ABSTRACT

The introduction of new technological trends has had a significant impact on the performance of libraries. These trends have transformed the way libraries operate and provide services to their users. The paper also provides an overview of the effects of these technological trends on library performance. Frankly, these trends represent advancements in information technology, communication, automation, artificial intelligence, data analytics, and more. Besides, they have the potential to disrupt traditional practices, improve efficiency, enhance user experiences, and create new opportunities for growth and development. The results also proved the key effects of new technological trends on library performance to be access to digital resources, online catalogs, and discovery systems, remote access and virtual services, digital preservation, data management, and research support, collaborative and social technologies, mobile apps and virtual services, and data-driven decision making. The paper also highlights the challenges faced by libraries in adopting these new technologies. The conclusion emphasized the importance of embracing technological advancements to enhance library services, and one of the recommendations was that libraries should provide regular training opportunities to their staff to keep them updated on the latest technologies and their applications in library services.

Keywords: Technologies; Trends; Applications; Libraries.

RESUMEN

La introducción de nuevas tendencias tecnológicas ha tenido un impacto significativo en el desempeño de las bibliotecas. Estas tendencias han transformado la forma en que las bibliotecas operan y brindan servicios a sus usuarios. El documento también ofrece una visión general de los efectos de estas tendencias tecnológicas en el desempeño de las bibliotecas. Francamente, estas tendencias representan avances en tecnología de la información, comunicación, automatización, inteligencia artificial, análisis de datos y más. Además, tienen el potencial de interrumpir prácticas tradicionales, mejorar la eficiencia, mejorar las experiencias de usuario y crear nuevas oportunidades de crecimiento y desarrollo. Los resultados también demostraron que los efectos clave de las nuevas tendencias tecnológicas en el desempeño de las bibliotecas son el acceso a recursos digitales, catálogos en línea y sistemas de descubrimiento, acceso remoto y servicios virtuales, preservación digital, gestión de datos y apoyo a la investigación, tecnologías colaborativas y sociales, aplicaciones móviles y servicios virtuales, y toma de decisiones basada en datos. El documento también destaca los desafíos que enfrentan las bibliotecas al adoptar estas nuevas tecnologías. La conclusión enfatizó la importancia de adoptar avances tecnológicos para mejorar los servicios bibliotecarios.

Palabras clave: Tecnologías; Tendencias; Aplicaciones; Bibliotecas.
INTRODUCTION
The need to acquire, use, and exchange knowledge has become more and more crucial as a result of the tremendous changes that have taken place in the world over the last few decades. The emerging technological developments offer librarians an opportunity to significantly improve user-centered services as well as to encourage and enable user-library collaboration. By identifying, gathering, organizing, customizing, and delivering information products and services in a variety of formats and varieties to the user community both on demand and in advance in physical and virtual environments in real-time, emerging technologies give library professionals new opportunities. To deliver user-centric library services, develop new resources, and expand on current ones, libraries need to foster a collaborative and participatory atmosphere (Ayo-Olafare, 2020).

According to Adams et al. (2017), new technological trends in libraries have changed the way librarians and users access information. The new technology of cloud computing is giving benefit to libraries. It is a system that is using a network of remote servers placed on the Internet, where information on the website is stored in a remote location. Library easily can store their website contents in the cloud system and the administration of the website can be done remotely anywhere at any time. (2)

Another new implementation of technology is the e-book service at the airport. The Kuala Lumpur International Airport launches a new library that offers free e-books to travelers. This smart facility operates through the use of Bluetooth beacon signals, which work on the principles of geo-fencing micro-location technology. It communicates with passengers’ smartphone applications, allowing them to access a special virtual library of e-books. Other technologies, such as RFID, automated checkout systems, and online databases, are among the good innovations helping the library cater to its users in the 21st century (Haris, 2016). (3)

Eguavoen (2011) admits that the advent of the Internet, digitization, and the ability to access library and research materials from remote locations had also created dramatic changes by the end of the 20th century. (4) Eguavoen (2011) explains that the use of digital or virtual libraries is among the trending issues in information service delivery. They further defined a virtual or digital library as a collection of library resources in electronic or digital format at various locations that can be accessed and used with great ease using computer information technologies for the purposes of teaching, study, research, learning, leisure, and decision-making.

Streaming media, podcasting, videocasting, blogs, and social bookmarking services are among the next IT developments in library services, claims Ayo-Olafare (2020). Libraries will be in charge of archiving and making accessible new media as it is produced. Podcasting and other consumer technologies can be used by libraries to distribute their material and services. Podcasting is used to send video content, whereas podcasting is used to deliver audio files. Streaming media, podcasting, videocasting, blogs, and social bookmarking services are among the next IT developments in library services (Ayo-Olafare, 2020). Libraries will be in charge of archiving and making accessible new media as it is produced. Podcasting and other consumer technologies can be used by libraries to distribute their material and services. Vodcasting is used to send video content, whereas podcasting is used to deliver audio files.

DEVELOPMENT
Concept of Technology
The concept of technology can be understood as the application of scientific knowledge and tools to create, modify, or improve processes, systems, or products to solve problems, fulfill needs, or enhance human capabilities. It encompasses a wide range of innovations, techniques, and methods that enable the manipulation and utilization of resources to achieve desired outcomes. It is multidimensional and encompasses not only physical tools and machines but also systems, processes, and the social and cultural aspects associated with their development, deployment, and use. It encompasses a wide range of fields and domains, including information technology, communication technology, medical technology, agricultural technology, manufacturing technology, transportation technology, and more. It includes both physical artifacts, such as computers, smartphones, and machinery, as well as intangible aspects, such as software, algorithms, and networks (Hargreaves & Homewood, 2019). (5)

Technology is influenced by various factors such as scientific knowledge, cultural values, economic considerations, and human needs and desires. Understanding technology involves analyzing its impacts, both positive and negative, on individuals, societies, and the environment and considering ethical and philosophical questions regarding its design, use, and consequences (Wajcman, 2010). (6) Technology plays a crucial role in shaping and transforming societies, economies, and cultures. It influences how individuals live, work, communicate, and interact with the world. Technological advancements have led to significant progress in various domains, enabling innovations, improvements in 555, access to information, and advancements in healthcare, transportation, communication, and many other areas (Feenberg, 2017). (7)

However, technology is not just limited to the development of new tools and devices. It also involves understanding the ethical, social, and environmental implications of technological advancements and considering their impact on individuals, communities, and the planet. Technology is a dynamic and evolving
field, constantly driven by scientific discoveries, research, innovation, and societal needs (Bunge, 2014). Overall, the concept of technology is complex and dynamic, continuously evolving as new innovations emerge and shape various aspects of human life and society.

Concept of Library

Library refers to a curated collection of resources, both physical and digital, organized and made accessible for information, education, research, and leisure purposes. Libraries serve as vital institutions that preserve knowledge, facilitate learning, and provide equitable access to information for individuals and communities. Libraries have existed for centuries and have evolved in response to technological advancements and changing user needs. Traditionally, libraries were primarily associated with physical books and printed materials. However, with the digital revolution and the emergence of the internet, libraries have expanded their scope to include a wide range of resources and services beyond books (American Library Association, 2021).

In the modern context, libraries embrace both physical and digital collections. They offer access to various formats of information, including books, e-books, journals, databases, multimedia resources, and online content. Libraries provide spaces for reading, studying, collaboration, and research, along with access to technology and internet connectivity (Abumandour, 2020). Libraries play a crucial role in promoting information literacy and lifelong learning. They provide services such as reference assistance, information retrieval, research support, and educational programs. Librarians, as information professionals, help users navigate the vast amount of information available and develop critical thinking and research skills. Furthermore, libraries serve as community hubs, hosting cultural events, workshops, and activities that foster engagement, social interaction, and knowledge sharing. They often act as centers for civic participation, promoting literacy, inclusivity, and access to information for all members of society (American Library Association, 2021).

The concept of libraries continues to evolve in response to new technologies and societal changes. Libraries now offer digital lending platforms, virtual reference services, online databases, and digital archives. They are embracing emerging technologies such as artificial intelligence, virtual reality, and data analytics to enhance services and meet the evolving needs of users (Research Planning and Review Committee, 2022). However, libraries encompass a curated collection of resources, physical and digital, and the services provided to support learning, research, and community engagement. Libraries have adapted to the digital age, offering a wide range of resources and services while upholding their role as gateways to knowledge and advocates for information access (Okwu et al., 2023).

Concept of New Technology Trend and Types in Library System

The concept of new technology trends refers to the emerging and innovative technologies that are transforming various industries and aspects of our daily lives. These trends represent advancements in areas such as information technology, communication, automation, artificial intelligence, data analytics, and more. They have the potential to disrupt traditional practices, improve efficiency, enhance user experiences, and create new opportunities for growth and development. Types of new technology trends in library system include:

- **Artificial Intelligence (AI):** AI involves the development of computer systems capable of performing tasks that typically require human intelligence, such as speech recognition, image processing, natural language processing, and decision-making. AI is being used in various fields, including healthcare diagnostics, autonomous vehicles, virtual assistants, and personalized recommendations (Russell & Norvig, 2022).
- **Internet of Things (IoT):** IoT refers to the network of interconnected physical devices embedded with sensors, software, and connectivity, enabling them to collect and exchange data. IoT applications range from smart home devices and wearable technologies to industrial automation and smart city infrastructure (Atzori, Iera, & Morabito, 2010).
- **Blockchain:** Blockchain is a decentralized and distributed ledger technology that provides a secure and transparent way to record and verify transactions. It has gained attention due to its potential applications in areas such as finance, supply chain management, healthcare, and voting systems, offering improved security, transparency, and trust in transactions.
- **Virtual Reality (VR) and Augmented Reality (AR):** VR immerses users in a computer-generated virtual environment, while AR overlays digital information onto the real world. These technologies are used in gaming, education, training simulations, and immersive experiences (Chen, 2018).
- **5G Technology:** 5G is the fifth generation of wireless technology, offering higher data transfer speeds, lower latency, and increased network capacity compared to previous generations. It enables advanced applications such as autonomous vehicles, remote surgeries, and smart city infrastructure (Dahlman, Parkvall, & Skold, 2018).
- **Robotics and Automation:** Robotics involves the design and development of intelligent machines capable of performing tasks autonomously or with minimal human intervention. Automation technologies

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are used in manufacturing, logistics, healthcare, and various industries to enhance efficiency and productivity (Chao, 2018).(17)

- Electronic resource management (ERM): With an increasing selection of eBooks, eJournals, and the like, a vast amount of information is now available digitally. ERM helps librarians keep track of what is and isn’t available (both in terms of accessibility and authorization), who is accessing it, and what particular items people find most useful. All of this facilitates both collection development and management.

- Cloud computing: Just as libraries’ services have expanded to include access to computers and the internet, library collections are now significantly enhanced by cloud computing, which increases the sheer amount of digital information libraries can make available to their patrons (and which doesn’t have to be physically stored anywhere).

- Federated search (FS): Similar in concept to cloud computing, federated search allows users to hunt for information spread across various databases in different locations using only one interface. It enables the virtual consolidation of information resources without the hassle of actual physical consolidation, making research that much easier (Okwu & Oladokun, 2023).(18)

- Big data and data visualization: Consolidating information in a way that makes it less overwhelming represents an important innovation for our current system. Through the use of visual aids like maps, graphs, and charts, vast amounts of data stored in information systems around a particular topic can be presented so that the user can more easily find and access exactly what they need.

- E-Reader applications: Tablet is a portable electronic gadget its utilization perusing advanced digital book and periodicals perusing books is one of the pastimes for a large portion of the individuals. They can peruse their preferred books anywhere with the assistance of an advanced mobile phone or tablet. Tablets can utilize the web through Wi-Fi. Tablet applications are accessible for the MAC and PC PCs just as for Androids, Blackberry, iPods, iPhones and windows telephone gadgets.

- Cloud printing, replicating, and examining: The computerized time has been legitimately influencing home printing. Individuals never again need to print pages in huge amounts (Hussain, 2017).(19) This is the place libraries can prove to be useful for individuals who would prefer not to keep a printer at home any more, or whose printer has broken. Cloud printing has become commonplace in libraries because it gives users the ability to utilize their smart phones, tablets, and laptops to print.

- 3D Printers: 3D PC illustrations or three dimensional PC designs are that utilization a three dimensional portrayal of geometric information that is put away in the PC for the reasons for performing computations and rendering 2D pictures. Presently one day the 3D printer will be anything but difficult to get to the general population. There has been a great deal of talk about the subject of 3D imprinting in this previous year and now the 3D printers have arrived at a lower value point.

Challenges of New Technological Trends to Librarians

According to Fagbe et al. (2015), there are some constraints to effective information technology availability and application in libraries, especially academic libraries. (20) The constraints include a lack of trained information technology (IT) manpower, library staff and users negative attitudes toward change in technology, encountering technical problems in the course of usage, the conversion of analogue information into digital format and its storage capacity placing a high demand on the bandwidth of the university, the crashing of a computer due to virus, malware, hackers, etc., which can have a large negative effect on loss of data and exposure of information to non-users, a lack of funds, and a maintenance culture. The above-stated constraints are also factors that should be considered by libraries in setting up fully functional IT-compliant libraries.

Onuoha and Obialor (2015) state why IT has not moved more rapidly in libraries. (21) Their reasons include; the impact of cost of implementing IT in libraries; lack of standards as a result of different standards being used by hardware manufacturers; lack of perceived market as publishers do not perceive a library market for new products based upon new technologies; content of disc in the sense that a 5 inch CD-ROM contains more than 500 megabytes, which is a lot of information, and publishers are having some difficulty determining logical groupings of information to assemble on a disc; library users are not yet ready to move from the printed page exclusively to electronic data; articles solely in electronic form are not yet perceived as valid contributions in the publish-or-perish cycle; the 1976 copyright law did not address emerging information technologies, and the library and publishing communities are attempting, with only some degree of success, to effect a compromise between the interests of the two groups. The copyright issue will become even more intense as full-text documents become increasingly available in electronic form and due to a lack of staff training due to the fact that most library staff are not internet-friendly. Other challenges include inadequate technical staff, complexity of the technology interface, slow bandwidth and high cost of Internet services, lack of funding, and insufficient power supply, amongst others.

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Effect of New Technological Trends on the Performance of Libraries

The introduction of various information technology (ICT) trends has led to reorganization, changes in work patterns, and demand for new skills, job retraining, and reclassification positions. The technological advancements of the past twenty-five years, such as the electronic database, online services, CD-ROMs, and the introduction of the internet, have impacted every sphere of academic library activity, especially in the form of library collection development strategies. However, new technological trends have had a significant impact on the performance of libraries, transforming the way they operate and provide services to users. Here are some of the key effects of new technological trends on library performance:

• Access to Digital Resources: Technology has enabled libraries to expand their collections beyond physical books and materials to include digital resources such as e-books, online journals, and databases. This has enhanced the accessibility and availability of information for library users (Bawden & Robinson, 2012).

• Online Catalogs and Discovery Systems: Libraries employ online catalogs and discovery systems that allow users to search and discover resources in an efficient manner. These systems provide advanced search functionalities, recommendations, and real-time availability status of materials (Zeng & Qin, 2008).

• Remote Access and Virtual Services: Libraries have adopted remote access technologies, enabling users to access library resources and services from anywhere at any time. This includes online renewals, document delivery, virtual reference services, and online chat support (Lankes, 2011).

• Digital Preservation: With the increasing digitization of materials, libraries face the challenge of preserving digital content for long-term access. They employ technologies and strategies to ensure the long-term preservation and integrity of digital resources (Digital Preservation Coalition, 2019).

• Data Management and Research Support: Libraries are increasingly involved in providing support for data management and research activities. They assist researchers in organizing, managing, and sharing their data by offering training, tools, and infrastructure for data curation, storage, and preservation (Pryor, 2017).

• Collaborative and Social Technologies: Libraries have embraced collaborative and social technologies to foster user engagement and collaboration. This includes social media platforms, online communities, and collaborative tools for knowledge sharing and creation (Dempsey, 2015).

• Mobile Apps and Virtual Services: Libraries have embraced mobile technologies by developing dedicated mobile applications. These apps provide users with on-the-go access to library resources, services, and notifications. Additionally, virtual services, such as virtual reference desks and online chat support, have become common, enabling users to receive assistance remotely (Okwu et al., 2023; Yang & Liu, 2020).

• Data-driven decision making: Technological trends have facilitated the collection and analysis of data related to library usage, resource utilization, and user preferences. Libraries can utilize this data to make informed decisions regarding collection development, resource allocation, and service improvements. Data-driven insights help libraries adapt to evolving user needs and enhance their performance.

• Preservation and Digitization of Cultural Heritage: Technological advancements have enabled libraries to preserve and digitize valuable cultural heritage materials, including rare books, manuscripts, photographs, and artworks. This digital preservation ensures long-term access and safeguards these materials from deterioration. It also enables broader public access to cultural heritage collections (O'Connell & Adams, 2019).

However, new technological trends have influenced the performance of libraries. The advancements in technology continue to shape libraries, enabling them to adapt and evolve in the digital age.

CONCLUSIONS

New technological trends have revolutionized the way libraries function and deliver services to their users. Libraries have expanded their collections to include digital resources, implemented online catalogs and discovery systems, and provided remote access and virtual services. They have also embraced collaborative and social technologies, developed mobile apps, and adopted data-driven decision-making. These advancements have greatly improved the accessibility of information, enhanced user experiences, and facilitated the efficient management of library resources. However, libraries also face challenges in implementing these technological trends, such as the need for trained IT staff, budget constraints, and issues related to data privacy and security. Overcoming these challenges requires a proactive approach, investment in staff training, collaboration with technology partners, and the development of policies and procedures to ensure the effective and responsible use of technology.
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