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Exploring the Potential of the Metaverse in Enhancing Knowledge and Information Science-Based Professions

Zeinab Ghafoornia*

Department of Knowledge and Information Science, Allameh Tabatabaie University, Tehran, Iran; Zeinab.ghafoornia@gmail.com.

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Abstract

The metaverse is a virtual world that significantly influences knowledge and information science management entrepreneurship. It is a platform for innovation, collaboration, and global knowledge sharing, allowing entrepreneurs to create businesses, products, and services tailored to the metaverse's unique needs. Advanced technologies like artificial intelligence, big data, and machine learning enhance information analysis and management. The metaverse also supports virtual learning environments, enabling individuals to acquire skills engagingly and inclusively, which can foster new educational models and expand knowledge-based industries. This study explores the role of metaverse technology in knowledge and information science management, highlighting its impact on innovation, collaboration, and knowledge dissemination. Furthermore, the metaverse helps organize and categorize information effectively, making it easier for users to locate and share data.

Keywords: Metaverse, Virtual education, Knowledge and information science.

1 | Introduction

Information and Communication Technology (ICT) is a general-purpose technology that significantly impacts various products and other technologies. This influence leads to the creation of innovative products, such as robots, supercomputers, artificial intelligence, and the Internet of Things (IoT). It inspires product innovations, including smart systems, web-based businesses, and virtual markets. Not only does ICT generate new ideas, but recognizing its potential products and markets can also create numerous entrepreneurial opportunities. The processes of idea generation, market identification, and technology identification—individually or collectively—can uncover opportunities and ultimately lead to the development of a technological business plan. Creating value through the production of specific features of integrable

✉ Corresponding Author: Zeinab.ghafoornia@gmail.com

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technologies like ICT can result in synergies when combined with other technologies. The identified technologies can serve as foundations for new product development, and the commercialization of these products—whether by selling or otherwise—can lead to value creation [1].

The metaverse, an emerging technology that represents the next generation of the internet, is expected to positively influence human lifestyles across various fields, including medicine, economy, and education. However, it also poses negative impacts such as new crimes, identity fraud, and privacy threats [2]. The transformation brought by ICT has affected numerous social activities, particularly entrepreneurship, and facilitates entrepreneurial processes in information science and knowledge-related fields [3].

Today, employment is one of the most pressing social issues globally, and considering the recent economic crises, it may become the most significant challenge of the coming decades [4]. This situation is further worsened by the high number of unskilled graduates who often seek employment rather than creating job opportunities and contributing to national development. Graduates in information science and knowledge science are not exempt from this trend and frequently find themselves in similar circumstances. To address this issue, many countries have considered promoting entrepreneurship within universities and rethinking the concept of work itself, shifting the focus from job-seeking to entrepreneurship, which emphasizes commitment [5].

As the metaverse continues to grow, it is bringing about significant changes in various social structures. While it presents unprecedented challenges for universities, organizations, and governments, it also provides unique opportunities for growth and excellence. The success of managers and entrepreneurs in addressing these challenges and maximizing existing capabilities depends on their engagement with this evolving virtual reality [6]. One notable aspect of this study, distinct from others, is the introduction of a new index for entrepreneurship. Unlike previous research, this study focuses on the latest technology—namely, the metaverse—and its impact on information science and knowledge professions, particularly concerning how ICT influences entrepreneurship.

Entrepreneurship in information science and knowledge science is increasingly recognized as a crucial and sustainable strategy for developing employment opportunities and reducing unemployment among graduates. Furthermore, it can enhance the community's mental health, contributing to the country's economic and cultural development. Therefore, focusing on research and study in this area could help identify the obstacles and challenges to entrepreneurial growth and offer solutions to overcome them [3]. Given the significance of entrepreneurship and job creation in information science and knowledge science, this study aims to examine and analyze a new and emerging business domain known as the metaverse through a descriptive-analytical approach. This examination seeks to provide a foundational perspective for specialists and graduates in information science and knowledge science to engage in entrepreneurial activities within this field. The central question of this study is: how can the metaverse be utilized in careers related to information science and knowledge science?

2 | Theoretical Foundations

2.1 | Entrepreneurship and Employment

The term "entrepreneurship," derived from the French word "entrepreneur," was first used in the sixteenth century to describe individuals who risked their lives in military missions and faced the possibility of death. Over time, the term evolved to refer to those who embraced the risks associated with economic activities and initiated innovations [7]. A review of the history of entrepreneurship literature confirms that the concept originated within economic theories developed by economists before it spread to various educational institutions and disciplines. Since the late 20th century, entrepreneurship has garnered attention from educational circles worldwide [8], contributing to economic growth and development, particularly in developed nations. Today, entrepreneurship education is recognized as a vital tool for enhancing individuals' entrepreneurial inclination [5]. Entrepreneurship is defined as a mindset characterized by thinking, reasoning,

and action that encompasses discovering and extracting opportunities through a comprehensive and balanced leadership approach. It necessitates a readiness to assume calculated personal and financial risks to balance risk-taking and rewards [9]. There are three significant reasons to focus on entrepreneurship: wealth generation, technological development, and productive employment [7]. In the contemporary business landscape, entrepreneurship is a highly popular topic and activity, symbolizing innovation and success. Entrepreneurs are seen as pioneers, taking risks and organizing and managing economic endeavors [10].

Innovation, defined as the process of creating new value through novel approaches in products, services, or businesses, goes beyond simply developing new ideas. It involves generating, absorbing, and implementing new concepts or activities that provide benefits to end users. Innovation can be characterized by several key traits:

- I. It is associated with novelty.
- II. It requires some degree of change or discontinuity.
- III. It relies on creativity and initiative for successful implementation.
- IV. It is based on a purposeful process that leads to outcomes and value creation [11].

An information entrepreneur, also referred to as an information creator, is an individual engaged in the business of collecting, disseminating, and sharing information. Information entrepreneurs do not emerge spontaneously; although there are many individuals with specialized knowledge and familiarity with current technologies, they may lack a proper understanding of how to start and manage an information-based business. Successful information entrepreneurs must possess specific characteristics, abilities, and competencies. For instance, they should be adept at identifying opportunities that create value by addressing user needs overlooked by current information systems. Additionally, they must endeavor to meet these needs while demonstrating resilience, pragmatism, and flexibility [5].

2.2 | Information and Communication Technology

ICT serves as a powerful tool for fostering innovation and development in various fields. The continuous advancement of ICT tools and their rapid adaptation to human needs has created a new environment for creative, active, and inclusive learning and interaction. Research indicates that innovation and systemic change, particularly in areas like research and investigation, cannot occur without the support and integration of information technology [12]. Since its inception, information technology has played a crucial role in the global economy due to its significant impact on various aspects of business [13]. Today, entrepreneurship heavily relies on platforms provided by information technology, benefiting greatly from its capabilities. Information technology is a key driver for entrepreneurship development and economic growth, demonstrating remarkable flexibility in this domain. Features such as increased speed and accuracy, reduced physical space for information storage, transparency in processes, the ability for remote work, and cost reduction exemplify its benefits [12].

Given that information technology is one of the most dynamic fields of science and technology, its rapid growth and expansion present serious challenges for industries that utilize it. Observations indicate that the penetration of information technology into other fields has been extensive, with virtually no area untouched by its influence. Libraries, in particular, have been profoundly impacted by information technology, resulting in a strong interconnection between the two fields, with information serving as the common denominator. Consequently, the growth of either dimension is expected to significantly influence the other [10].

Discussions within digital technology circles regarding the emerging concept of the metaverse have increased significantly. Proponents believe that the metaverse represents the next evolution of the internet, which has captured widespread interest and spurred investments in this area [2].

2.3 | Metaverse

The metaverse refers to a collection of simulated, interconnected, and technology-driven multidimensional spaces where social, economic, scientific, and various other interactions occur collaboratively between intelligent agents (such as avatars) and humans. Interactions in the physical world can be transferred into the metaverse. The presence of intelligent agents, coupled with advanced graphic and simulation capabilities, makes these virtual spaces more dynamic and appealing. Individuals or entities create and develop an enhanced, flexible, and agile representation of their physical existence by engaging in the metaverse. The application of electronic tools within the metaverse has eliminated many specific limitations of the physical world, replacing them with dynamic entities and modes of communication. The metaverse processes information based on users' circumstances and requests, providing them with relevant data that helps improve efficiency, facilitates access to information, or allows them to input data into the network.

In the metaverse, users are immersed in vast information derived from the virtual world while remaining rooted in the real world. The metaverse's advancement enhances existing technologies and strengthens the connection between the real and virtual realms. As an emerging technology, the metaverse comprises virtual and augmented realities, creating spaces where people can interact without being physically present. This new world enables everyone to communicate and have diverse experiences, overcoming the limitations of the current internet. Within the virtual environment of the metaverse, anything one desires can be created — users can design their favorite character and experience life as they would in the real world. Control over this virtual existence is entirely decentralized, free from management by any specific governmental authority. Companies can leverage the metaverse in various ways.

In this limitless landscape, organizing events, developing cross-functional features, and engaging with user communities has become easier than ever, allowing businesses to connect with consumers in innovative ways previously unattainable.

The metaverse concept can be seen as a convergence point for addressing challenges across various fields, including computing, information science, artificial intelligence, graphics, social sciences, and business. The term "metaverse" is derived from two words: "meta," meaning "superior," and "verse," originating from "universe," which means "world." Hence, the metaverse can be interpreted as a "superior world" or "world beyond the current one." Although we are still distant from practical implementations of metaverse technology, the concept has existed for several decades, appearing in stories, video games, and digital technologies. The metaverse serves as a parallel reality within a virtual realm, constructed from computer graphics and accessible to users worldwide through specialized equipment like headphones and VR glasses. In the metaverse, users manifest as digitally designed entities known as avatars.

The metaverse is a vast network of persistent 3D worlds and simulations processed in real-time. It allows continuity between individuals, physical objects, human history, and even payment systems. This environment can accommodate many people simultaneously without requiring them to be physically present in one place. The development of the metaverse occurs in two directions: from real to virtual space, where the virtual world mirrors the real world, facilitating profound digital experiences that enhance real-life interactions. This process leads to a digital realization of real experiences, improving efficiency and enhancing the overall experience of the physical world. The second direction is from virtual to real, which involves translating digital experiences into tangible realities and discovering new products and uses based on virtual settings [14].

The metaverse is often referred to as the future of the internet, possessing unique characteristics that differentiate it from traditional online experiences. While the internet offers certain features like speed and collaboration, the metaverse amplifies these qualities, providing a higher degree of interactivity. Key aspects of the metaverse, often referred to as "metavariabls," that are described as follows.

2.3.1 | A sense of real presence

The most crucial feature of the metaverse is the feeling of presence. In this context, presence means users experience a sense of being in the virtual world alongside others. Research indicates that this sense of presence enhances the quality of interactions in the metaverse. While Internet technology has provided some aspects of this feeling within social networks, the metaverse creates a much more tangible and immersive experience. Users can explore various virtual worlds and gain diverse digital experiences. Achieving this sensation of presence requires the use of special three-dimensional and multi-dimensional glasses, which evoke a genuine feeling of being together with others in a shared space [15].

2.3.2 | Interaction and collaboration

The metaverse facilitates global collaboration despite geographical distances. It can host social events that might be impossible in the physical world, such as concerts attended by millions from around the globe. Thus, interaction and collaboration are defining features of the metaverse. Users can easily navigate its vast digital landscape, engage in communication, and conduct activities like buying and selling. This integration enables users to have the same avatar throughout all parts of the metaverse, allowing them to enjoy its various facilities seamlessly [2]. Users in the metaverse can be present anytime and anywhere without space limitations. Synchronization allows users in different countries and at great distances to communicate as a unified group. In the metaverse, users can interact and communicate with one another worldwide simultaneously. This means that billions of users can engage and interact in real time.

2.3.3 | High-speed capability

Everything in the metaverse occurs quickly and without delay. All information is accessible to active metaverse users simultaneously, referring to this capability as speed. This feature is crucial to the metaverse since users do not need to search for information; everything is instantly available. Although the internet has improved in speed in recent years, the speed in the metaverse is even higher and of better quality [2].

2.3.4 | Persistence

The characteristic of persistence in the metaverse means constant access and storage. Users can build any device or structure in any way they choose, and new tools are saved for future visits. Unlike the real world, where information and tools may be lost or destroyed, in the metaverse, they remain intact due to their digital nature. This is made possible by blockchain technology, which allows for permanent storage of information. While the internet also offers storage capabilities, in the metaverse, information is stored forever [2].

2.3.5 | Low cost

In the metaverse, travel and equipment costs are significantly reduced. One of the most evident advantages of this digital space is the elimination of physical-world expenses, such as travel costs, training fees, and hardware and software purchases. The need for travel and physical equipment is minimized, which can lead to an improved quality of life.

The emerging technology of the metaverse presents numerous new opportunities across various fields, including medicine and health, science and education, gaming and entertainment, land purchases, tourism, trade, and income generation. The unique features of the metaverse—such as the feeling of real presence, interaction and collaboration, standardization, timelessness, high-speed capabilities, sustainability, and low costs—position it as the future of the Internet and foster a new lifestyle [2]. With the rapid advancement of artificial intelligence, quantum technology, and digital innovations, various sectors of society may be influenced by the metaverse. Consequently, the boundary between the physical and digital worlds will diminish, turning the metaverse into a crucial public infrastructure that impacts multiple aspects of human life. The importance of the metaverse, propelled by major technology companies, is expected to gain widespread traction globally, providing scientific, educational, recreational, and commercial benefits to all

people. Therefore, it will be essential to pay attention to this issue and establish regulations and governance in the metaverse space.

2.4 | Information and Knowledge Science

Information science and Knowledge science are fields focused on the management of information and knowledge. Their primary goal is to create optimal conditions for society—both individuals and organizations—to easily and effectively access information. This profession, grounded in a robust theoretical framework developed throughout its history, involves processes for selecting, providing, organizing, and disseminating information. Formal training courses, particularly at the higher education level, have been established to effectively teach these processes to employees who serve the community in libraries and information centers.

In today's context, organizational information is crucial for societal development. Providing and organizing essential resources facilitates quick and easy access for individuals to various information sources in education and research. Consequently, it is vital to continually utilize the latest resources, tools, and methods for information management, which include needs identification, selection, provision, organization, and dissemination of information. In recent years, numerous specialized libraries and information and documentation centers have been created within government and non-government organizations, including industrial and commercial sectors, to meet the diverse and growing information needs of organizations, managers, and individuals. The surge in information resources and systems, along with the proliferation of new technologies, has prompted the information science and knowledge profession to reassess the content, methods, and educational systems used to equip librarians with the necessary knowledge and skills.

There is a strong recognition of the importance of entering new business areas, which researchers deem essential for the economic growth of countries. To better organize these themes and enhance outcomes, the following 10 general thematic groups were identified from 26 specific topics:

- I. Bibliometrics: Includes citation analysis, webometrics, and scientometrics.
- II. Information retrieval: Encompasses reference services, information storage and retrieval systems, users' information skills, and users' information needs.
- III. Librarianship and information dissemination: This covers library economics, university, school, public, digital, special, and children's libraries, as well as library management and research in librarianship.
- IV. Printed and electronic resources.
- V. Cataloging.
- VI. Information technology.
- VII. Information management.
- VIII. Electronic publishing.
- IX. Scientific communications.
- X. Classification.

Based on the findings from this study, it is hoped that researchers in the field will address societal needs, considering the emergence of new technologies that have transformed the landscape. Their research should focus on topics relevant to contemporary society and keep pace with technological advancements in information science and knowledge [16].

3 | Research Background

A review of existing research indicates that the metaverse concept is emerging but has received limited academic attention. The following summarizes key findings from studies related to entrepreneurship and evolving factors within the fields of information science and epistemology.

Saberi [5] surveyed to identify the factors influencing entrepreneurship among doctoral students in information science and epistemology. He identified five key factors: skill development, content, education, promotion, and support. He urged curriculum planners and educational administrators to focus on these areas.

Shahbazi et al. [17] validated a questionnaire designed to develop a competency model for teaching information science and epistemology, based on an analysis of curricula and labor market needs. Their findings revealed that by removing 17 items from the initial questionnaire and factor analyzing the remaining items using the Varimax rotation method, 8 components emerged. Notably, the analysis highlighted that "Principles of Creating and Managing Simple Computer Networks" was a critical topic missing from the programs in this field.

Mohammad Hassanzadeh [6] briefly discusses the generational changes impacting citizens and universities and their characteristics. He then focuses on the evolving concept of the meta university and outlines essential elements for universities to establish a strong presence in the metaverse.

Hong et al. [18] explore the characteristics, possibilities, and limitations of the metaverse. They conclude that due to the rapid advancement of digital technology, all sectors of society are likely to accelerate their integration into the virtual world, leading to a blurring of boundaries between the physical and digital realms. Consequently, the metaverse is expected to emerge as a significant public infrastructure.

4 | Research Method

This study is applied research conducted in a descriptive-analytical format. Information and data were collected to analyze the identification and effectiveness of the metaverse in the fields of information science and epistemology.

4.1 | Identification and Effectiveness of the Metaverse in Information Science and Epistemology

Based on the theoretical concepts outlined above, we will now examine the relationship between the metaverse, information science, and epistemology. The metaverse offers a wide range of services in the field of information science, including the following:

- I. Virtual libraries and archives: In the metaverse, users can access vast collections of digital resources such as books, articles, and multimedia content within a virtual environment
- II. Online learning platforms: Educational institutions and organizations can establish virtual classrooms and immersive learning environments, enabling students to engage with course materials and interact with instructors and peers in real time.
- III. Collaboration and communication tools: The metaverse facilitates collaboration on projects, idea sharing, and connections with colleagues and experts worldwide through virtual meetings, conferences, and workshops.
- IV. Data visualization and analysis: Advanced data visualization tools in the metaverse help users understand complex information better and make data-driven decisions.

- V. Knowledge management systems: The metaverse can host sophisticated knowledge management systems, allowing organizations to store, organize, and share their collective knowledge and expertise.
- VI. Virtual research labs: Scientists and researchers can conduct experiments, simulations, and analyses in virtual labs, enabling collaboration and sharing of findings with the global scientific community.
- VII. Digital art galleries and museums: Cultural institutions can create virtual exhibitions and galleries, allowing users to explore and interact with art, artifacts, and historical documents in new and engaging ways.

The metaverse also significantly impacts the publishing industry in several ways:

- I. Virtual bookstores and newsstands: Publishers can create virtual bookstores and newsstands in the metaverse, allowing users to browse, purchase, and read digital books, magazines, and newspapers in an immersive environment.
- II. Interactive storytelling: Authors and publishers can develop interactive, multimedia-rich stories that leverage the metaverse's unique capabilities, such as 3D environments, virtual reality, and augmented reality.
- III. Social reading experiences: The metaverse can facilitate social reading experiences where readers can discuss books, share recommendations, and participate in virtual book clubs and author events.
- IV. Advanced marketing and promotions: Publishers can utilize the metaverse to create engaging marketing campaigns, including virtual book launches, author interviews, and interactive promotional events.
- V. Collaborative writing and editing: The metaverse offers a platform for authors, editors, and other publishing professionals to collaborate on projects in real time, streamlining the writing and editing process.
- VI. Self-publishing opportunities: The metaverse presents new opportunities for self-publishing, enabling authors to create and distribute their work directly to readers in a virtual setting.
- VII. Educational publishing: The metaverse can revolutionize educational publishing by providing immersive learning experiences, such as virtual field trips, interactive simulations, and augmented reality textbooks.

The metaverse in scientometrics refers to the study of relationships among scientific articles, their authors, topics, journals, and other factors related to the production and dissemination of knowledge. Scientometrics focuses on assessing and evaluating scientific and research performance. By utilizing the metaverse, researchers can uncover patterns in these relationships and understand the factors that contribute to the success or failure of an article or researcher. For instance, one can analyze which topics are most popular in a particular field or identify which journals have the greatest impact within that area. These methodologies enhance our understanding of how knowledge is transferred and developed, as well as the factors that influence this process. This information is invaluable for advancing science and supporting researchers in their work.

Generally, the metaverse serves as a structured and standardized system for categorizing and cataloging information. This system aids librarians and other information professionals in easily identifying, categorizing, and searching for resources. Additionally, it enables users to access the information they require with ease. The metaverse also plays a significant role in library management by improving access to information. Here are some key roles of the metaverse in library management:

- I. Classification and cataloging: The metaverse aids librarians in classifying and cataloging resources in a structured and standardized way, facilitating easy access for users seeking information.
- II. Information search and retrieval: With the metaverse, users can quickly search for and retrieve desired resources by subject, author, title, and other criteria.
- III. Inter-library connectivity: The metaverse enables libraries to share information with one another, allowing users to access resources available in different libraries.
- IV. Collection management: The metaverse assists librarians in managing their collections efficiently, enabling them to easily add new resources and update or remove outdated ones.

- V. Statistics and reports: The metaverse provides librarians with tools to collect and analyze statistics and reports regarding library resource usage. This data can help enhance library services and guide future planning.

5 | Conclusion

ICT can serve as a powerful tool to foster innovation across various fields. The rapid development and adaptation of tools based on these technologies have led to a new form of creative, active, and inclusive learning environment. One of the most significant emerging innovations in this context is the metaverse, which has the potential to be effective in numerous domains. The metaverse offers countless opportunities for innovative thinkers to create new jobs and services. The metaverse, which refers to data that informs about other data, is crucial in information science and knowledge management. This data organization helps us categorize information more effectively. Additionally, the metaverse allows easier access to information and facilitates user sharing. The metaverse is a three-dimensional virtual space where individuals can interact and communicate in real-time. It provides new possibilities for information services and serves as a platform for delivering diverse and engaging services to both casual and professional users. Through the metaverse, we can efficiently access and share information through virtual interactions, encouraging creative problem-solving and collaborative learning. Moreover, the metaverse can serve as a valuable educational tool. Educators can utilize this virtual environment to present content that engages students interactively. Finally, the metaverse creates new business opportunities. Companies can leverage this space to offer products and services to customers, elevating market competition to new heights. Overall, the metaverse significantly impacts information services, and its influence will only grow. It is essential to continually seek innovative and creative ways to thrive in this fast-paced and ever-changing landscape.

Author Contributions

Zeinab Ghafoornia was solely responsible for the conceptualization, literature review, analysis, and manuscript preparation for this study.

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Data Availability

No datasets were generated or analyzed during this study. Relevant information is available within the article.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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