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PROSPECTS AND CHALLENGES OF LIBRARIANSHIP IN THE 4TH INDUSTRIAL REVOLUTION

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ABSTRACT

This study will cover the opportunities and difficulties facing librarians and information professionals throughout the Fourth Industrial Revolution (4IR). Exploring this subject is crucial since 4IR has fundamentally altered how information is received and used by individuals. A librarian or LIS professional is described as having knowledge of resources in all of their forms as well as the ability to acquire, organize, and disseminate

Introduction

A new degree of organization and control over the entire value chain of products is referred to as the fourth industrial revolution (4IR). The fourth industrial revolution is linked to numerous developments that aim to compel digitalization, networking, and virtualization in all spheres of life, including librarianship. It has to do with data interchange and automation in manufacturing technologies built on digital technology (Spotti and Windelband, 2020). In the workforce today, both digital and human components are used. With the development based on the 3 main pillars of digital, biological technology, and physics, information and library practices have joined other professions in the fourth industrial revolution (Industrial Revolution 4.0). Particularly, the foundation of digital development is made up of fundamental concepts like artificial intelligence (AI), the internet of things (IoT), and big data (Big Data), which are closely tied to the information and library sector.

The way in which information is provided to users is expected to drastically change as a result of this. The fourth industrial revolution, according to a 2017 research by the World Economic Forum, will disrupt current employment and skill sets while also creating new opportunities. Artificial intelligence has been the Fourth Industrial Revolution's main focus. The Fourth Industrial Revolution's transforming forces include artificial intelligence and automation processes, which have the potential to eliminate some jobs and replace them with cheaper robots or

these materials. The fourth industrial revolution (4IR) is characterized by a greater degree of interconnection between humans, digital technology, and scientific technology (such as robots). Moreover, a time when technology is more frequently used by people to fulfill their daily tasks. Information in general has been transformed forever by 4IR. Because of this, information and LIS professionals need to reconsider their skills and offerings if they wish to remain relevant in this age. The key benefit of 4IR is that users can access internet materials whenever they want. This presents an opportunity for them to guarantee that they perform their function as sources of unfettered knowledge. However, their inability to acquire the necessary skills to be e-ready is their biggest obstacle as a result of 4IR. Another issue is the expanding digital divide, which prevents them from contributing to the provision of services and access to the less fortunate. Due to the fact that some clientele wouldn't be able to access the internet services and resources. In conclusion, the study examined the potentials and difficulties that Information Professionals and Librarians face while engaging in 4IR.

new hires who possess the necessary abilities. Nevertheless, the fourth industrial revolution has had a significant impact on librarianship in terms of services and marketing principles. To avoid falling behind, libraries—which are transforming agents of 4IR—need to keep up by updating their information technology skills. If used as a service instrument, the revolution may open doors for libraries and librarians. The review research consequently concentrates on the opportunities and difficulties facing librarianship in the fourth industrial revolution.

The Industrial Revolution's historical progression

Simply put, industrial revolutions are periods in which new technologies were invented and introduced that are related to the digital transformation of technologies (David-West and Torukwein, 2021). In the 18th century, the first industrial revolution had its start in the United Kingdom. Mechanical manufacturing and steam pressure were introduced (Philbeck and Nicholas, 2019). The idea that science and technology are the keys to a brighter future was propagated throughout the second industrial revolution, which took place between 1867 and 1914. This wave of systemic change is what is known as the "second industrial revolution." It created new, potent technologies in the educational industry that result in new, creative educational institutions. This time period was designed to support industrial classes and create chances for universal access to education.

The 1950s saw the start of the third industrial revolution, which brought to the development of computers and the internet. With the globalization of academic research accelerated by online technology, it is defined as computerization and web-based interconnection, the growth, and access to education gained increased prominence. With the advent of instantaneous, free information, the third industrial revolution changed the educational landscape and shifted attention to active learning pedagogies that prioritize cooperation in varied teams and peer learning contexts (Mazur, 2009). The 4IR is the current and emerging environment where disruptive trends and technology are altering how people live and work. It is imperative that librarians and information specialists respond to it since doing so will give them the chance to build capacity and implement the paradigm change in their service delivery.

Conceptual Framework

The internet and data are the two main drivers of the fourth industrial revolution. The three primary components of Industrial Revolution 4.0 are artificial intelligence (AI), the internet of things (IoT), and big data (big data), the application of which is information and communication technology (ICT). These variables will have an impact on any areas or fields that are following the Industrial Revolution 4.0's development, therefore the information and library sector cannot be excluded from this trend. The ICT application at the center of library 4.0 connects diverse sources from across the globe to provide users with access to information whenever and wherever they need it. A vast and full data set (known as "Big Data") is produced by combining user data, lookup data, and other resources to suit the demands of users in all disciplines (Cao, 2019).

A generation of libraries known as "Library 4.0" is thought to have been created to address user needs in the context of the current Industrial Revolution 4.0. It is built on the foundation of the information and communication technology system, in which web 4.0 technology is a key component. The fourth generation of the web, known as Web 4.0, is now in use and builds on the accomplishments of the first three. The "web of connected things" or "web of intelligence connections" is what is referred to as Web 4.0. Web 4.0 puts into practice the cooperative relationship between people and computers. Web 4.0 appears to be a continually connected environment with greater facilities and services, blurring the line between "physical library" and "digital space."

In web 4.0, self-learning systems are using artificial intelligence to learn how to comprehend users. In line with how people converse with one another, Web 4.0 communicates with its users. It would be a very fast, dependable, linked, open, and intelligent website. Additionally, the library 4.0 development process requires the server system, internet transmission line, data storage system, software system, and other supporting equipment to be capable (Huynh, 2018).

Technological Innovations for 4IR

Recent technological advancements have changed how library and information services are provided to users (David-West, 2021). A suitable plan that allows professionals to gain skills in the quickly expanding fields of data science, artificial intelligence, and robots, among others, might be supported, particularly in librarianship, as a result of technological changes brought on by 4IR. As a means of fostering 4IR literacy among library and information science professionals, emphasis should also be given to computer applications, computer programming, software development, JavaScript, and network systems, among other topics. With the development of virtual learning and artificial intelligence, the new developing technologies will also lead to a paradigm shift on how librarians and information scientists teach. The usage of robots in service delivery could have both favorable and unfavorable effects (Zeruodi, 2020). Robots could be seen as a danger to human labour since they can drastically cut labour costs while lowering the possibility of human error. Robots may also increase productivity pay and overall labour demand, although primarily for the benefit of highly skilled people.

Developing New Skills for the 4IR

The number of jobs available to low-skilled workers will decline as 4IR is implemented. According to the World Economic Forum Report (2018), the new division of labour between humans and machine algorithms may result in the creation of at least 133 million new roles worldwide by 2022. Employees will need to significantly reskill and upskill as a result of this (Baldwin, 2019). As a result, professionals in the fields of library and information science can acquire knowledge on how to use these new technologies in an ethical and moral manner. Professionals in librarianship should possess the knowledge and skills necessary to deal with the implications of the fourth industrial revolution. The competence model can include the skills needed to deal with global openness as well as the analytical and evaluative skills necessary to promote interdisciplinary learning and expand on current initiatives for updating skills in the usage of today's most quickly developing technology. Developing capabilities allows for original answers to previously unsolved issues.

Influence of 4IR on Librarianship

For librarians, it has been exceedingly challenging to see bibliographic and authority data serving any other use. As a result of libraries' incorporation into the internet of things, library data are now disseminated globally. Because of 4IR, a treasure trove is created where the MARC records are transformed into linked data, then into big data to meet the information needs of library users. Like past revolutions, the fourth industrial revolution will be more intriguing for the library community, though librarians were already living in interesting times (Ellen, 2016). There are several reasons why librarians and libraries

should embrace this change, including Uber, Book to Desk B2D, mobile work list alerts, and push academic content. Libraries can incorporate these changes in their services to meet the rising demands of their patrons. The new revolution is transforming the role of librarians from collection knowledge to user knowledge. Because of the alarming volume of books in libraries, it may be difficult for librarians to connect these books with their clients in a more effective way without adopting the advancement that comes with the fourth revolution.

Living through the fourth industrial revolution as Librarians

The following guidelines when implemented by library practitioners in their libraries will definitely pave way for Industrial Revolutions 4.0:

Modification in librarians' perceptions:

The work of librarians will improve and become more robust due to the industrial revolution. Not only would it raise the level of living for librarians, but it will also promote the safety and security of a larger population. The mindset of librarians needs to shift. Technologies of the present and the future will facilitate and strengthen library operations when effectively harnessed.

Interconnecting technologies and librarians:

The delivery of good library services depends on both humans and technologies, each has strengths and flaws of its own. The computer processes data, stores it, and makes decisions impartially. In order to solve problems in a variety of activities, the library profession will always crave human abilities and genius, including software and technology in the provision of its services. Therefore, practitioners are connected by both humans and technologies to produce more outputs.

Information-based and interpersonal power:

Information professionals will have more power and use their intelligence more effectively as a result of the 4.0 revolution. They'll be able to handle more challenging issues and perform their duties more effectively. In this revolution, interpersonal and information power have been blended to enhance service delivery.

Technological versus mechanical skills:

In order to complete any challenging work in library practices, it is crucial to acquire the necessary mechanics and technological skills. Work is completed more quickly, with fewer mistakes, and with better results when mechanics and technology collaborate. The mechanics were not replaced by technology; instead, it gave them more freedom to carry out their duties effectively. In the age of 4IR, technology and mechanics working together

will result in a superior outcome than a manual system. Much more broadly and profoundly than the first Industrial Revolution, the Fourth will have an impact.

Prospects for libraries during the 4th Industrial Revolution

The capacity to connect the real world with the virtual world has enabled library generations to grow from 1.0 to 4.0 along with the growth of web generations (Phan, 2018). A single bibliographic database and the Online Public Access Catalog (OPAC) are considered to be part of the Library 1.0 generation of libraries. The term "Library 2.0" refers to the incorporation of web 2.0 into library services, which entails using web-based multimedia tools and other technology that promotes engagement and cooperation. In order to meet the needs and expectations of its customers, Library 2.0 offers a range of services that guarantee the accessibility of information resources and services everywhere, at any time. The web management team, technological partners, and the larger community are all encouraged to collaborate, participate, and get involved since Library 2.0 makes everything simple. User-centeredness and supporting seamless user-library interaction through tools like wikis, blogs, RSS, etc. are core concepts of library 2.0. The term "Library 3.0" refers to the library system that takes advantage of cutting-edge technological advancements like the semantic web, cloud computing, mobile devices, and the system of tools like affiliate search systems to support the creation, management, and sharing of user-generated content through fluid collaboration among users, professionals, and libraries. Web 4.0 and Library 4.0 have many comparable ideas and technology, and they both incorporate them. Library 4.0, built on the foundation of Web 4.0, is an intelligent library that includes not only readily available information and studies but also an autonomous system for analyzing recent findings. It is conceivable that this environment, which combines a number of platforms, services, and contents, enables users, machines, and librarians to collaborate, read, write, execute, and unite. Additionally, this serves as a library for reasoning-based, decision-making and delivering library services. Web 4.0 has many benefits that considerably aid library 4.0 in using information technology. In library 4.0, there are essentially no restrictions on the number of resources that may be used by each library, and users are permitted access to both their local library's extensive collection as well as the global one. More importantly, there won't be any expense for duplicating documents when libraries are connected to share resources. This significantly lowers the investment expenses for libraries and gets them out of their financial challenges (Duong, 2018).

Challenges and Recommendations

Due to the demands of the Industrial Revolution 4.0, library 4.0 not only faced opportunities but also numerous obstacles. Despite having a lengthy history, libraries seem to be playing a smaller role. Furthermore, most people only have a hazy

understanding of what an "information service" is. The Industrial Revolution 4.0 has unquestionably brought about profound changes in every part of life, which implies that the pace of technological advancement will only go up. In order to properly carry out their objective of giving information and knowledge, libraries must update their methods of operation and service delivery. If they don't, they will fall behind (Duong, 2018).

Because of its significance and practical applications, data is essentially the lifeblood of the library 4.0 age. A library cannot be upgraded to a version 4.0 library if there is no data. As a result, a library must improve its information resources, notably by creating databases with metadata that can satisfy the various needs of its customers. Information security and privacy have become more difficult to maintain in the 4.0 Industrial Revolution, because data is available everywhere. Finding a way to ensure the exchange of information among the systems is a major challenge for all libraries. In addition, assuring data transparency and quality is another difficulty (Vu, 2018). In today's libraries, librarians must possess a variety of additional abilities, skills, and qualifications that are suitable and appropriate for the position. Since libraries share the same data source and the library linkage system is growing in popularity, it is well known that the Industrial Revolution 4.0 has made it challenging to distinguish between them. Therefore, a suitable and equitable mechanism for linking and exchanging resources among libraries must be developed by the library and information professionals. For long-term usage of digital material, libraries must keep up with and adhere to worldwide standards in data storage and preservation.

Conclusion

Library and information science professionals will gain more speed in this revolution by using technologies to produce more work quickly. Despite the fact that experts in the field of libraries contend that the industrial revolution would result in job losses for librarians. However, modern technology and artificial intelligence combined with capacity building can accomplish tasks more efficiently. To deliver the best services in the shortest amount of time during a data tsunami, librarians must also keep up with the most recent technological advancements. Library 4.0 is experiencing both opportunities and challenges as a result of the 4^{th} industrial revolution. Implementing synchronous solutions and utilizing the benefit of the revolution are prerequisites for creating a library of the future. Also, increased access to knowledge and information from around the globe may result from this, enhancing socioeconomic and cultural advancement as well as helping people better understand one another and eventually overcome obstacles.

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