry.

### 1.3 Research Questions

1. What are the sources of information for S&T research in Nigeria?
2. Do the academia use e-collaboration networks?
3. What are the available-collaboration networks for S&T research?

### 1.4 Objectives of the work

1. Investigate the sources of information for S&T research activities
2. Determine the use of e-collaboration networks by the academia
3. Explore the available e-collaboration networks for research.

## 2.0 Methodology

This research is a quantitative study which employed descriptive survey design. It involves the design and administration of questionnaire to 150 groups of academic staff in two universities and a science and technology research institute in south-western Nigeria with a view to soliciting relevant information on the subject under investigation. Other methods of data collection included oral interview and personal observation. Validity and reliability of the instrument was carried out by means of crumbach alpha coefficient of 0.6 and above.

## 3.0 Results and Discussion

### 3.1 The Sources of Information for S&T Research Activities

It is interesting to observe that all identified information sources were used at all levels of S&T research activities. Nevertheless, internet 96.6% tops the list of information sources. Others include Books and Monographs 81.5%, Conference Proceedings (65.2%), Theses & Dissertations 66.7% and Government gazettes 47.6% respectively. This implies that most of the conventional information sources still relevant even in the internet era. Besides the study looked at the factors influencing the use of electronic collaboration networks in S&T research and found that the most important influencing factor was quality information sources (70%). Other important factors include purpose of research and public opinions (51.9%) respectively.

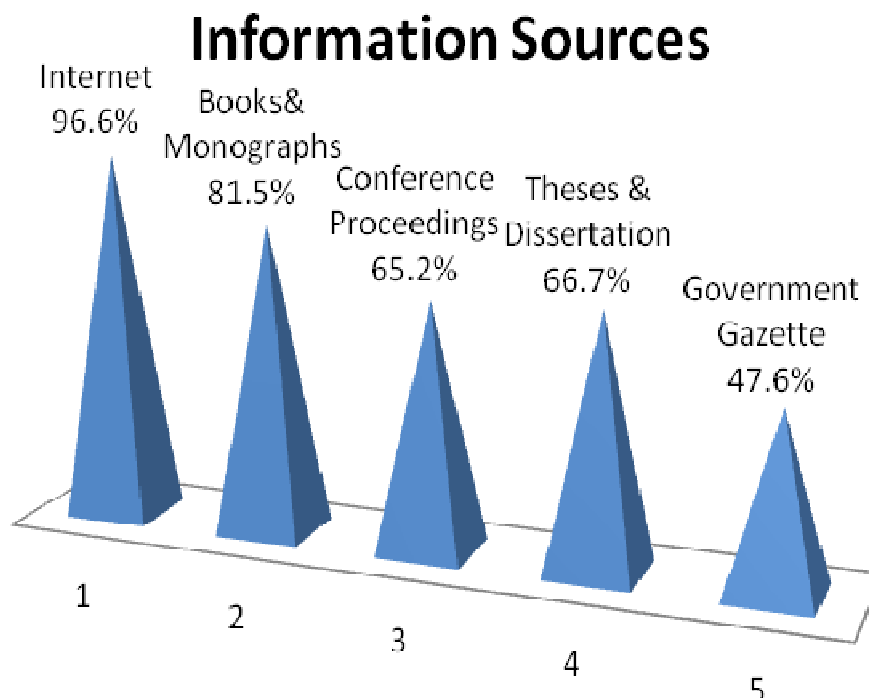


Figure 1: Pictorial representation of the sources of Information for research

**Table 1: Characteristics of S&T information**

	Satisfied	Acceptable	Dissatisfied
Reliability	60.0	30.0	10.0
Timeliness	43.4	36.7	20.0
Effectiveness	48.2	44.8	6.9
Relevancy	60.0	33.3	6.7
Accessibility	60.0	26.7	13.3

**Source: filed survey, 2014**

The results in Table1 showed that the common characteristics of S&T e-collaboration networks are reliability, timeliness, effectiveness, relevancy and accessibility of information by its members. As shown in the analyses, the top satisfied and highly satisfied characteristics were effectiveness and relevancy and accessibility. (60%) of the respondents were satisfied with the relevancy of e-collaboration networks. Besides, 48.2% others were satisfied with its effectiveness and 43.4% with its timeliness. Nevertheless, 13.3% were dissatisfied with accessibility. It implies that even though e-collaboration network is acceptable among the academics, few still have challenges with it. This calls for a continuous awareness programme of the significance of e-collaboration in this knowledge economy. Additionally, the various characteristics of e-collaboration serves as attraction to many young researchers with high preference for internet use since it allow multiple interactions among members simultaneously.

**Table 2: Percentage distribution of sources of information used in S&T Research**

Sources	During the research process	At all stages	At initiation stage
Books and Monographs	11.1	<b>81.5</b>	7.4
Conference Proceedings	25.0	<b>53.6</b>	21.4
Internet	3.4	<b>96.6</b>	0
Theses &Dissertations	18.5	<b>66.7</b>	14.8
Government gazettes	38.1	<b>47.6</b>	14.3

**Table 3: Factors influencing the use of electronic collaboration networks in S&T research**

Factors	Important	Relevant	Not Relevant
Purpose of the network	88.9	11.1	0
Public Opinion	88.9	11.1	0
<b>Quality information sources</b>	<b>93.3</b>	<b>6.7</b>	0
Alternative information sources	72.4	27.6	0
Technical information sources	72.4	27.6	0
Technology factor	79.2	17.2	3.4
Political consideration	43.3	23.3	30.0
Public Opinion	51.7	31.0	17.2
Influence of other higher authority	44.8	41.4	13.8

**The use of e-collaboration networks by the academia**

The analysis in table 4 revealed that e-collaboration networks are at least occasionally used by a good number of academic staff in the universities and research institutes in Nigeria. The analysis showed that although 58.6% of the respondents occasionally used feedback provision, 40.0% regularly used feedback provision of e-collaboration networks. Furthermore, 40% of the respondents occasionally made use of information needed formation of collaborations, 35.7% others regularly explored policy objective formation of e-collaboration network. With regards to assurance of information needed, 40% occasionally, 60% regularly engaged in e-collaboration since it guarantees assurance of information needed. The study further showed that 70% of the respondents agreed that e-collaboration research network ensures information sources availability for use for its members.

**Table 4: e-collaboration used**

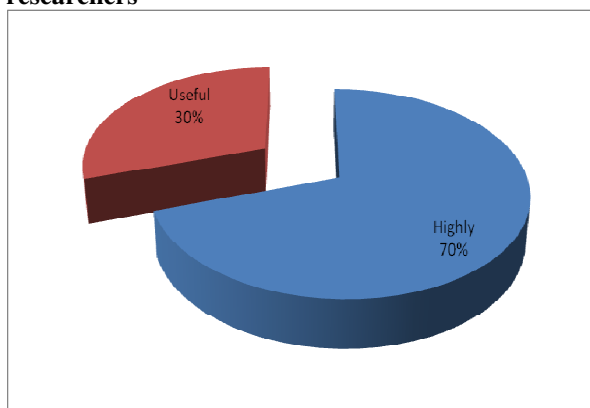
	Never	Occasionally	Regularly
Feedback provision	10.3	58.6	40.0
Policy objective formation	14.3	50	35.7
Information needed guarantee	0.0	40.0	60.0
Guarantee timely information sharing	0.0	34.5	65.5
Information sources readily available for use	0.0	31.0	70.0

**Source: filed survey, 2014.**

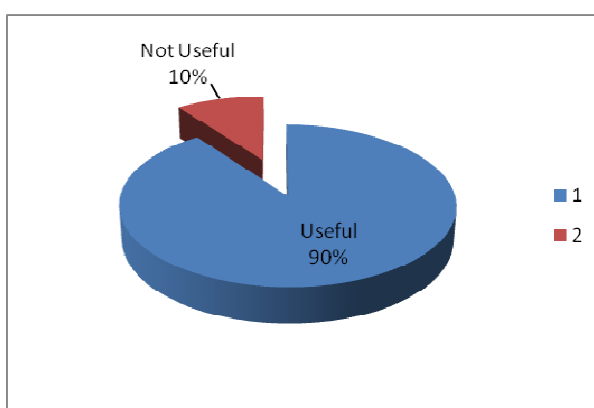
### Usefulness of the e-collaboration information to R&D

The analysis in the figure below showed that 70% of the researchers described the e-collaboration information to research activities to be highly useful. Also, 83% of the respondents said they enjoyed close relationship with others scholars via e-collaboration network technology. Furthermore, 90% described the usefulness of the networks to researchers to be useful and very useful. Lastly the investigators were interested in knowing the up to date level of information via e-collaboration medium and the study revealed that 90% of the respondent described the e-collaboration network to be up to date when compared with other research networks.

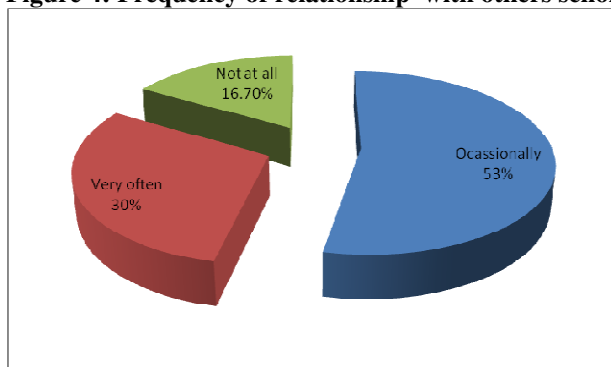
**Figure 2: Usefulness of the e-collaboration information to researchers**



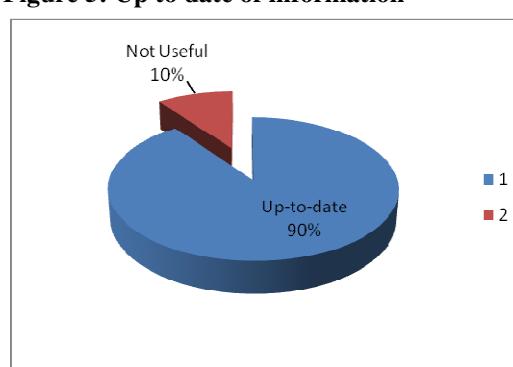
**Figure 3: Usefulness of the networks to researchers**



**Figure 4: Frequency of relationship with others scholars**



**Figure 5: Up to date of information**



### Conclusions and Recommendation

This study revealed that the use of e-collaboration network among Nigerian researchers is highly commendable and that the e-collaboration networks available has tremendous impact on the productivity of the researchers and as well increase their efficiency. It also noted that most researchers spent more time on e-mails and social media as they interact occasionally on other academic networks. Hence, maximizing these networks, will give up-to-date information and improve the quality of research outputs. It also strengthen research and support scientific and technological excellence through the integration of existing and emerging research activities and the exchange of knowledge. It is also important to encourage intellectual intercourse between the academic and such can be achieved through locally developed e-collaboration platforms by various knowledge institutions in order to harness the full benefits of e-collaboration.

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