

# The Reality of Applying Metaverse Technology in the Information Institutions Sector: An Analytical Study

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## ABSTRACT

Emerging technologies, such as metaverse technology, have become a crucial tool in the information revolution, providing users with easy access to services and places through simulating the physical world. This technology offers a platform for users to transcend time and place, providing new interactive services that achieve transparency, efficiency, and reduce costs. This study aims to identify the reality of applying metaverse technology in the information institutions sector. It relied on the documentary approach by analyzing a set of related Arab and foreign studies. It also used the SWOT analysis method to evaluate the strengths, address the weaknesses, identify the opportunities and the challenges. The results showed that Metaverse technology has proven successful in providing real-time services with minimal effort for users and workers. However, the use of this technology is still in its early stages, facing challenges such as privacy and security concerns and a lack of information awareness about its benefits. The study's importance derives from the importance of the topic itself focusing on reviewing the experience of using Metaverse technology in the information institutions sector. The study recommends a future vision for investing in metaverse technology in the sector and preparing global regulatory legislation to govern the use of metaverse technology and its supporting technologies.

**Key words:** Augmented reality, virtual reality, etaverse, digital environment, information institutions.

## I. INTRODUCTION

Given the current diverse progressing technological advancements, the information institutions sector must keep pace with these successive developments to improve its services and ensure their efficiency and high quality. In this regard, Emerging metaverse technology allows employees to provide virtual services without space and time constraints, enhancing efficiency and innovation in the provision of services to beneficiaries.

Henceforth, the information institutions sector is poised to be among the first to adopt information technology, enabling library patrons to access resources and services remotely, and to interact with information specialists, marking a significant qualitative shift in the sector. At this level, future research on metaverse technology will be crucial in the coming years, particularly for information scientists, since this technology is a key tool for managing information and providing services having a solid connection to information science topics.

The study highlights the significance of Metaverse technology in information institutions, highlighting its potential for service development. It contributes to intellectual production by enabling further research on recent advancements. Despite the limited number of studies on Metaverse technology's usefulness in institutions, the study's practical significance lies in determining its application in information institutions using its findings and suggestions.

From this perspective, the current study aimed at reviewing the characteristics of Metaverse technology application in information institutions, identifying its strengths, weaknesses, opportunities, and challenges (SWOT). It analyzed Arab and foreign studies and reviewed models of institutions implementing Metaverse technology. Thus, the current study's problem can be formulated as follows: How far along is the actual application of Metaverse technology in the field of information institution.

### - The concept of Metaverse technology:

Defining the term Metaverse is still controversial because concepts have been multiplied by researchers after research and investigation.

Linguistically, "Metaverse" is divided into two parts: Meta, which is a Greek word meaning beyond, and Verse, which is an abbreviation of the word (Universe), meaning beyond the world referred to as a three-dimensional virtual world.

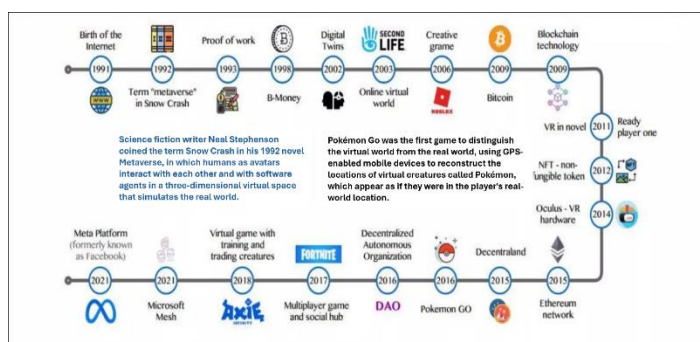
It is also defined as the "new virtual world beyond reality." It is a vision for how the Internet will be used in the future

by permanently connecting physical reality and virtual reality in three dimensions. Users represented through each user's avatar can communicate and participate in many entertainment and educational activities [6]. Metaverse technology emerged as a natural result of the amazing progress in digitization and communications in the modern era. [15] In this context, and at the end of 2021, Facebook CEO Mark Zuckerberg announced the Metaverse project, which aims to create an Internet that embodies social relations, making users an element within the world. This allows users to meet anyone from anywhere in the virtual world, allowing them to live experiences that simulate the real world with all its characteristics.

An operational concept of metaverse technology: It's an optional virtual world determined according to the desires of users so that they can create their own environment from different and multiple virtual worlds so as they control their appearance, activities, and relationships with others in the virtual world.

### **- The chronological development of the metaverse technology:**

The metaverse technology is the outcome of decades of development. The timeline of the development of the metaverse technology is displayed in Figure (1). Obviously, the early stages of development began with the Internet emergence. The term "metaverse" first appeared in 1992 in *Neil Stephenson's* novel *Snow Crash*, in which he described how humans interact as avatars with software agents and each other in a three-dimensional virtual world. The stages of development continued until the first project for the virtual world (Metaverse) by companies like Microsoft and Facebook. [24]



**Figure 1:** The timeline of the development of Metaverse  
Source: [22]

### **- Metaverse technology and its relationship with other technologies:**

The web generation that supports Metaverse technology is Web 4.0, which is linked by an integrative relationship with the basic technologies on which Metaverse is based, including augmented reality, virtual reality, user interaction, robotics, artificial intelligence, and blockchain to ensure data storage and handling, and other related technologies.

[15] defined it as a digital reality that combines virtual reality and augmented reality technologies to allow users to interact virtually, so that AR technologies integrate digital technologies, visual and sensory elements into reality to enhance the users' experience, allowing users to dive in the content through combining physical and digital worlds.

The Metaverse technology is an integration of the availability of tools for virtual reality (VR), augmented reality (AR), mixed reality (MR Mixed Reality), a three-dimensional environment (3D), and artificial intelligence (AI) technologies that interact in real time continuously and effectively. The digital reality system offers a real-world environment for global users to communicate and interact, utilizing technologies like computer vision, sensors, and blockchain for data storage and handling. This new digital reality provides a three-dimensional experience, combining virtual and augmented reality, with symbolic digital characters within a workspace.

**Table 1:** The difference between the concepts and the related technologies from the researcher's point of view

Virtual Reality (VR)	Augmented Reality (AR)	Mixed Reality (MR)	Metaverse
A virtual model that presents an environment allowing displaying things and interacting with them as if they were real. But it is a virtual experience for users with the possibility of interaction.	A technology that integrates composing and imaging a digital content with the real physical world.	A technology combining virtual reality and augmented reality technologies with mutual interaction between them while maintaining the characteristics and elements of each.	It creates a completely virtual world that blends with reality, enabling users to enter this world in three dimensions using virtual reality and augmented reality technologies.

### **- The characteristics of Metaverse Technology:**

The main properties of Metaverse technology are:

- 1- Access is available on the platform without the need to log in and out every time when entering this world, as the virtual character remains present and interactive even if the user is not connected to the Internet.
- 2- All procedures in terms of transactions, communications, and activities that happen in the virtual world are saved and archived for all types of visual, audible or written content.
- 3- Overcoming temporal and spatial barriers by cutting down on travel expenses and distances, which saves time and effort when putting activities and services into action. People can live and work anywhere, at any time, in the experience of moving virtually between different worlds.
- 4- The creation of a new virtual world that offers opportunities while simulating reality by introducing dazzling elements represented by sound, image, and personification, as well as creating multiple copies of virtual characters for a single user to perform tasks in multiple locations simultaneously while at work.

5- Interoperability, which provides a highly interactive personal experience, allowing users to easily move around any chosen virtual space.

6- The continuous synchronization eliminates the need for physical presence by enabling access to the platform at any time from any where. This feature puts users in a stable state by getting the information they need when it's convenient for them.

7- Immersion and presence: Users engage with each other and experience their real presence in the virtual environment[14]

#### **-The future of Metaverse technology in Saudi Arabia:**

Saudi Arabia is embracing new technologies to create a technical society and align with its digital transformation strategy and Vision 2030. The government has approved a plan to adopt and use Metaverse technology, which is the most prominent modern technology globally. This approach has started to yield benefits in the planning and development phase of some projects.

Accordingly, the Digital Government Authority declared that the Kingdom ranked third in the Digital Government Maturity Index 2023 indicating its readiness to adopt emerging technologies including augmented reality and Metaverse. At the LEAP 2023 conference in Riyadh, the authority signed a cooperation agreement with Sandbox Company to grant the Authority access to the Sandbox Metaverse platform and facilitate the future application of Metaverse in various sectors in a way that supports the Kingdom's accomplishment of its objectives and renaissance in all fields in light of the ongoing effort to advance the nation's economy and society [5].

#### **-The experiences of using Metaverse in Saudi Arabia:**

This section reviews the experience of using Metaverse technology in some sectors as follows:

- 1- ***The Royal Commission for AlUla Governorate:*** The historic city of Al-Hijr, the first Saudi location registered in the UNESCO World Heritage List, now has a digital presence in Metaverse thanks to the Royal Commission for AlUla Governorate. The Metaverse Decentraland platform was used to carry out the project. Thus, users from the whole world can virtually explore this three-dimensional destination and set out on adventures to discover the most well-known landmarks in AlUla through Metaverse. Using their virtual personas, visitors can navigate space. In this way, visitors to Metaverse worlds can explore and discover the spatial areas and get to know each other. Users can talk and engage with each other in this world. Visitors can also interact with applications available in Metaverse such as having a dedicated board to learn more about heritage and tourist landmarks, and customizing the shapes of their avatars using clothes, accessories, and

physical specifications. (Official website of the Royal Commission for AlUla Governorate)



**Figure 2:** The Metaverse space of the historic city of Al-Hijr

#### ***2- Ministry of Municipal and Rural Affairs and Housing:***

Under the name "Sakani Metaverse," this platform was introduced at the LEAP 2023 conference as a ministry-affiliated service and the first metaverse platform in the Kingdom's housing industry. It seeks expanding the areas of citizens servicing and improve the home ownership experience without field visits. This facilitates the beneficiaries' experience during their virtual visit to the comprehensive Sakani Center, which includes a package of developers, real estate consultants and financing agencies in one place. The Sakani platform will therefore make the beneficiaries' journey to home ownership more convenient allowing them to examine the offered different housing options and evaluate the service providers in simulating reality at different levels and coverage areas to provide their services regardless of their current locations [18].



**Figure 3:**The Sakani platform in the Metaverse space [18]

#### ***3- General authority for the Affairs of the holy Mosque and the Prophet's Mosque:***

The authority launched the "Haramain Exhibition" application, which enables visitors from all over the world to explore the exhibition of the architecture of the Two Holy Mosques in Makkah Al-Mukarramah virtually and browse the displayed artifacts and photographs and learn about their details. The application provides a 3D experience to visit the exhibition of the architecture of the Two Holy Mosques allowing users to view information in both Arabic and English. Moreover, the authority launched the initiative of "Virtual Black Stone" to enable touching the stone virtually via virtual reality technology. The General President of the Affairs of the Holy Mosque and the Prophet's Mosque, Sheikh Dr. Abdul Rahman bin Abdulaziz Al-Sudais, confirmed that this initiative aims at simulating natural reality, digitize the great religious and



historical treasures that Saudi Arabia possesses, and deliver them to everyone around the world.

Finally, the Metaverse platform experiment to educate pilgrims taking users on a virtual journey to introduce them to the Hajj rituals in just three minutes and with very high accuracy [2]



**Figure 4:** The exhibition of the architecture of the Two Holy Mosques on the Metaverse space

#### – Metaverse in the Information Institutions Sector:

The Information Institutions Sector uses many advanced technologies in libraries and information to improve its services to beneficiaries including modern virtual reality technology (Metaverse). This platform allows users to access services smoothly and easily using technology that simulates the real world to enable them obtaining the services they need at any time and place, achieving transparency and efficiency while reducing related costs and complications.

The following section reviews the mechanisms for employing Metaverse to enhance the information institutions services from the researcher's point of view:

1- The Metaverse reality facilitates virtually visiting the institution's or center's headquarters, moving around its facilities easily, and communicating and sharing with staff and other individuals without any time or space constraints.

2- Thanks to Metaverse, people can access information sources and services virtually, finding the right resources without having to physically visit the institution's or center's headquarters.

3- Using Metaverse, individuals with special needs can access the information institution's virtual environment and take advantage of its resources and services.

4- Because Metaverse makes it possible to visit information institutions virtually in an appealing and understandable manner for all departments and contents, more people can benefit from the institution from anywhere.

5- Beneficiaries can now access information institutions in a new way thanks to Metaverse, which improves users' experience by enabling creative communication and the utilization of services and information content.

6- Organizing events and preparing training programs via the Metaverse world.

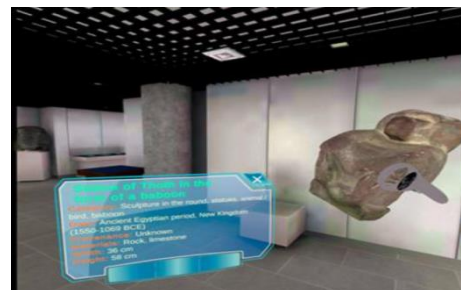
7- information specialists' potential to work in the field as a specialized team in a virtual environment.

8- Linking a group of beneficiaries from around the world within the Metaverse platform of a specific institution.

#### - Experiences of using Metaverse in the information institutions sector:

This axis reviews the experience of using Metaverse in some information institutions as follows:

1- Beneficiaries can access the **Museum of Antiquities** at the library of Alexandria by using the **Oculus Store**, a dedicated platform that offers a display of information on archaeological landmarks in a distinctive virtual experience.



**Figure 5:** The Virtual Museum in the Library of Alexandria

2- **The Future Museum:** A pioneering experience in the museums sector in the United Arab Emirates to keep pace with the shift to smart cities in the experience of the new interactive museum model. It is equipped with the best virtual means and tools in the world of the Metaverse, and contains all the archaeological collections to stimulate visitors to experience visiting the museum virtually by transcending time and place [16]



**Figure 6:** The Future Museum on the Metaverse Platform

3- **Qassim University:** The university has adopted emerging technologies like Metaverse to equip academic and research laboratories in the administrative and health fields in the university's medical city. It has also equipped virtual laboratories using the "Role Model" model for virtual student participation and interaction to advance the educational process, keep up with technological advancements in digital transformation, and accomplish its objectives [5]



**Figure 7:** Qassim University Virtual laboratories and halls on Metaverse space

## 2. THE STUDY METHODOLOGY AND TOOLS

To accurately describe and express the phenomenon as it exists and to study the reality of applying Metaverse in information institutions, the current study relied on the descriptive analytical method in convenience with its nature. The SWOT analysis, which is concerned with identifying strengths, weaknesses, opportunities, and challenges in the study topic, was used to study the current situation, analyze it, describe it, and observe it. Several studies and research projects that focused on the topic of Arab and international intellectual production were used to gather data and information.

## 3. ANALYSIS OF THE PREVIOUS STUDIES

The previous studies on the topic of Metaverse, gathered between 2022 and 2024, will be presented in chronological order, starting with the most recent:

- i. [13] study entitled: "Developing the Attitudes of Applied Arts Students towards Metaverse Technology and its Role in the Educational Process", aimed at identifying the attitudes of students of the Faculty of Applied Arts, Damietta University, after introducing them to the technology, regarding the use of Metaverse applications in education and their positive and negative effects as well as identifying students' opinions about the uses of Metaverse. The results showed the potential of metaverse education, which offers a fun and adaptable learning environment as a unique method of multimedia and visual education. Additionally, educating students about Metaverse through seminars and videos influences their attitudes and understanding of Metaverse and illustrates its function in the educational process. The study suggested that to take advantage of contemporary technologies like artificial intelligence and Metaverse, higher education institutions must implement some distance learning strategies. Moreover, for the metaverse technology to function properly and efficiently, it needs equipment that speeds up networks and the Internet. Additionally, teachers need to be trained in all new technologies in the field of education.
- ii. [10] study entitled "Metaverse in Kuwaiti Information Centers: A Prospective Study", aimed at identifying the future of Metaverse applications in libraries and information sector in Kuwait by revealing future aspirations about Metaverse in Kuwaiti information centers in relation to investing in Metaverse according to officials in Kuwaiti information centers. The results showed the need to train workers using this technology as well as developing an operational plan by specialists. The study recommended conducting several ongoing studies that focus on the importance of adopting information centers Metaverse applications.
- iii. [11] study entitled "Proposed vision for implementing Metaverse technology in the Department of Innovation and Scientific Olympiad at the Ministry of Education in the Sultanate of Oman", Listed and evaluated local and global virtual platforms that apply Metaverse in education and the mechanisms for implementing them to benefit from them by developing a proposal to adopt Metaverse in the Ministry of Education by applying it consistently with the environment and the available capabilities. The results showed that Metaverse platforms prove their worth in raising the level of educational outcomes and their ability to attract students' attention in obtaining information from the fun side, which stimulates learning motivation. The study recommended providing virtual educational systems and benefiting from the experiences of advanced countries in applying Metaverse in education and other fields, as well as preparing the infrastructure to enable the application of modern technology, and conducting studies about the application of Metaverse and the mechanism for activating it in educational institutions.
- iv. [8] study entitled "Metaverse Applications and Their Impact on Libraries: A Prospective Study", identified the survey respondents' perception of Metaverse and the extent of their awareness of its use in libraries. It revealed the most important challenges facing the use of Metaverse and its positive and negative aspects in libraries. The results showed that the opinions of the study sample were unanimous and that libraries face major challenges in relation to modern technological developments, including Metaverse. The most prominent challenges facing libraries with Metaverse applications are financial and administrative challenges. The study recommended the need to pave the way to take steps to employ Metaverse in libraries. Also, libraries are required to adopt awareness programs on the benefits and risks of Metaverse, and to qualify human cadres with skills enabling them to use modern technologies.
- v. [7] study entitled "Archives and their services in the era of the metaverse and its technologies: a future study", aimed at building a future vision related to the development of archival services and how to employ Metaverse in archival services. The results showed the diversity of modern technologies and software, including Metaverse, in their use in archival services in information centers and the availability of international standards for building a digital archive including the characteristics of the Metaverse environment, which facilitates the provision of services and data management to ensure the effectiveness of archival services. The study recommended encouraging the digitization of

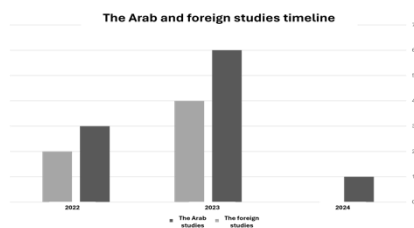
documentary materials to make them available and published online, paying attention to financial resources in providing a budget to build infrastructure in archival institutions, and developing digital skills in qualifying human cadres to practice digital training.

- vi. [15] study entitled “Using Metaverse in Public Relations as a Tool to communicate with the Public: A Survey Study on UAE Government Spaces”, sought identifying how far public relations practitioners in government agencies in the United Arab Emirates employ the Metaverse, and depicting the interactive elements and tools focused on in Metaverse spaces within the framework of achieving it as a tool for communicating with the public according to the theory of dialogue and the capabilities it provides. The results showed that the degree of use and employment of metaverse spaces by public relations departments in communicating users was affected by taking advantage of the communication advantages of the metaverse and its unique capabilities in achieving interaction and dialogue with users. The study recommended enhancing the readiness of government agencies to open up to the world of Metaverse in the development phase, determining the mechanism for transforming government services into Metaverse, benefiting from the capabilities of this technology in improving the citizens' experience, educating those charged of government Metaverse spaces about the components through which they can be motivated to the virtual reality, and the importance of qualifying a specialized cadre to be appointed as virtual employees in the customer service center via Metaverse.
- vii. [14] study entitled “Metaverse Technology and the Future of Home Economics Education in the Light of Digital Learning: A Prospective Study”, aimed at identifying the perception and orientation of experts and specialists in the field of educational technology in educational institutions regarding the use of Metaverse technology, identifying the requirements for employing Metaverse technology, and the challenges faced when applying it. The main results were raising the level of knowledge about Metaverse and clarifying the scope of its application negative and positive aspects. Among the main requirements for employing Metaverse is the necessity of providing institutional financial support and working to prepare qualified human cadres to deal with it. The study recommended the necessity of updating and providing a strong infrastructure qualified to employ Metaverse in educational institutions, and working to hold workshops and training courses preparing qualified cadres to deal with Metaverse and its implementation in education.
- viii. [25] study entitled “De-contextual communication: Factors influencing usage intentions of metaverse technology in digital library services”, aimed at identifying the factors influencing using Metaverse in digital library services within higher education institutions, revealing users' perceptions of the use of Metaverse in digital library systems, and identifying the factors that affect their experience of using Metaverse. The main results indicated that using Metaverse in digital library services has shown to meet the needs of professionals to encourage their use of these services through technology. After analyzing users' experiences with digital library services using the metaverse platform, several influential factors were identified, including ease of use, system quality, service quality, and information quality. These factors were found to significantly influence users' willingness to adopt technology to access digital library services. The study recommended working on future studies on the impact of system quality on the user experience with technology, developing visions on the integration of digital library services via using Metaverse, and evaluating technical factors as they can provide a strong basis for future academic research as well as a guidance for strategies for developing services in the field of modern technology in libraries.
- ix. [23] study entitled “Applications of Metaverse Related Technologies in the Services US Urban Libraries”, sought to identify the applications of Metaverse in American urban libraries, explore cases of American urban libraries' practices in using metaverse-related technologies to serve patrons, and try to find the factors that may affect the application of metaverse-related technologies in libraries at this stage. The results indicated that Metaverse is widely used in American urban libraries, but there are differences in the prevalence of its application with different technologies, with a primary focus on intelligent search, virtual assistants, and robotic librarians. This study found that library infrastructure operating expenses and population size do not affect the application of metaverse-related technologies in libraries. The study recommended conducting more research on Metaverse usage and the benefits of the services provided and the mechanisms that it provides when applied in libraries and formulating technical development plans to better serve the library community through Metaverse- related technologies.
- x. [26] study entitled “Libraries in the Metaverse: the need for metaliterary for digital librarians and digital age library users”, aimed at uncovering the potential of Metaverse to enhance user experiences, provide access to information, enhance library programs and services, such as virtual reference services, virtual tours of library spaces, and virtual learning environments, and the potential of Metaverse in information retrieval and access. The results showed that librarians in the digital age need to effectively develop their competencies and cognitive skills. Metaverse provides an opportunity for libraries to provide new and innovative services, while not all users may be able to access the required services.

The recommendations emphasized libraries seeking to create an information and accessible environment through metaverse spaces including promoting an environment to provide the necessary accessible resources and equipment. It is also necessary to provide librarians with continuous training.

- xi. [22] study entitled “Imagining the prospects and possibilities of Metaverse in Library and information Services”, tried to identify the applications used by Metaverse in Library and Information Services. The results showed that Metaverse can be leveraged to provide more effective services such as virtual tours, virtual reference services, and the possibility of offering scientific conferences and virtual events through metaverse platforms. The study recommended raising awareness and education about metaverse technology and providing education and training for information professionals.
- xii. [3] study entitled “Managing and investing in digital assets in global and local museums: Cryptocurrency, NFTS, Metaverse as models”, sought to identify the future tendencies of traditional and digital museums and their managing methods, present modern trends in museum investment and the aspects of development in the field of museums in Saudi Arabia and the United Arab Emirates. The results showed that Metaverse is still in its early stages of use, despite the fact that there are aspects of the Metaverse world that are relatively similar to the applications of virtual worlds. The study recommended interacting with modern trends and collaboration in sharing virtual environments from anywhere.
- xiii. [9] study entitled “Employing Metaverse Technology in Newsrooms of Arab Press Institutions: An Applied Study”, aimed to quantitatively monitor and qualitatively interpret the perceptions, positions and trends of journalists and leaders in Arab press institutions regarding the use of Metaverse within newsrooms, and to identify the extent of the study sample’s knowledge of the technology and the extent of their awareness of the importance of employing it and knowing its positive and negative effects. The results indicated that more than half of the sample reported that Arab newsrooms were not ready to employ this technology, and that there were positive and negative impacts on the employment of this technology, including professional challenges, ethical challenges, and economic challenges, as the most important challenges facing Arab journalistic institutions in light of the employment of Metaverse. The main recommendations were working to develop journalistic institutions by employing Metaverse and benefiting from its positive effects on journalistic work within newsrooms, qualifying the infrastructure of Arab journalistic institutions, and raising the level of journalists’ knowledge of Metaverse.
- xiv. [1] study entitled “Metaverse Technology and Family Education Home Economics: Between Reality and Hope: A Future Vision”, sought to identify the use of Metaverse in educational institutions and their readiness for this technology, as well as revealing the positive and negative effects resulting from using metaverse in educational institutions. The results showed that there is a positive impact in using Metaverse as it enriches the technical aspect of classrooms and scientific content production. However, there are some drawbacks including electronic crimes and the learners’ complete separation, which affects their creativity in the real environment. This will create technological, institutional, economic, and professional challenges. The study recommended making efforts to deal with technical developments and transformations, including Metaverse, working to create a digital infrastructure, seeking to identify Metaverse applications and mechanisms, and developing a strategic plan in the stages of the required actual employment of the technology.
- xv. The study of [20] entitled “The Readiness of Jordanian Universities to Enter The World of Metaverse : Technological, Social, and Psychological Risks”, The study aimed to assess the readiness of Jordanian universities to use Metaverse, and to know how to acquire information and skills to deal with risks. The results showed a general average level of technological capacity in accessing Metaverse by university staff and students but a high overall level of social and health risk. The study recommended the need to raise technological readiness in universities, increase awareness resulting from this virtual society, and the need to develop security legal legislation that protects students and academics from the consequences of electronic crimes.
- xvi. The study of [24] entitled “Scope of Metaverse Technology in Central Library Rajiv Gandhi University”, aimed at discovering the use of virtual world technologies in libraries, identifying Metaverse technology in the scope of application in the Rajiv Gandhi University (RGU) library, and discovering the possibility of creating a virtual library with technologies that are compatible with a central library with the availability of requirements and resources. The results showed the existence of technological obstacles such as weak infrastructure and bad internet access, as the university is in a mountainous area. It also revealed that the availability of effective tools to implement Metaverse implies the possibility of transforming the central library into a virtual library. The study recommended the necessity of conducting more studies on the subject in the field of libraries to enhance the experience of the virtual world, working on the readiness of virtual reality devices, and providing a high budget to provide the necessary devices to implement the virtual library.

– **The results of the analysis of previous studies:**



**Figure 8:** Comparing the number of Arab and foreign studies according to the years of publication

Through the previous review of the major Arab and foreign studies addressing the topic of Metaverse technology, the total number of studies is (16) studies, divided into (10) Arab studies and (6) foreign studies, and most of Arab and foreign studies were in (2023). The following is an explanation of the main points of similarity and difference between the previous studies:

- The topic of Metaverse technology has emerged in recent years as a main topic in information technology. There are studies that addressed the theoretical aspect of Metaverse technology, its characteristics and advantages, and also addressed several axes such as the potential positive and negative effects, the requirements necessary to employ it, the most important challenges it may face, and means of enhancing the Metaverse employment.

- The following studies tackled the use of Metaverse in the information centers sector namely the study of [10], in document and archive storage centers, the study of [7], in museums, the study of [3]. In the press institutions sector, there were the studies of [9] and (Bilal and Al-Mahlawi, 2023). In the libraries sector, there were the studies of [8], [24], [22], [26], [25] and [23].

- There is a diversity in foreign studies, while there is a scarcity of Arab studies in the libraries sector. However, many studies dealt with the educational institutions sector namely the study of [13], [11], [14], [20] and [1].

- Some studies have indicated the necessity of developing the capabilities of human cadres to deal with Metaverse namely the studies of [8], [26], and [14].

- The studies of [9], [11] and [14] have confirmed providing the necessary infrastructure to support and employ Metaverse.

- The results of the studies of [25], [11], and [10] showed the necessity of presenting future research that must be taken into account when adopting Metaverse.

- The studies of [9] and [13] indicated and confirmed the necessity of raising the level of knowledge about Metaverse among all members of society so that it can be used and activated in addition to conducting training on the technology usage.

- The study of [7] recommended the importance of providing financial support and providing the necessary

budget, as it requires the provision of many capabilities, whether technical or financial, to facilitate its employment.

#### **4. RESULTS AND DISCUSSION:**

The basic step to know the application of Metaverse technology in information institutions was achieved by studying and analyzing the status of experiences using this technology in information institutions based on studies and research conducted in this field. This was done using the SWOT method, which is "a planning tool for success in dealing with the changing environment, which is an assessment that examines the conditions of the external and internal environment, whether appropriate or inappropriate, through relative strengths, relative weaknesses, current and future external opportunities and threats." [4] The goal of the analysis process is to identify and know: **What are the strengths and weaknesses? What are the opportunities and challenges?**

##### ***First / Analysis of internal factors:***

##### ***Strengths:***

Through studying and analyzing the reality of applying Metaverse in information institutions, the main strengths were:

- 1- Simulating a virtual environment improves the level of planning and reduces errors and costs.

- 2- Encouraging innovation in the information institutions sector by implementing Metaverse and enhancing its contribution to change and development.

- 3- An opportunity for users to explore and experience by diving into an interactive virtual environment.

- 4- Adding vitality to the provision of services provided in the information institutions sector in a modern way with the possibility of using techniques and containers that are not available in real environment.

- 5- Using Metaverse enables users and workers to interact with each other in real time.

- 6- Helps provide services with the minimum time and effort by users and workers in the information institutions sector.

##### ***Weaknesses:***

Metaverse faces some weaknesses through analysis and study, as following:

- 1- The lack of readiness of information institutions to employ this technology.

- 2- The lack of specialized and qualified staff to provide training for workers in information institutions.

- 3- The lack of technical qualifications of workers, which resulted in the lack of experience in using Metaverse to provide services to beneficiaries.



- 4- The high material cost of establishing the infrastructure and providing the necessary devices, tools, and software to activate the platform and the expenses of workers' training.
- 5- There may be a digital gap between users who have digital skills and those who do not, which constitutes an obstacle to benefiting from the virtual experience.
- 6- The lack of applications required to operate Metaverse that support the Arab language as it is an emerging technology.

#### ***Second / Analysis of external factors:***

##### ***Opportunities:***

Metaverse technology achieves several opportunities when employed, namely:

- 1- Enabling users to undergo the experience, which gives them the opportunity to interact with an environment that combines the real environment and the virtual environment.
- 2- Enhancing competition between information institutions by attracting emerging technologies to provide services and pushing them to race to the new virtual world (the Metaverse world).
- 3- Developing and improving the quality of services provided in information institutions.
- 4- Facilitating users' access to the resources and services available at any time.
- 5- Helping everyone keep pace with the requirements of the era and its changes in the pursuit of developing digital skills.

##### ***Threats:***

Metaverse may face some challenges and threats as follows:

- 1- Security and privacy challenges at the level of individuals or institutions facing security attacks.
- 2- Technological challenges: The weakness of the infrastructure required to operate the technology, and its need for continuous updating and development, as well as high-speed data networks.
- 3- Human challenges: The lack of qualified human resources capable of dealing with technology and the reluctance of senior management and employees of the idea of entering the Metaverse world in the information institutions sector.
- 4- Financial challenges in providing resources for attached tools and systems used to activate the technology and its periodic maintenance.
- 5- The constant endeavor by employees to develop themselves and hone their skills to keep pace with the continuous acceleration of modern technologies.

## **5. CONCLUSION, RECOMMENDATIONS AND FUTURE WORK**

The multiple uses of Metaverse in information institutions were reviewed, through a four-part analysis of the subject by identifying strengths, weaknesses, opportunities and threats. The current study reached the following results:

- 1- Metaverse provides a shared social space between users by embodying their appearance in virtual models that can be changed to suit the user's desire, such as changing clothing, choosing the way to speak and move using control tools, and helps to create their own virtual things and interact with elements together.
- 2- The capabilities of metaverse technology and its ability to own virtual things as they happen in real world.
- 3- Metaverse technology is characterized by easily overcoming barriers in the virtual world and communicating with people and interacting directly in a way that simulates reality.
- 4- Metaverse technology provides the ability to display the contents of information institutions in a way that attracts beneficiaries, as it contributes to explaining the content in details by displaying images, drawings and videos, as well as displaying precise materials that cannot be borrowed, which increases the motivation for the virtual experience.
- 5- The technology provides a highly interactive user interface between humans and computers, with the aim of providing a streamlined experience that simulates reality to a degree that makes the virtual world a parallel reality. For example, you can visit the information institution's website virtually and view the workflow mechanism and the services it provides to visitors.
- 6- Information institutions face major financial and administrative challenges concerning modern technological developments.
- 7- The results showed that Metaverse can be used to provide more effective and efficient services such as virtual tours, virtual reference services, and the possibility of presenting scientific conferences in an attractive and interactive manner.

Considering the previous results, the following future proposals and recommendations would contribute to the development of the application of metaverse technology in information institutions:

- Developing a future vision for investing in the application of Metaverse in the information institutions sector.
- Developing global regulatory legislation to govern the use of Metaverse and the technologies that support it in the information institutions sector.
- Strengthening global strategic partnerships to achieve maximum benefit from the application of Metaverse in the information institutions sector.

- Involving those in charge of Metaverse platforms in programs and training courses related to the use of virtual space technologies and avatar design.
- Drafting security legislation related to data protection and intellectual property privacy, with the importance of defining the role and responsibility of all parties concerned in accessing the Metaverse platform.
- Preparing studies on the areas of application of Metaverse and the mechanisms for activating it in information institutions.
- Combining the efforts made by officials in information institutions to build an integrated information ecosystem between the information institutions sector in Metaverse platforms, and prepare a feasibility study to implement the technology.

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