The Elements of Every Metaverse Types: A Systematic Literature Review

Satrio Pradono Suryodiningrat [1], Arief Ramadhan [2], Tsukasa Hirashima [3]

[1] *School of Computing and Creative Arts, University of Bina Nusantara, Jakarta, Indonesia*
[2] *School of Computing, Telkom University, Bandung, Indonesia*
[3] *Graduate School of Engineering, Hiroshima University, Higashi-Hiroshima, Japan*

Abstract **– The understanding of the metaverse is currently expanding, and several interpretations and implementations may be present. The many metaverse iterations have distinct components and capabilities, which have the potential to evolve and enhance over time in tandem with technological advancements and evolving user requirements. The metaverse has emerged as a widely discussed subject of public interest, with individuals and organizations alike contemplating its potential applications. However, a prevailing misperception persists over its fundamental comprehension. The concept of the metaverse is often misconstrued as solely referring to a virtual world; nevertheless, it encompasses more than simply a virtual realm. Three other categories can be classified as constituting the metaverse. The metaverse encompasses four distinct categories, each characterized by unique aspects that may or must diverge from one another. The elements play a crucial role in the development of any metaverse kind. This work aims to provide a valuable contribution by offering a comprehensive analysis of the constituent features of various metaverse types. Its purpose is to assist anyone interested in studying or implementing a certain metaverse type by fostering a deeper understanding of its core aspects.**

Keywords **– Metaverse, elements, lifelogging, augmented reality, virtual reality, mirror world, digital twin.**

DOI: 10.18421/TEM131-80
https://doi.org/10.18421/TEM131-80

Corresponding author: Arief Ramadhan,
School of Computing, Telkom University,
Bandung, Indonesia
Email: arieframadhan@telkomuniversity.ac.id

Received: 30 October 2023.
Revised: 06 February 2024.
Accepted: 12 February 2024
Published: 27 February 2024.

1. Introduction

The concept of a metaverse, or a virtual environment that anybody may enter, has been around for decades. The word was invented by science fiction author Neal Stephenson in his 1992 novel "Snow Crash," which depicted a dystopian future in which individuals spend much of their time in a virtual realm known as the Metaverse [1]. The notion of the metaverse first emerged in the early 2000s in the form of online gaming worlds like Second Life and World of Warcraft, which enabled users to create avatars and interact with other players in virtual landscapes. The breadth and accessibility of these early virtual worlds were restricted, and they frequently required expensive computers to function. In the years thereafter, technological advances like as the general availability of high-speed Internet and the development of virtual and augmented reality headsets have enabled the creation of a more fully realized metaverse [2]. Linden Lab, the founders of Second Life, as well as corporations like Facebook, Roblox, and Epic Games, have extensively invested in the creation of their metaverse systems [3]. As individuals throughout the world have been compelled to stay at home and minimize physical contact with others due to the COVID-19 pandemic, interest in the metaverse as a method of virtual social connection and entertainment has increased in recent years. Because of this, the metaverse has gained traction in the IT industry, and its future importance is widely expected to increase in the next years.

Key causes include technology developments, gaming and entertainment, social media and networking, economic and commercial opportunities, and cultural and sociological upheavals have all contributed to the establishment of the metaverse. The advent of cutting-edge technologies like VR/AR, AI, and the Internet has made it possible for the metaverse to exist.

The metaverse has expanded in depth, breadth, and depth of experience as these technologies have developed and become more generally available [1]. The basis for virtual worlds and social interaction, video games were essential to the growth of the metaverse. The popularity of online games like Fortnite, PUBG, and MMORPGs like Second Life have all helped to expand the metaverse. Social media sites like Facebook and Twitter have paved the way for the ubiquitous integration of social networking features into today's most popular metaverse applications. The economic and commercial potential of the metaverse is immense since it creates new markets for everything from digital advertising and marketing to digital goods and services. Because of the promise it holds, businesses are pouring resources into building the metaverse. The rise of distant work and the necessity for virtual communication amid the COVID-19 pandemic has accelerated the development of the metaverse. Furthermore, as society gets more accustomed to virtual engagement, the metaverse is expected to become an increasingly crucial aspect of our daily lives.

Overall, the development of the metaverse is driven by a complex interplay of technological, cultural, and economic factors. As new technologies and platforms emerge, and as our society continues to evolve, the metaverse is likely to become an even more important part of our digital lives. According to the authors' previous research about the types of the metaverse, it has 4 different types starting from augmented reality, lifelogging, virtual world, and digital world or mirror world. Those 4 types of metaverse have different understandings and requirements for technology [3].

Based on the previous study, this paper developed 4 research questions to find elements from each type of metaverse; the research questions are:

2. What are the elements of metaverse type: augmented reality (AR)?
3. What are the elements of metaverse type: lifelogging?
4. What are the elements of metaverse type: virtual worlds (VR)?
5. What are the elements of metaverse type: mirror world or digital twin?

The metaverse and its type, the paper's primary technology, are the subject of the next section, followed by the second stage of the Systematic Literature Review (SLR) procedure.

2. Theoretical Foundation

The prefix "meta-" is commonly used to denote more abstraction or self-reference. It is a universal symbol for something more abstract or generic.

The prefix "meta-" in the context of the metaverse suggests a higher degree of abstraction than specific instances of virtual environments or games. It is shorthand for the idea of a vast, linked web of virtual locations and resources. Any digital area, such as a game or social network, that can be viewed and engaged with through technology is considered a virtual reality environment (or "verse"). The term "universe," from which "verse" is derived, can refer to either the entire physical world or all that lives inside it. The term "metaverse" refers to the resulting unified digital cosmos that is the result of the combination of many VR/AR settings, and the "verse" in the term is meant to communicate this notion [1]. Mirror worlds, digital twins, augmented reality (AR), and lifelogging are the four main types of metaverse technologies [2]. The illustration of types of the metaverse is presented in Figure 1.

To put it simply, augmented reality (AR) is a system that superimposes computer-generated content over a user's perspective of the real world [4]. Common tools for this task include smartphones and augmented reality headsets with cameras and motion and location tracking capabilities. Thanks to AR technology, the virtual items appear to stay in the same position and at the same viewing angle while the user walks about.

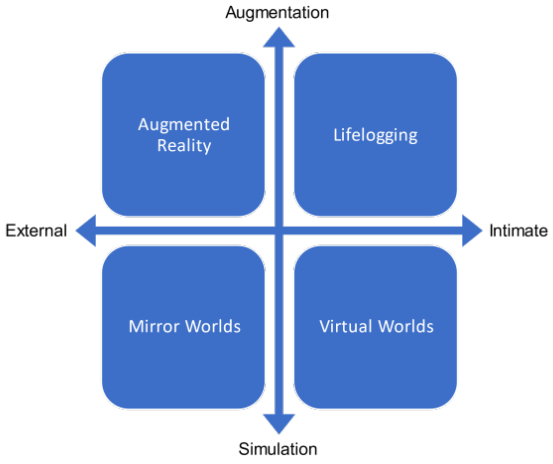

Figure 1. Metaverse types [3]

The term "lifelogging" refers to the process of documenting one's routines, emotions, and observations in a digital format. Images, videos, and audio recordings may be collected using a variety of modern tools, including smartphones, wearable cameras, and sensors. Many different approaches, from simple journaling to complex data gathering and analysis, can all be considered forms of lifelogging [5]. Lifelogging can be used for memorialization or self-improvement by tracking calorie consumption, exercise, and sleep. One use is studying how our environment affects health and behavior.

Users can interact with avatars in a virtual reality (VR) environment [6]. Virtual environments can be accessed through desktop and portable computers, video gaming consoles, and VR equipment. Virtual world players can freely explore and interact with their surroundings. MMORPGs like Second Life and World of Warcraft enable users to explore enormous open areas, accomplish missions, and socialize. Other virtual worlds simulate real-world settings for practice. Technology will make virtual worlds more realistic, engaging, and immersive [4].

Satellite photography, ground-level photos, and other data are used to create a digital mirror world. Yale computer science professor David Gelernter postulated a mirror world in 1991. In a mirrored universe, all real-world objects and locations have virtual counterparts. This virtual environment replicates the real world [7]. The mirror world is used for mapping, urban planning, and real estate. The software can simulate and train without real prototypes or field testing. The mirror universe is dynamic and ever-changing. The mirror world collects and uploads more data as it seems more recent and accurate [8].

3. Method

The Kitchenham technique [9] was adopted in this study, and the steps of this study are represented in Figure 2 below.

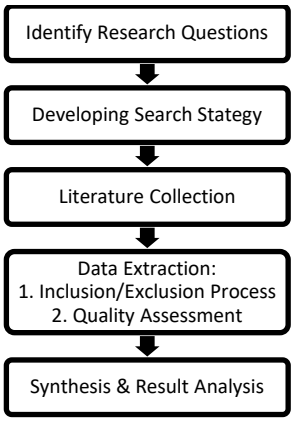

Figure 2. The steps of this study

3.1. Search Strategy

The research questions have been identified in the introduction section. Then the next step is determining the search strategy of this SLR. This step started by determining which database will be used. The authors have selected to use numerous databases, including ACM Digital Library, IEEE Xplore, and Springer, to mention a few.

Then, the author used the keywords "elements of" AND "lifelogging or augmented reality or virtual reality or digital twin or mirror world" to search the articles from January 2019 to December 2022 in those chosen databases.

3.2. Literature Collection

The authors began the literature collection at this step by utilizing the chosen keywords in the chosen databases, as shown in Table 1, which shows the number of articles found in each search database. 41 articles have been gathered.

Table 1. Search result summary

Databases	Article Found
ACM	1
Elsevier	4
IEEE	15
IOP	2
MDPI	8
Springer	9
Taylor & Francis	2
Total	**41**

3.3. Data Extraction

In this step, the authors employ inclusion and exclusion criteria to the 41 articles to decide which articles suit the research purpose. The inclusion and exclusion criteria are shown in Table 2.

Table 2. Exclusion and inclusion criteria

Inclusion	Exclusion
1. Publications from 2019 to Q1 of 2023 2. Providing the appropriate results the elements of lifelogging, augmented reality, virtual reality, and digital twin or mirror world 3. The language of the papers is English	1. Papers that are non-accessible.

Finally, the authors only chose 31 papers and eliminated 8 others. There are two publications from Elsevier, three from IEEE, one from MDPI, one from Springer, and one from Taylor & Francis. All eight articles were removed because they did not achieve the desired results from lifelogging, augmented reality, virtual reality, and digital twin or mirror world elements.

Table 3 depicts the demographics of the chosen articles. It demonstrates that IEEE, Springer, and MDPI dominate the contributions to the selected articles. The journal dominates the article type, followed by the conference and book chapter, according to Table 3.

The table will also reveal the demography of the selected articles on elements of lifelogging, augmented reality, virtual reality, and mirror world or digital twin.

Table .3 Selected article demography

Type	Quantity
Journal	15
Proceeding	14
Book Chapter	4
Total	**33**

Table 4 contains some of the descriptive information from the article that has been combined into the American Psychological Association (APA) reference style and linked to the related reference. It also reveals the metaverse type, publishing kind, and database name of each article.

Table 4. The descriptive information

No	Author	Metaverse Type	Publication	Database
1	(Zhang *et al*., 2019)	Virtual Reality	Proceeding	ACM
2	(Ladj *et al*., 2020)	Mirror World	Journal	Elsevier
3	(Hughes *et al*., 2022)	Mirror World	Journal	Elsevier
4	(King *et al*., 2020)	Augmented Reality	Proceeding	IEEE
5	(Ogasawara & Bandai, 2020)	Virtual Reality	Proceeding	IEEE
6	(Williams *et al*., 2020)	Virtual Reality	Proceeding	IEEE
7	(J. Li *et al*., 2021)	Virtual Reality	Proceeding	IEEE
8	(Miller *et al.,* 2021)	Virtual Reality	Proceeding	IEEE
9	(Ksibi *et al.,* 2021a)	Lifelogging	Journal	IEEE
10	(Z. Li *et al*., 2021)	Virtual Reality	Proceeding	IEEE
11	(Y. Lu *et al*., n.d.)	Augmented Reality	Proceeding	IEEE
12	(Xia *et al*., 2020)	Augmented Reality	Proceeding	IEEE
13	(Salim *et al*., 2022)	Virtual Reality	Proceeding	IEEE
14	(Ding *et al*., 2022)	Augmented Reality	Proceeding	IEEE
15	(Promod *et al.,* 2019)	Virtual Reality	Proceeding	IEEE
16	(Romli *et al*., 2020)	Augmented Reality	Proceeding	IOP
17	(Cuevas-Lara *et a*l., 2020; Struková et al., 2022)	Mirror World	Proceeding	IOP
18	(Cuevas-Lara *et al*., 2020)	Virtual Reality	Journal	MDPI
19	(Bonmarin *et al*., 2022)	Augmented Reality	Journal	MDPI
20	(Liu *et al.,* 2022)	Mirror World	Journal	MDPI
21	(Lee *et al*., 2020)	Virtual Reality	Journal	MDPI
22	(Hachaj & Piekarczyk, 2019)	Virtual Reality	Journal	MDPI
23	(Pietroni, 2019)	Virtual Reality	Journal	MDPI
24	(Nasirahmadi & Hensel, 2022)	Mirror World	Journal	MDPI
25	(Vorländer, 2020)	Virtual Reality	Book Chapter	Springer
26	(Gupta Aboul Ella Hassanien Ashish Khanna Editors, 2020)	Virtual Reality	Book Chapter	Springer
27	(D. Lu *et al*., 2021)	Virtual Reality	Journal	Springer
28	(Goos *et al*., 2020)	Virtual Reality	Book Chapter	Springer
29	(Slavkovic *et al.,* 2020)	Mirror World	Journal	Springer
30	(İyigün *et al*., 2022)	Virtual Reality	Book Chapter	Springer
31	(Šimoník & Krumnikl, 2022)	Augmented Reality and Virtual Reality	Journal	Springer
32	(Dargan *et al.,* 2022)	Augmented Reality	Journal	Springer
33	(Ralston *et al.,* 2020)	Mirror World	Journal	Taylor & Francis

Authors then do the quality assessment process by reading thoroughly all of the chosen articles and determining whether the articles are properly written and reflect some contributions that can answer our research questions.

After a careful quality assessment process, all of the authors agree that all of those 33 articles have a quality to be included in the synthesis steps. The results of the synthesis are then elaborated in the results section and discussion section.

4. Results

Discussion of augmented reality is very popular nowadays as many people are already using it for various purposes because it is easier to use and does not require any extra peripherals like a head-mounted display. Based on the SLR that the authors conducted many elements of augmented reality (AR) can be found. Images, action, and movement are the top elements that should be in eXtended Reality (XR) technologies called AR. From Table 5 we can see that Human-Computer Interaction (HCI) is the most frequent result compared with others. Followed by images, cameras, locations, and 3D models that share the same number of appearances. Table 5 and Figure 3 provide an answer to RQ1 - what are the elements of metaverse type: augmented reality (AR)?

Table 5. Elements of augmented reality

No.	Elements of Augmented Reality	References
1	Images, videos, location, sound, choice, action, and movement.	[10]
2	Recognition using images, camera	[11]
3	3D model	[12]
4	Head-Mounted Display (HMD) or Near-Eye Display (NED)	[13]
5	Shadow Synthesis	[14]
6	Accurate real-time hand pose estimation	[15]
7	Real environment, tracking registration, human-computer interaction, virtual and real fusion	[16]

Since lifelogging is tracking the daily activities of someone by using technology, a camera is an element of lifelogging activities to record or take a picture of what they are doing. According to the result of this SLR, the only result that the authors could find is a camera. Table 6 provides the answer to RQ2 -what are the elements of the metaverse type: lifelogging)?

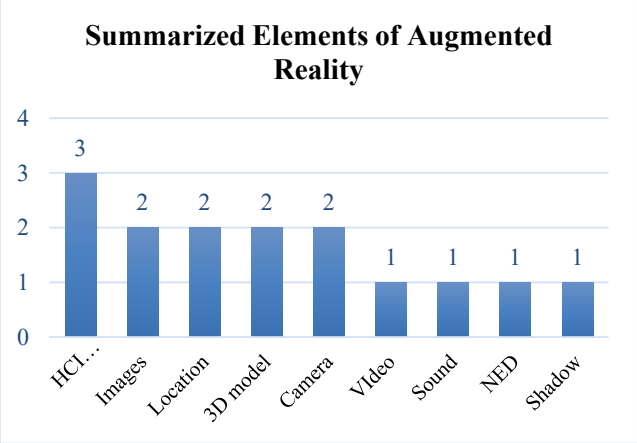

Figure 3. Summarized elements of augmented reality

Table 6. Elements of lifelogging

No.	Elements of Lifelogging	References
1	Camera	[17]

Table 7 answers RQ3 - what are the elements of metaverse type: virtual reality (VR)? Virtual reality by far is the second most popular XR technology other than AR. VR is very popular in gaming because it allows gamers to immerse in the virtual world and makes the gaming experience much more fun than it was. Based on the authors' research for this paper, 18 elements of VR are important. 3D models and movement recognition are the top elements of this XR technology. The result can be seen in Figure 4.

Table 7. Elements of virtual reality

No.	Elements of Virtual Reality	References
1	3D model	[18]
2	Virtual and technology environments	[19]
3	Augmented reality	[20]
4	Head-mounted display, CAVE Technology	[21]
5	360-degree video streaming, head-mounted display	[22]
6	Head-mounted display	[23]
7	Visual representations, movement	[24]
8	Visuo-haptic feedback, multisensory integration	[25]
9	Hand gesture recognition	[26]
10	Virtual stereo	[27]
11	Omnidirectional video	[28]
12	Motion tracking	[29]
13	Physical movement	[30]
14	Virtual intelligent human modeling technology	[31]
15	Immersion, Interaction and participation	[32]
16	Imagination	[33]
17	Marker-less object recognition, device calibration	[34]
18	Accurate real-time hand pose estimation	[15]

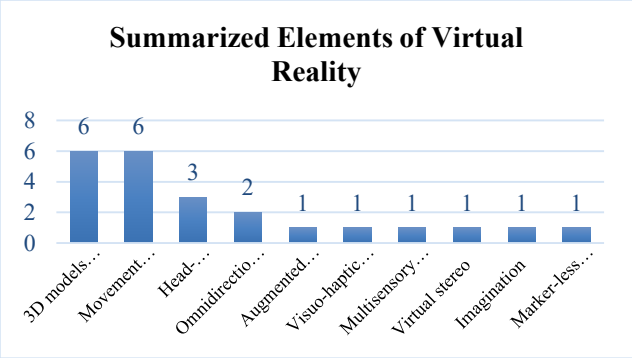

Figure 4. Summarized elements of virtual reality

RQ4 - what are the elements of metaverse type: mirror world or digital twin, will be answered in Table 8 and Figure 5. Again, similar to elements of VR, the 3D model is the popular element of mirror world or digital twin. But other than the 3D model, the physical system is also part of the elements that need to exist. This physical system is not required in VR technology because everything is about imagination in VR.

Table 8. Elements of mirror world or digital twin

No.	Elements of Mirror World or Digital Twin	References
1	Digital shadow	[35]
2	Real-time monitoring, 3D imaging technology	[36]
3	Geospatial platform	[37]
4	Classification models	[38]
5	Vibrational analysis	[39]
6	Dynamic model, digital model	[40]
7	Physical products in real space, virtual products in virtual space, and connected data that brings physical and virtual products together	[41]
8	Physical system	[42]

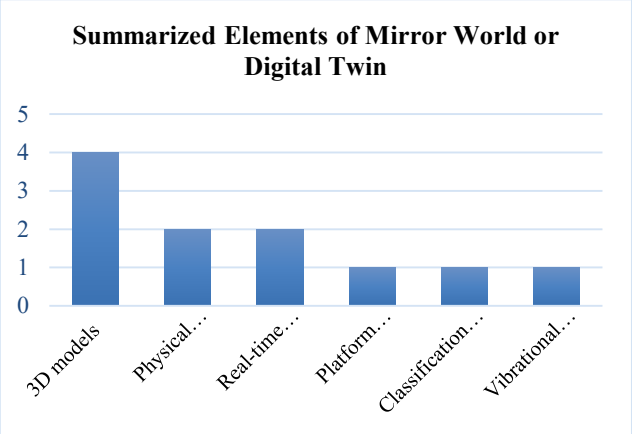

Figure 5 Summarized Elements of Mirror World or Digital Twin

5. Discussion

In this section, we will analyze the systematic literature review's results holistically and tie them to the theoretical underpinning and other research topics.

5.1. Discussion Regarding RQ1. What are the Elements of Metaverse Type: Augmented Reality (AR)?

Augmented reality (AR) is a popular XR technology since it is easier to use than VR because AR applications may be created to be utilized only with mobile phones. According to Statista.com, the mobile augmented reality (AR) industry is expected to be valued at $12.45 billion in 2021. It is expected to be worth over 17 billion US dollars in 2022, rising to more than 36 billion US dollars by 2026. Digital commodities, such as in-app purchases in AR apps, as well as ad placements and visualization tools, are all part of the industry. Finally, the mobile augmented reality market revenue globally rose by 4 - 5 billion US dollars on average each year from 2021 to 2026, as illustrated in Figure 6 [43]. According to this forecast, mobile AR will continue to rise at a quick pace. The addressable market for mobile AR is massive, with smartphones, tablets, and other mobile devices all being included in the target market for mobile AR. The number of mobile AR users is likely to increase dramatically in the future years as corporate and industrial mobile AR software investment rises [44]. Consumer growth in the mobile AR industry, including digital AR experiences, is also projected. Pokémon Go, the location-based AR mobile game, is one of the most well-known instances, with in-app purchases accounting for a major amount of consumer mobile AR expenditure [45]. In 2021, the hardware and software sales from augmented reality (AR) glasses for consumers and businesses will amount to 1.85 billion US dollars. This is projected to increase to $3.78 billion in 2022 and $35.06 billion in 2026.

As the popularity of augmented reality (AR) is getting higher and higher because it is easier to develop and use, according to this research the elements of AR are Human-Computer Interaction (HCI) including making choices, actions, and movement, images, location, 3D models, camera, video, sound, near-eye display (NED), and shadow. Because AR overlays digital components in the actual world that people view, HCI is the most common aspect that occurs in many publications. The user may still view the real environment, but it is enhanced with digital features like as annotations or photographs.

The HCI is to give their customer a better experience by giving the customers to try virtually before they buy the product. 3D models, cameras, locations, and images share the same number of appearances, this makes those 4 elements have the same importance level. When people use AR, they have to use the camera to see the real world and the 3D model is the object that is overlayed in the real world that has been captured by the camera. A 3D model is an object or digital asset that the user can see virtually and interact with it as the HCI elements.

Other than 3D models, images are also one of the possible assets that can be overlayed. Most AR applications required location tagging to make them more accurate or increase the user experience, which is why location is also considered an important element of AR. Video, sound, NED, and shadow are considered the least important elements because the number of appearances is lower compared with others. Those last 4 elements are also considered nice-to-have elements because those elements might increase the user experience level but it is not necessary.

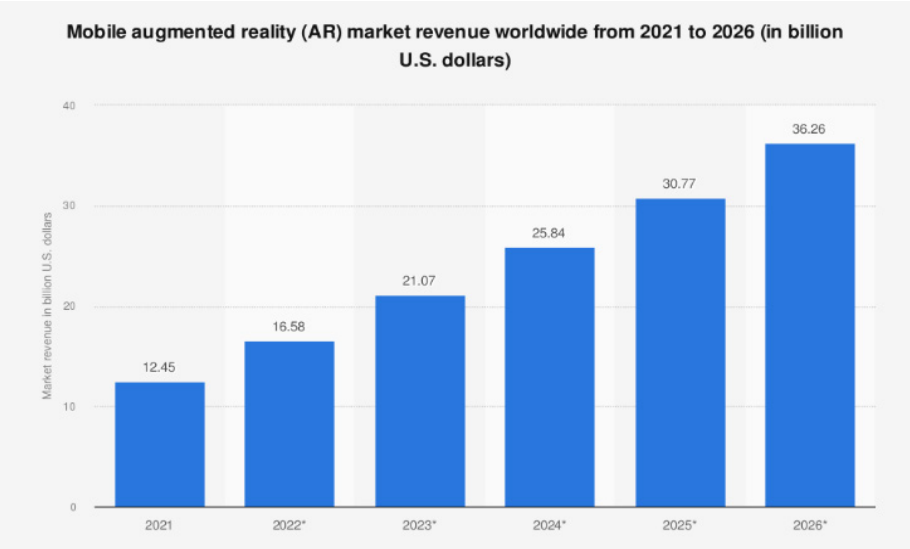

Figure 6. AR worldwide revenue [46]

5.2. Discussion Regarding RQ2. What are the Elements of Metaverse Type: Lifelogging?

Wearable technology, such as a computer, that records or captures huge portions (or even every minute) of a person's everyday life was the inspiration for the notion. This was originally accomplished back in 1994. Steve Mann, a Canadian researcher, is known as the "father of wearable computers" since he broadcast every moment of his life via a wearable computer [47]. Lifelogging is connotated with someone who tells their daily life activities using a video or vlog. The popular lifelogging platforms are YouTube, Instagram, and TikTok. With those 3 popular platforms, the only element that they use is a camera(s). According to the result of this SLR, the only element found is the camera because is the most popular lifelogging method that most people know, and it is easier because you do not need an extra gadget to do it and they can use their phone to record themselves. Although, the fact that lifelogging is not limited to recording yourself for entertainment purposes but also health purposes. Fitness and sleep patterns may be monitored using devices like the Jawbone UP and Fitbit.

5.3. Discussion Regarding RQ3. What are the Elements of Metaverse Type: Virtual Reality (VR)?

Virtual reality (VR) is a common technology for gaming and such. VR creates a virtual setting in which users may move about and interact with one another. Virtual reality (VR) can also refer to anything that gives the impression of being as real as a computer-generated environment. Through the use of a head-mounted display, a computer, and a joystick, the user is immersed in a 3D virtual world. The growth of VR is represented in consumer and enterprise virtual reality (VR) sales will reach 11.97 billion US dollars in 2022, an increase over the previous year as shown in Figure 7. VR revenue is predicted to increase to 15.81 billion US dollars in 2023 [48].

According to the above explanation, this is aligned with the result of this SLR paper. The top elements of VR that frequently appear are 3D models and movement recognition. The idea of VR is to replace real reality with a new virtual computer-generated environment and trick the human brain into thinking that the virtual computer-generated environment is a new reality.

With that, the 3D models are agreed will be one of the top elements of VR because the new-virtual computer-generated environment is all based on 3D models. When users use the VR system, the idea is to trick the human brain that virtual reality is a new reality, which means it needs to recognize the movement of the user to increase the user experience and to make it even more real. The 3rd top element is the head-mounted display (HMD). This is interesting because the HMD is the crucial hardware of VR, but according to this paper, HMD does not come as a top or number 1 element. The interesting fact about HMD as shown in Figure 8, is by far the most popular extended reality (XR) headsets on the market are Oculus VR headsets (XR Headset Shipment Share Worldwide by Brand 2022, n.d.). The Oculus Quest 2, the company's newest device, is likewise leading the way among Steam players. Continued advancements in VR technology, such as the introduction of smaller and more stylish devices, are anticipated to encourage growing consumer and industrial use of VR. The 4th element of VR is omnidirectional video.

This element is easy to understand why it is one of the important elements of VR because when we are using the HMD can turn our vision 360 degrees to see our new reality surroundings.

The rest of the results: Augmented reality, visual-haptic feedback, multisensory integration, virtual stereo, imagination, marker-less object recognition, and device calibration share the same appearance which is 1 time. Those elements are as much as important as the others but VR can be done without them too, hence, these are like icing on the cake for VR technology. Increased VR adoption is projected across numerous industries, with healthcare, education, workforce development, and manufacturing among the areas most likely to be affected by VR technology. Emirates will introduce the first airline VR app in 2021, allowing passengers to tour the cabin from the comfort of their own homes. Facebook also unveiled Horizon Workrooms, a VR experience designed exclusively for individuals to collaborate using the company's Oculus headsets.

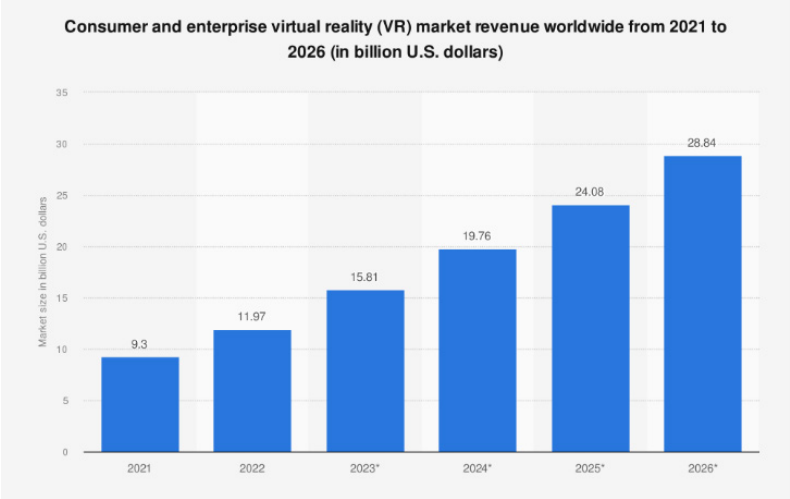

Figure 7. VR Market revenue worldwide [49]

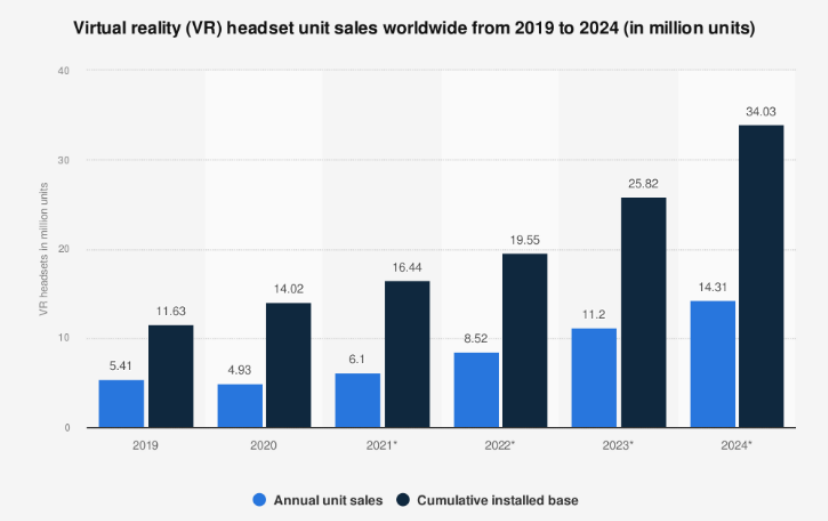

Figure 8. VR headset unit sales worldwide [48]

5.4. Discussion Regarding RQ4. What are the Elements of Metaverse Type: Mirror World or Digital Twin?

The manufacturing industry has been quick to adopt the digital twin, particularly for use in smart factory applications; the healthcare industry for designing and implementing digital technology in smart hospitals; the automotive industry for capturing a vehicle's operating data in real-time to evaluate the condition and optimize usage; and the technology industry for designing and simulating smart cities to meet global demand for a sustainable future. All digital twin applications have the benefits of quicker risk assessment, predictive maintenance, real-time monitoring, and greater cooperation and decision-making [50]. This allows businesses to gauge the viability of concepts before investing in costly prototypes. The process involves making a computerized replica of the intended procedures, which helps manufacturers catch errors and irregularities before production begins. As a result, costs are reduced while product output and development times are both improved. Microsoft, Bosch, General Electric, IBM, Siemens, Oracle, and Cisco are just some of the largest names in the digital twin industry. In addition, many of these businesses provide the development of cloud-based digital twins to other companies as a service. The findings indicate that 3D models are the most crucial component of the mirror universe, followed by physical systems, digital shadows, real-time monitoring, platforms, a categorization model, and vibrational analysis. This form of metaverse will rely heavily on 3D models due to the similarities between virtual reality mirror worlds and digital twins.

The main difference between VR and mirror worlds or digital twins is the 2nd element, which is physical systems. The mirror world or digital twin is a digital replica of the real thing so it makes much sense if the physical systems must exist. Real-time monitoring is much more important compared with the others. This is because the concept of a mirror world or digital twin is making an exact copy of the physical systems. Every time the physical system is changed, the digital copy also needs to be changed accordingly. The rest of the elements share the number of appearances according to the authors, but the next element according to the authors is the system platforms. All of the digital copies or mirror worlds or digital twins must be accessible from certain platforms because, without them, it is impossible to make use of the digital twins. This is the same concept as VR or AR. As in VR, the platform example is Play Station. The rest of the elements from the results of this SLR are closely related to the specific field.

For example, classification models are used in the medical field to classify any disease and make better decisions before any medical procedure. The vibration analysis is to monitor the health of complex industrial systems

6. Conclusion

Based on the results of this research, the authors found much information about the elements of the metaverse. There are 4 types of the metaverse, they are augmented reality (AR), lifelogging, virtual reality (VR), and mirror world or digital twin. Augmented reality's top element is Human-Computer Interaction or HCI. This includes choice, action, and movement from the users. This element is important because it will increase the user experience. The only lifelogging element that the authors found is the camera. This is interesting because any wearable device that monitors people's activity such as heart rate monitoring also considered lifelogging. But there is still misconception of lifelogging. The 3rd type of metaverse is VR, and in this type, 2 elements have the same number of appearances, they are 3D models, including the human and environment, and movement recognition. These 2 elements are simply easy to understand why they are important. The mirror world or digital world has the top 3 elements, which are 3D models that are coming on the top and physical system, and real-time monitoring which shares the same number of appearances.

This research can make major academic contributions across several fields. It entails the creation of novel technologies. These breakthroughs boost computer science and technology, opening the door for new applications and interactions in virtual environments. Insights into human-computer interaction patterns, user behavior, and usability difficulties may be gained by studying how people interact with the metaverse and virtual worlds. This study contributes to better user experiences and interface design in immersive settings. Collaboration across fields is encouraged, allowing ideas and approaches to cross-pollinate. This multidisciplinary approach advances knowledge and fosters the development of novel solutions. Overall, metaverse research has far-reaching ramifications in academia, resulting in advances in technology, social understanding, education, economics, and a variety of other sectors. The exploration of virtual worlds and immersive encounters in the digital era brings up new areas for study and academic inquiry.

The practical contributions of this research are potentially affecting a wide range of sectors and areas of daily life. The goal is to provide immersive and interactive experiences for consumers.

The practical contribution is to provide innovative and exciting methods for people to connect with digital materials, goods, services, and each other. Metaverse apps provide significant chances for training and skill development. Practical contributions include using virtual simulations for professional training in industries like healthcare, aviation, and engineering, among others. Remote cooperation and communication are made possible by metaverse technology. The practical benefit is that virtual meetings, conferences, workshops, and team projects may be held without requiring physical attendance. Metaverse research helps to create individualized learning experiences that respond to individuals' requirements and interests. It provides practical advantages for students looking for customized educational material and routes. Overall, the practical contributions of metaverse-type research are diverse and cover several disciplines, influencing industries, society, and human experiences. As technology advances, the metaverse is expected to have increasingly more practical and transformational uses.

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