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Big Data: A Roadmap to Library and Information Centres Development

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One thing is sure to know the real value of raw data and the extent to which they will change the information landscape in library and information centres which is an essential task for all information professionals. To explore all the new and powerful possibilities of Big Data, to transform it into actionable knowledge that can be used by decision makers, supporting at the same time, information and data analysis literacy must be enhanced for good libraries' services. In the research directions, it was further extended in the literature review by analyzing the use of Big Data in each category of libraries separately. The in-depth study of all these elements certainly led to more accurate and precise conclusions regarding the ways the library world is influenced by Big Data technologies.

Keywords: Big Data, Roadmap, Library and Information Centres, Development

INTRODUCTION

Today, libraries must provide various web-based services, social media, and internet services to patrons in order to adequately support their information needs. In addition to these services, the maintenance of online literature, databases, data sets, and archives cause librarians to have to handle huge amounts of data each day. Big data supports with quality improvement and problem solving library services and help librarians to provide up-to-date and innovative real-time services to library users. In the dynamic environment, records and management systems are independently maintained by education institutions, library books and data are not readily accessible in a centralized position. Big data is being created due to digitalization of libraries and this has enabled researchers, educationists, scholars and policy maker's efforts in improving the quality and efficiency of information delivery (Kamupunga and Chunting, 2019)

Big data is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software (Wikipedia, 2021). Currently, many information professionals are considering the library's involvement with Big Data. What is the library's role with big data and information? The answer is simple: to identify and select valuable resources; organize, describe, and preserve them; and finally provide access to their patrons. While dealing with Big Data, librarians are asked to involve themselves at all stages of the information cycle, while traditionally they focused on handling the products of information research that has been filtered through cataloguing and classification.

Since 2012, references to the term Big Data have become more frequent in the headlines of newspapers, proprietary magazines, and academic journals in many disciplines globally. Big Data is valuable to most subject areas; its capabilities, uses, and applications are varied and can yield surprising insights. In the new digital

era, in the fourth industrial revolution, Big Data is everywhere. Therefore, it is important to prepare for the changes that will soon or later occur in society. So, where do libraries stand with these changes? Many questions arise on how libraries will follow, implement, integrate, and work side-by-side with these new innovations and challenges. The main goal of data science and information professionals is to transform large datasets into actionable knowledge through analytical thinking procedures. Libraries should therefore aim to facilitate knowledge creation in their communities (Wikipedia,2021).

Big Data is certainly a new area of academic research; thus, it is essential to explore the aspects that impact libraries and the new challenges it presents. The field of networks and digital technologies is undoubtedly dynamic and rapidly developing and in turn this has led to the continuously increasing volumes of information. Within the Big Data context, the traditional library service concept has changed, as effective library collection development requires the effective analysis of the needs of library patrons. In addition, with the implementation of Big Data technologies, new knowledge can be gained and new services may be provided, adding value to existing ones. Furthermore, librarians can employ big data analytics to evaluate and improve library services and provide more high-quality, targeted services characterized by a self-adaptive personalized information system and a knowledge information service for auxiliary decision-making(Wikipedia,2021).

This paper reviews the literature on Big Data and libraries, identifying articles focused on how Big Data can help libraries to better understand their patrons, by implementing Big Data technologies and thereby adding value. The review of the existing evidence on the implementation of Big Data in this context and all the ideas and thoughts about future plans and directions will inform the design of more user-centered tools and strategies while highlighting some of the main challenges and problems related to the application of Big Data.

Big Data:An Overview

The following conceptual definitions were offered Garoufallou and Gaitanou,(2021): Big Data "is data that exceeds the processing capacity of conventional database systems; the data is too big, moves too fast, or doesn't fit the structures of your database architectures; to gain value from this, you must choose an alternative way to process it." In general, Big Data can be defined as data being generated constantly, automatically and rapidly and is a much more complex issue than just massive amounts of data.

The modern term Big Data refers to data whose scale, diversity and complexity require new architectures, techniques, algorithms, and analytics to manage it and

extract value and hidden meaning from it. In particular, Big Data is a combination of four very important characteristics: volume, velocity, variety and veracity; volume refers to the amount of data; velocity refers to data in motion and more specifically to the speed at which data is created, processed and analyzed; variety is about managing the complexity and heterogeneity of multiple datasets, including structured, semi structured, and unstructured data; finally, veracity refers to data uncertainty and to the level of reliability/quality associated with certain types of data. It presented a very interesting attempt to define the term Big Data, as shown (Garoufallou and Gaitanou, 2021).

Big Data and Library and Information Centres

According to Garoufallou and Gaitanou,(2021) big data are applied in different libraries:

- **Big Data in Academic Libraries**

Academic libraries have a long history of collecting data, reporting their analyses, and compiling them into library statistics as a way to assess the library's resources and performance. Recently, the rise of Big Data has made several data collection tasks easier and faster and has engaged libraries in complex data analysis. Deng (n.d) in Garoufallou and Gaitanou, (2021) analyzed the characteristics of Big Data and its influence to the university library context. Sun et al (n.d) in Garoufallou and Gaitanou, (2021) used Big Data technology to mine, identify, organize, and analyze the implied reader behavior in structured and semi structured data information to improve library services and resources to achieve the optimum configuration. Big Data technologies can be used to learn about searching trends in library catalogues and thus improve library resources.

Xiaodan and Wei in Garoufallou and Gaitanou,(2021) referred to the Big Data impact on the traditional service pattern of academic libraries, highlighting the fact that library services reformation and upgrade can be accomplished. Zeng in Garoufallou and Gaitanou,(2021) addressed another important issue relating to the research field of university library management: information ethics. He believed this is an important factor in the era of Big Data that cannot be ignored at present.

All these papers highlight the evolving field of Big Data research in academic libraries, and it seems that academic librarians have a clear role in Big Data analytics by helping library users to enhance the optimization of the library management process. Nevertheless, despite the volume of research, very few studies discussed the implications of analyzing Big Data tools and techniques in academic libraries.

- **Big Data in Public Libraries**

According to Garoufallou and Gaitanou,(2021) Public libraries can bridge the gap between the general population and the knowledge of what happens with data and how it can be used. This role adds value to the libraries in anticipating needs and then providing community-based services. They can help people better understand data generation and decide in what kind of data world they wish to function. The implementation of Big Data and Big Data technologies in public libraries is explored. Zhan and Widén in Garoufallou and Gaitanou,(2021) outlined several roles that public libraries in Finland should undertake in the context of Big Data to better serve citizens, communities and organizations. Therefore, it is obvious that public librarians focus a lot on community-based services. Public libraries serve as cultural centers to their patrons, aiming to provide added value services to them and further benefit the community.

- **Big Data in Research Centres**

As mentioned by Colby and Levin (n.d) in Garoufallou and Gaitanou,(2021), librarians should collaborate with researchers in creating new models that support the curation and visualization of Big Data, as well as recommend tools and strategies for data analysis and also advise researchers on data management planning. Federer (n.d) in Garoufallou and Gaitanou,(2021) mentioned that librarians can be valuable collaborators with research teams facing knowledge management challenges: management, analysis, and preservation of research data. He attempted to survey how research has evolved in the age of Big Data and how librarians and other information professionals can respond to researchers' emerging needs. Xie and Fox (n.d) in Garoufallou and Gaitanou,(2021) explored the roles that research libraries should play in the research lifecycle and discuss the motivations behind a research project to investigate effective library Big Data cyber infrastructure strategies.

These papers present several possibilities and opportunities for the use of Big Data in research libraries, focusing on the analysis, management, and preservation of research data.

Big Data in Medical Libraries

Lu et al (n.d) in Garoufallou and Gaitanou,(2021) analyzed the existing problems in health information service and discuss the importance and urgency of strengthening the health information services to the community in the age of Big Data. Two years later, they presented a Big Data age-featured innovative health information services model in university libraries in China through transforming their traditional role, constructing a patient-oriented, network-sharing health information resources bank, and forging full-time and part-time health information literacy service teams.

From the above, it is clear that medical libraries actively focus on Big Data technologies to provide better-coordinated clinical research management services to faculty and clinical researchers. It is essential that they explore Big Data analytics and all emerging technologies to deliver clinical research data management services to the research community they serve.

- **Big Data in Special Libraries**

In the Big Data era, special libraries face some unique challenges as well. Murray (n.d) in Garoufallou and Gaitanou,(2021)   believed that special librarians need to watch all technological trends that affect libraries in general, the information industry in particular, as well as their organizations. More specifically, they need to take a leadership role in the field and get involved dynamically in their organization's data strategies. This meant that the library's mission statement had to be re-examined and redefined to meet the corporate goals.

It is obvious that special libraries still haven't embraced Big Data tools in their services; nevertheless, it is essential to align provided services with Big Data technology to offer added value to their patrons. In particular, corporate librarians can better manage and maintain all company-owned information resources and associated content, thus helping company staff members with projects by conducting extensive research and archiving data, (Garoufallou and Gaitanou, 2021).

CONCLUSION

Big Data seems to be a multifaceted and evolving term that has caught global attention and has led to creative brainstorming, changing and transforming rapidly the way we live, work, and think. Research indicated that Big Data is a huge opportunity for libraries, as it can lead to the creation of new roles for the librarians and the information professionals. Librarians have always been a vital part of the data and information sector. The main aim, therefore, is to be aware always of the evolving data-based research, to facilitate knowledge creation in communities. This review indicated that Big Data technologies already play an important role in some types of libraries, such as academic and medical libraries, while some other libraries, such as public and research libraries, take still first steps toward implementing a Big Data strategy.

It is our duty as information professionals to follow the rapid changes in society, to be well informed and prepared, well trained, work closely with other communities, build synergies, and meet future challenges for the benefit of our society. These issues might set up a

future agenda for the library and information science community (Zhan and Widen, 2018)

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