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The Adoption of Big Data in Selected Information Institutions in Bangladesh: a study

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Abstract

Purpose: The purpose of the study is to identify the big data adoption in information institutions as well as to justify the understanding and expertise level of information professionals. The study tried to identify the adoption of big data in the information institutions of Bangladesh.

Materials and Methods: A structured questionnaire was adapted cautiously for conducting the study. The Questionnaire was sent to more than 50 professionals of information institutions via email and FB messenger. The respondents are the professionals and faculty members who had the minimum qualification of bachelor/master /postgraduate degree in information science and library management. Among them, 25 respondents from 20 information institutions replied.

Result: The study found that most of the information institutions yet to adopt big data properly in Bangladesh. Twenty percent of institutions adopted big data whereas eighty percent did not adopt it even some of the institutions are not aware of big data. The study found that sixty percent of professionals are not aware of the monthly amount of data used in their institutions.

The results found that information professionals are, in general, positive in big data adoption. The study also assessed the understanding level of them.

Conclusion: The effort has been made to explore the current awareness activities of big data and its adoption in the information institutions of Bangladesh for the first time that will trigger further study on big data.

Keywords: Adoption, Big data, Information institution, Bangladesh, Library

Introduction

Due to rapid invention of modern communication technology, uncountable information are producing and using tremendously in information institutions. The flow of rapid growth of information has accelerated the organization to control large numbers of digital resources. Actually the development of digital library is the product of the development of information technology, especially internet technology (Li et al., 2019). Bibliometric studies provide a map to control and manage the information of the library. Big data is a phenomenon caused by the swift flow of information. The issue of big data in libraries has begun to be widely discussed. While its application in the public or government sector, seems to be still limited (Anna & Mannan, 2020). Big data refers to data that is very large, speedy or multifaceted that it's tough and unfeasible to process by conventional system. A technology-based library is a pre-requisite for continuing education and research of any university. University library exists to meet the information needs of its users by the right information to the right person at the right time (Ranganathan, 1961). The use of ICTs in libraries may be classified into three broad groups which are Integrated library system, information storage & dissemination, and administration management tasks (Islam, 2007). Lots of work on big data have been carried out all over the world but a very few efforts have been made to assess the extent of big data adoption in the university libraries of Bangladesh. So, it is expected to determine the present status and extent of big data adoption in Bangladeshi university libraries for building awareness among library professionals and users regarding big data. As well as, it is desired to assess the awareness, knowledge level and competencies and skills of library professionals for the implications of big data adoption (BDA) in information institutions. Consequently, it may be concluded that an effort has been made for the first time to assess the extent of big data adoption in the information institutions of Bangladesh.

Objectives

A very few efforts have been made to assess the extent of adoption and the effectiveness of the big data in the information institutions like university libraries, health libraries in Bangladesh. The study has made the following objectives based on the raised questions, research gaps, and social impact.

i. To determine the present status of big data adoption in the information institutions of Bangladesh;
ii. To reveal the familiarity with big data of information professionals in Bangladesh;
iii. To measure the overall understanding and expertize levels of information professionals for the implementation of big data adoption in information institutions.

Research Questions

We tried to find out the answers of the following questions:

1. How well do you understand the specific term "big data"?
2. Does your information institution adopt big data? Indicate the adoption level of your institutional library.
3. How much data does your institutional library use per month?
4. Do your institution has necessary resources to adopt big data?
5. How do you familiar with big data adoption?
6. As a knowledge leader, what is your expertise level of big data adoption?

Literature review

Many scientists and practitioners have reviewed the possibility of implementing big data in information institutions. The first article on big data in the information institute perhaps first appeared in 2012. After that every year big amount of big data write up in the library is develops and attains its peak in 2019. This shows that the big data issue has only been popular in the past five years. It can be predicted that in 2021 onwards, the number of articles about big data in libraries will continue to grow up (Anna & Mannan, 2020). The act of accessing and storing large amounts of information for analytics has been around a long time. But the concept of big data gained momentum in the early 2000s when industry analyst Doug Laney articulated the now-mainstream definition of big data as the three V's: Volume, Velocity and Variety (Big Data/ *SAS*, 2020). Big Data has characteristics as follow: 3V; volume, variety, velocity and other V elements such as veracity and value. Volume (data capacity) is related to the size of data storage media, which is very large or may be unlimited to petabytes or zettabytes; variety (diversity of data) is related to the type of data that can be processed, starting from structured

data to unstructured data; while velocity (speed) is related to the speed of data processing generated from various sources, ranging from batch data to real time, while the characteristics of veracity (truth) and value are related to the uncertainty of the data and the value of the benefits of the information generated (Sirait, 2016).

Big data enables library to be smart and user-friendly by providing personalized and intelligent services (Liu & Shen, 2018). Big data is trustable and authentic data of multiple formats generated and delivered from different geospatial locations and large enough to not be processed by particular software, a spreadsheet or a computer and which may create value for organizations (Ahmed & Ameen, 2017). Simović, (2018) presented a big data smart library model with the aim of building a system that can recommend personalized content to users with increased precision by analyzing users interests collected from multiple sources, as well as the characteristics of content from different types of data.

Ahmad et al., (2019) found that perceptions of information professionals in the understanding of Big Data Adoption (BDA) ranked high in data privacy, data availability, data organization and data literacy. In another study Ahmad et al., (2019b) revealed that most of the professionals of Pakistan were well aware of the concept of Big Data analytics. Moreover, they were using a large amount of data to carry out various library operations, including the acquisition, preservation, curation and analysis of data. Today, LIS institutions in the USA, UK and Asian countries have played indispensable and sometimes leading role in the interdisciplinary study of information sciences. The information science education and research in LIS institutions are flourishing and may be in the best of times (Wang, 2018). But Bhat, (2018) expressed that current storage technologies are not viable for digital libraries for long-term preservation of big data. Adopting the technologies in digital libraries will certainly result into many significant financial implications on digital libraries besides not being able to provide enough storage space to preserve all the big data submitted for its long-term preservation. In Bangladesh Information institutions are trying to serve their users using modern technologies. Some public and private university libraries of Bangladesh have ensured world-class library services to their patrons. Rest of the libraries at various stages to upgrade their services (Rahman, 2019). They are providing data analysis, reference management, plagiarism checking, text analysis, SPSS, STATA, turnitin, endnote, zotero, voyant, omeka.net, blockchain technology, IOT, AI, drones, RFID technologies and ILS software as library services.

Operational Definition

Big Data: Big data is a term that explains the large volume of data – both structured and unstructured – that overwhelms a business on a day-to-day basis. But it's not the amount of data that's significant. It's what institutions do with the data that matters. Big data can be evaluated for insights that lead to better decisions and strategic business moves (Big Data/ *SAS*, 2020). Big data is an nascent term that explains any voluminous quantity of structured, semi-structured and unstructured data that has the prospective future to be mined for information.

Information institution: Information institutions are organizations that are charged with providing resources and services to meet the educational, informational, cultural and/or recreational needs of their clients (*IS 287*, 2020). Here information institutions refers to all educational institutional library like university, college, health and NGO's digital or virtual or electronic library.

Methodology and Materials

To attain the research objectives efforts were made to collect data through a set of structured questionnaire. Questionnaire was designed for collecting data about big data adoption in the information institutions of Bangladesh. Questionnaire was designed also to assess the overall understanding level of library professionals and knowledge leaders towards big data. The Questionnaire was sent to more than 50 professionals of information institutions via email and fb messenger in April, 2020. The researcher distributed the questionnaire among the information professionals and faculty member who had the minimum qualification of master/bachelor/postgraduate degree in information science and library management. Among them, 25 respondents from 20 information institutions replied, Quantitative data were analyzed using SPSS 23nd Version and the data were examined thematically.

Data Collection Tools

Questionnaire included the demographic information, big data adoption, familiarity, agreement to adopt, role of big data, expertise level of knowledge leader, understanding level toward big data tools. A 5-point Likert scale was administered containing 5= understanding the term and concept, 4= understanding the tern, not concept, 3= heard the term only, 2= not understand, and 1= highly understand for assessing understanding level of information professionals and users towards big data tools. Another 5-point Likert scale was administered containing 1=

strongly disagree, 2= disagree, 3= neither disagree not agree, 4= agree and 5= highly agree for assessing agreement of the respondents for big data adoption in their institutions.

Data analysis

Adoption of Big data in information institution

The study found that most of the information institutions yet to adopt big data properly. Table 1 shows that only twenty percent information institutions adopted big data in Bangladesh. The findings revealed that forty percent of institutional library didn't adopt big data. Only 28 percent have plan to adopt it whereas twelve percent either don't have plan to adopt or not aware of big data. That means most of the information institutions of Bangladesh either do not adopt big data, or not prepared to adopt big data at present.

Table I.

Adoption status of information institutions

Adoption	Frequency	Percent	Valid Percent	Cumulative Percent
Adopt	5	20.0	20.0	20.0
Do not adopt	10	40.0	40.0	60.0
Planning to adopt	7	28.0	28.0	88.0
Do not have plan to adopt	1	4.0	4.0	92.0
Not aware of big data	2	8.0	8.0	100.0

Data use in institutional library use per month:

The study found that the highest proportion sixty percent of professionals are not aware of amount of data monthly used in their institutions. Below 100 GB data are used in twenty percent information institutions whereas 100 GB to 500 GB used in eight percent institution, above 100 TB, 1 to 100 TB and 500 GB to 1 TB in 4 percent information institutions prospectively (Table II).

Table II

Statistics of data used in information institutions per month

Data	Frequency	Percent	Valid Percent	Cumulative Percent
Above 100 TB	1	4.0	4.0	4.0
1 to 100 TB	1	4.0	4.0	8.0
500 GB to 1 TB	1	4.0	4.0	12.0
100 GB to 500 GB	2	8.0	8.0	20.0
Below 100 GB	5	20.0	20.0	40.0

Not aware of the amount of data	15	60.0	60.0	100.0

The results found that information professionals are, in general, positive in big data adoption. The level of agreement with each factor was analyzed on a five-point Likert scales in table III, and the mean and standard deviation of the responses were calculated using the following scores: 1= strongly disagree; 2 = disagree; 3 = neither disagree nor agree; 4 = agree: 5 = strongly agree using the SPSS descriptive analysis.

Table III

Level of agreement regarding the responsibilities that information professional has motivations towards big data

Statement	N	Minimum	Maximum	Mean
Library has the resources necessary to use big data adoption	25	2	5	3.60
Big data adoption helps me accomplish things more quickly	25	3	5	4.12
Big data adoption increases users' productivity	25	3	5	4.32
Big data contribute to getting information of individuals of a country in a needy situation	25	3	5	4.08

Overall understanding level on big data

The statement of overall understanding level of respondents' opinion level as minimum 1, and maximum 5 indicated that professionals were not satisfactorily understandable with the big data term and concept (table IV). A 5-point Likert scale was administered containing 1= understanding the term and concept, 2= understanding the tern, not concept, 3= heard the term only, 4= not understand, and 5= highly understand for assessing understanding level of information professionals towards big data tools.

Table IV

Level of understanding of information professionals towards big data terms

Term	N	Minimum	Maximum	Mean	Std. Deviation
Big data	25	1	5	2.08	1.256
Data science	25	1	5	2.12	1.364
Data analysis	25	1	5	1.92	1.115
Data mining	25	1	5	2.40	1.258
Data engineering	25	1	5	2.48	1.122
Python	25	2	5	2.76	.831

Hadoop	25	2	5	3.40	.866
IOT	25	1	5	2.88	1.301
AI	25	1	5	2.40	1.323
Cloud computing	25	1	5	2.52	1.358

Familiarity with big data adoption:

Figure 1 revealed that the highest forty percent of information professionals are slightly familiar with big data and the lowest 4 percent are extremely familiar with big data. Twenty four percent are moderately familiar, Twenty percent are somewhat familiar and twelve percent are totally not familiar with big data adoption.

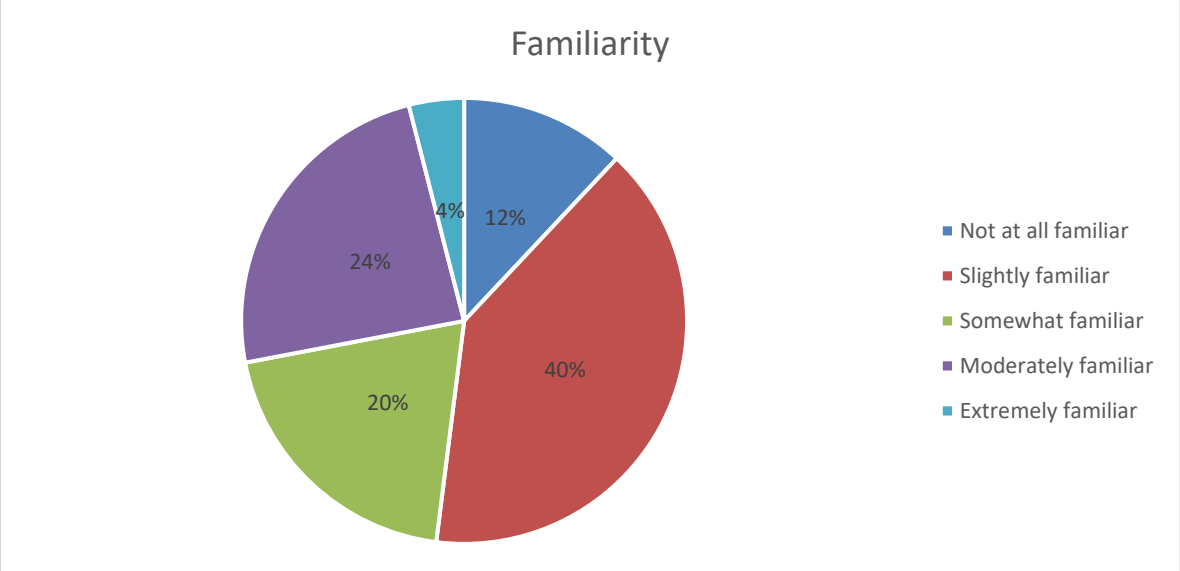

Figure 1: Familiarity with big data adoption

Expertise level of big data adoption:

The study tried to know the expertise level of information professionals regarding big data adoption. A 5-point Likert scale was administered containing 1= excellent, 2= above average, 3= average, 4= below average, and 5= very poor for assessing understanding level of information professionals. The table V showed that the highest forty eight percent of information professionals are in average level for big data adoption and the lowest 4 percent are above average in big data. Twenty four percent are below average, sixteen percent are very poor and eight percent are excellent in big data adoption.

Table V

Expertise level of information professionals for adopting big data

Level	Frequency	Percent	Valid Percent	Cumulative Percent
Excellent	2	8.0	8.0	8.0
Above average	1	4.0	4.0	12.0
Average	12	48.0	48.0	60.0
Below average	6	24.0	24.0	84.0
Very poor	4	16.0	16.0	100.0
Total	25	100.0	100.0	

Findings and Conclusion

The study explored the present status of big data adoption in the information institutions of Bangladesh and found that the information institutions yet to adopt big data properly in Bangladesh. Twenty percent institutions adopted the big data whereas eighty percent did not adopt it even some of institutions are not aware of big data. The study found that the highest proportion sixty percent of professionals are not aware of the amount of data monthly used in their institutions. The study found that information professionals are, in general, positive in big data adoption. The study also assessed the understanding level of big data tools like big data, data science, data mining, data engineering, python, IOT, AI, and Hadoop etc. and result showed that the understanding level of information professionals is in average level. The results found that the highest forty percent of information professionals are slightly familiar with big data and the lowest 4 percent are extremely familiar with big data. Besides, the study tried to know the expertise level of information professionals regarding big data adoption in their respective information institutions. The result showed that the highest forty eight percent of information professionals are in average level in big data adoption and the lowest 4 percent are above average.

The study explored the present status of big data, investigated the agreement of big data adoption, and assessed the overall professionals understanding level towards big data in the information institutions such as in university, college and health libraries of Bangladesh. The survey conducted among information professionals from 20 university, college and health libraries using a set of structured questionnaire. The findings of the study showed that most of the information institutions did not adopt big data tools as well as unaware of adopting big data in information institutions in Bangladesh. The study also revealed that the understanding and expertize level of library professionals in surveyed university, college and health libraries of Bangladesh. Modern technologies have replaced many traditional information dissemination services. Information institutions of Bangladesh are trying to adopt big data tools, information

techniques and communication technologies which are needed for controlling and managing lots of data and information.

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