

The metaverse as India's next-generation internet : Opportunities and challenges

Sukhmeet Kaur *

Faculty of Business and Communication

INTI International University

Persiaran Perdana BBN Putra Nilai

71800 Nilai

Negeri Sembilan

Malaysia

Divya Goel †

Jaypee Business School

Jaypee Institute of Information Technology

Noida 201309

Uttar Pradesh

India

Babita Yadav §

Department of Business Management

Doctor Harisingh Gour Central University

Sagar 470003

Madhya Pradesh

India

Saloni Devi ‡

The Business School

University of Jammu

Jammu 180006

India

* E-mail: sukhmeetkaur9686@gmail.com (Corresponding Author)

† E-mail: divyagoel.jmi@gmail.com

§ E-mail: babitas.yadav@rediffmail.com

‡ E-mail: saloneepadyar@gmail.com

Sharmila Devi Ramachandaran^{*}

Faculty of Business and Communication

INTI International University

Persiaran Perdana BBN Putra Nilai

Nilai 71800, Negeri Sembilan

Malaysia

Abstract

The Internet, work, and workplace were disrupted historically the with idealized evolution of the metaverse. The term “metaverse” is not new but more validating and captivating than before. It was originally used in a science fiction novel called “Snow Crash” as a traveling bag of “meta” and “universe.” The technology know-how believes that the metaverse is characterized by a platform where physical and virtual worlds come together and continue to be authentic. Furthermore, it also transformed the workplace elements such as communications, culture, collaborations, networks, team structure, organizational framework, and meetings. Indian industries like online gaming, travel, and tourism, e-commerce, real estate, banking, finance, education, and healthcare. India’s Global Innovation Index (GII) ranks 40th in 2022 as compared to 2015 81st rank. The present paper primarily investigates the opportunities for India for the next generations and existing barriers. The paper also discusses the role of the government in promoting the metaverse in India. The authors used descriptive research methodology for the study. The limitation of the paper is also incorporated at the end.

Subject Classification: 68M11, 97R40.

Keywords: *Augmented reality, Disruptions, Metaverse, Opportunities, Virtual reality, Workplace.*

1. Why does everyone wish to be Meta?

The metaverse is defined as “simulation technologies that create physical virtual spaces” [5]. These digital avatars unite for social gatherings, community interests, and educational sharing. The metaverse will be the biggest digital platform revolution of the millennium. In the world of the metaverse, avatars (people) will interact with each other and socialize together so that one cannot tell the discrepancy between a computer-generated and a physical meeting. It is argued that experts added interaction capabilities to models. They can be accessed from gadgets like desktop and laptop computers, mobile apps, smart TVs, virtual reality headsets, and, in the not-too-distant future, architectural spaces that serve as interfaces via panoramic screens or holographic predictions. The metaverse is a collection of virtual worlds that enable new forms of avatar-

^{*} E-mail: sharmila.devi@newinti.edu.my

based communication through large-scale computer networks like the Internet. Digital 3D or 4D spaces make up the metaverse. [24] the topmost reasons to join Metaverse were knowing new things (41%), communicating in new spaces (40%), and optimistic ways to connect with people (38%). Interestingly, the survey also indicated that 23 % wanted to become a different person from their real self [24]. Roblox, an online game platform, that allows users to program their games and play other's programmed games is the world's first closet blueprint to the Metaverse. It became the third highest earning of \$2.29 billion online game of 2020, surpassing PUBG and Horror of Kings [27].

During the COVID-19 pandemic, online gaming services like Roblox became one of the easiest ways to communicate with each other [25], Facebook [28], and blockchain and cryptocurrencies like MetaFI [15]. Upadhyay & Khandelwal, [31] stated that Metaverse can be very useful in creating sensitive scenarios like medical, military training, police, and firefighting training in an immersive virtual environment. The metaverse environment can create virtual teams, opponents, coaches, team players, and even the virtual audience under which players can perform 3D learning and gamification.

2. Members of Metaverse

Metaverse was introduced as a concept by Neal Stephenson in the year 1992 in his science fiction novel "Snow Crash". He was the first to characterize a parallel virtual world that was akin to a physical place. He created an environment where the users could participate in social activities such as shopping, doing business, and socializing with friends and other communities. In 1999, the popular movie "The Matrix" imagined humankind inside a virtual space. However, in terms of technology acceptance and completion, Metaverse proved to be complex and challenging. In 2003, an online interactive program *Second Life* was launched by Philip Rosedale "Linden Lab" where users could create an "avatar" for themselves and then interact, buy, sell, trade, or even rent services or goods with other people by using "Linden dollar" in a three-dimensional online environment. According to him "his vision of establishing virtual worlds in the form of Linden Lab antedates before the introduction of Snow Crash book in his early years at the University of California". Also, in 2006, Roblox, a multiplayer game platform crossed 55 million daily active users. With the historic breakthrough in 2021, Facebook CEO Mark Zuckerberg retitled Facebook to Meta, aiming at investing more than \$10 billion in the Metaverse ecosystem.

Dionisio et al., [5] opinionated “It is an integrated network of 3D virtual worlds”. Ball, [2] understands the concept of metaverse as a digital “jacked-in” internet. The author emphasizes it as a stunning world that remains active even after the user leaves. The metaverse is independent of any physical device, nor maintained by a single supplier; rather it is an independent virtual economy run by digital currencies [7].

Immersive technology refers to a combination of hardware and software elements of a computer that accelerate the five senses of humans in a controlled stimulated environment to generate the sense of physical presence. In the business and commercial world, immersive technology has attracted many industries and is openly adopted by education, healthcare, gaming, manufacturing, and workforce development firms. In terms of social interaction, immersive shopping, virtual meditation, and can provide both pleasurable and utility value.

Milgram, [16] proposed a Reality- Virtually (RV) Continuum, where Mixed Reality (MR) is referred to as the “one in which real and virtual world objects are displayed together within a single display i.e., anywhere between the extremes of the continuum” (p.283).

Extended Reality (XR) is a canopy term that comprises a string of digital space, electronic, hardware, and immersive technologies where data are characterized and estimated. XR includes Augmented Reality (AR), Mixed Reality (MR), and Virtual Reality (VR).

Virtual Reality (VR) is a digitally created environment, where users experience different immersive worlds and respond similarly just like in real surroundings.

Hardware: VR headsets, immersion helmets

3. Research Methodology

Primarily the present paper targets the metaverse concept and its acceptance by various leading firms in different forms to win the war on talent. The review focuses on literature from two sources: those theoretically studying the application of Metaverse in industry and those empirically studying the challenges of

Thirdly those who focused on the impact of using Metaverse technology on human health and climate and others. The insights obtained in this paper can shed light on the actual acceptance of Metaverse and guide future questions. In summary, this research has the following objectives as shown in Table 1.

Table 1
Flow of Paper Identification

Identification	Screening	Eligibility	Exclusion	Inclusion
Identification of previously published papers on WoS, Emerald Insight, Scopus, and Taylor and Francis (n = 1,050)	Screening records after removing duplicates (n = 989)	Full-text open access for eligibility (n =411)	Removing, irrelevant subjects, case studies, articles in the press, and experimental studies (n = 33)	Studies included in the paper (n=13)
Flow of Identification of papers through systematic review as of 9 th October 2022				

Source: Authors' own Compilation

3.1 Research Approach

The systematic review guidelines followed the protocols suggested by "Preferred reporting items for systematic review and meta-analysis" (PRISMA) in mapping and reporting all available studies. The systematic review of the literature was performed in October 2022. The data were collected from Scopus (948), Emerald Insights (93), Taylor and Francis (2), and Web of Sciences (7) databases, inspecting the manuscripts and articles of the last four years (from January 2019 to October 2022), to execute the latest evidence in the proposed field.

3.2 Selection Strategy

In a systematic review, the Population, Intervention, Comparison, and Outcomes (PICOS) and Study Design frameworks are employed to develop literature strategies to ensure bias-free and comprehensive selection. The first stage of Identification: The Keyword "Metaverse" was used on every database in the fields of Social Sciences, Business and Management Administration, Economics and Finance, Health Professionals, and Arts and Humanities. The keywords "Metaverse" (80) are more cited and reference strings on search than "Virtual Reality" (32), "Augmented Reality" (16), "Avatar" (6) and "Extended Reality" (6) shows in Table 2.

Table 2
PICO Strategy

Parameters	Inclusion Criteria	Exclusion Criteria
Population	Any type of Participant	Non-human Participants
Intervention	Any	None
Comparator	Not Applicable	Not Applicable
Outcomes	Opportunities/Prospects and Barriers/Challenges	Any other controlled Outcomes
Study Design	Review and Article	Cases, Empirical, Working Paper, Reports
Restrictions	Language: English Full open-access Manuscript Time: 2019-2022	Full text not available, Abstracts, Duplicates Language: Non-English Time: Before 2019

Source: Authors' own Compilation

4. Literature Review

The review of selected papers is as follows in Table 3.

Table 3
Review of Opportunities, Threats & Focus

Year	Opportunities	Threats	Focus	Referenced Paper
2022	Metaverse in IPRs leads to create new virtual IPRs, NFTs, Trademark, Patents	Disputes over infringements and IPR laws & Norms	Intellectual Property Rights (IPRs)	(Vig, 2022) [32]
2022	It will enable users to achieve higher engagement through avatars, badges, guilds, artificial intelligence, and extended reality	Humans can convert insensitive, disassociate, and idle toward natural emotions. Absence of Digital Confidentiality High restrains on eyes and mind.	Gamification	(Tayal et al., 2022) [26]

Contd...

2022	Rich hybrid formal and informal learning Blended pedagogies help in more social connection	Harmful to physical well-being, loss of privacy, and unauthorized moral and ethical issues	Education	(Mystakidis, 2022) [18]
2022	Opportunity for different learning situations via games, higher creativity, and customization. Language course	The huge size of network traffic, reduced team skills, false eye-blinking systems, High design cost, and time-consuming	Education	(Tlili et al., 2022) [29]
2022	Freedom to use any physical pitcher, Repetitive practice, and learning	Cost of 3D training, hardware, and software	Sports (Baseball training)	(Upadhyay & Khandelwal, 2022) [31]
2022	Creativity, the spectrum of offers, decentralization democratization	Sexual misconduct, virtual sex parties (condos), stalking, harassment, Reputational, and financial risks	Adventure	(Hirsch, 2022) [11]
2022	Technology Improvement, Virtual Collaboration	Trust and Relationship Issues, Social Pressure	Multi-Industry	(Cheng & Zhang, 2022) [4]
2022	Limited distractions, enjoyable and Interesting	Tiredness cybersickness, low resolution, and difficulty connecting to others	Education	(Hines & Netland, 2022) [10]
2022	Help in renovating old tourist destinations, pandemic-type restrictions, less human footprint	Economic burden, tourism-based product, and service	Tourism	(Go & Kang, 2022) [8]
2022	Less training cost, urban services, good education	Fraud, legitimate risk, health, privacy issues, ethical	Multi-industry	(Smaili & de Rancourt-Raymond, 2022) [23]

Contd...

2022	Reduce waste and infrastructure, overcoming social barriers	Energy-intensive, costly, privacy and ethical issues	Urban Sector	(Allam et al., 2022) [1]
2022	Learning opportunities, training, manufacturing, and operational benefits	Security and Threats, sustainable environment, addiction	Multi-industry	(Dwivedi et al., 2022) [6]
2022	Cognitive learners, Instant Feedback, training opportunities	Ethical issues, technological supports, cost, light weighted equipment	Education	(Hwang & Chien, 2022) [12]

Source: Authors' own Compilation

5. Discussion

India -Land of Meta "Creators"

Metaverse is an emerging concept in India, mounted on a series of hardware, software, physical environment, digital content, digital accessories, avatars, digital currencies, 3D models, and virtual services and goods. To build the single virtual universe of 360-degree view, high-speed data transmission and computation administering capabilities as well as storage are required. The advancement of the metaverse is experienced when time and space boundaries are separated. Metaverse ecosystem highly counts on Artificial Intelligence, Blockchain, and Non-Fungible Tokens (NFT). At the first stage of creating a metaverse universe, the space and time of both parallel worlds are matched. In the second stage, users can set up their creative content and build innovative avatars, which are also present in the physical world. At the final stage, a self-sustaining bizarre world is developed that incarnates the actual world into itself. This is the stage where the unification of real and virtual worlds can be experienced.

The collective influences of the COVID-19 pandemic, social distancing, digital transactions and payments, Web 3.0, blockchain technology, remote working, the dissemination of the internet and smartphones, and smart cities have given the way to pioneered metaverse industry. Industries like education, music, fashion, sports, transportation, gaming, and e-commerce expanding their users by adopting metaverse-based marketing and introducing game-based brands. Generation Z extensively used AI-based

devices like voice assistants, smartwatches, and stand-alone speakers to execute everyday jobs effortlessly [17].

As per the survey conducted by Ipsos in 29 different countries, in India, more than 70 percent of adults believe that by the next 10 years, the metaverse will be the way we use gaming, tourism, entertainment, and socialization. According to CB Insights, the metaverse industry could reach US\$ 1 trillion by the end of 2030. As per Fortune India "Indian Metaverse economy is projected to touch \$100 billion by 2025" [22]. The Table 2. List of industries releasing and introducing Metaverse in India [Table 4.]. The year 2020, India's Republic Day boarded with the theme "Vedas to Metaverse: National Policy on Education 2020" under the leadership of the Union Ministry of Education.

Table 4
List of Meta-India

Meta-India	Creators
"LOKA" (2020)	India's first Multiplayer gamified usings #D maps and virtual spaces
"NextMeet" (2020)	India's first virtual conference and networking in a 3D environment
"OneRare" (2021)	India's first food metaverse game where users can claim for favorite dishes by earning game levels.
"Zippy" (2021)	India's first Meta Marathon where users can run long within cities, jungles, and beaches
"How Far Will You Go to Make Them Blush" (2022)	Ogilvy and Mondelez launched India's first-ever Metaverse Valentine Dinner Date
TardiVerse (2022)	India's first Wedding reception was held by a couple from Tamil Nadu to cope with COVID-19 restrictions and in memory of their Late father-in-law.
"Bollyverse" (2022)	In the entertainment industry, the country's first Meta platform where users can write, act, play, and hire actors to run their own stories and characters.
"Rivaahverse" (2022)	Tanishq presented the first virtual press conference for their viewers to show a highly immersive and 3D virtual experience
CEAT Shoppe (2022)	Ceat Limited offers a 3D view of the tire, order, and delivery of the tire with a more immersive idea of size and capacity

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Wargame Research and Development Centre (WARDEC)	Indian Army's first simulation-based training on metaverse platform to develop skills on realistic battlefield to soldiers in collaboration with Tech Mahindra and Rashtriya Raksha University
"Kiyaverse" (2022)	Kiya.ai launched India's first-ever banking and serving financial solutions
Partynite Metaplex (2022)	Airtel introduces India's first Metaverse Multiplex offering live movies, music, sports, and events
Da One Sports (2022)	India's first sports city to experience sports games, gym, cafes, 3D running tracks, sports library, and cricket stadium World in One Metaverse (or WIOM) (July 2022) and Bliv. Club by Shikhar Dhawan
Uni-Verse (2022)	In collaboration with Union Bank of India and Tech Mahindra, to explore banking products and services, India's first PSU lounge to catalyst customer readiness
Altyug (2022)	Wiztales launches India's first e-commerce and events metaverse platform for shopping, interactions, and organized events
Flipverse (2022)	e-commerce company Flipkart announced its first Metaverse shopping experience with the help of 3D virtual reality through a smartphone
"SquareYards (2022)	India's first real estate platform to sell, buy, rent, and manage property on Metaverse.

Source: Compiled by author

Global-Metaverse Goals

In 2021, social media giant player Mr. Mark Zuckerberg rebranded his establishment from Facebook to Meta to emphasize the 'metaverse' virtual-reality vision. Umar, [30] projected 17 Meta-Sustainable Development Goals (SDGs) that can accelerate education, climate control, health, energy, women empowerment, and many other aspects of SDGs. Metaverse emerges as a catalyst for SDGs, provides a virtual environment and immersive experience that contributes more quality education (SDG 4), reduced inequality (SDG 11), decent work and economic (SDG 8), and climate change (SDG 13) [21]. The application of the metaverse in developing smart cities is an innovative application worldwide. The South Korean, city 'Seoul' was the first in the world to come forward with "Seoul Vision 2030" offering various services like education, taxation, communication, culture, and urban development. With a huge gaming market, the Chinese government plans to use metaverse technology to achieve breakthroughs in industrial meta-universe worth US\$52 billion by

2025. Japan launched 'Metaverse Economic Zones' or "MEZs" which were specifically designed to facilitate economic innovation.

Worldwide, Metaverse technology supports healthcare infrastructure and enhances opportunities to serve as the care delivery between an actual patient and a remote medical surgeon. For instance, Mystakidis [19] pointed out that excessive eye contact at audio-video conferences upsurges cognitive load and constraints on physical movement. Metaverse can benefit from such 'Zoom Fatigue' with the likelihood of less exhausting and realistic interactions [19]. To preserve and celebrate its long history and heritage, the Saudi Arabian government laid the 'Cultural Universe' platform which is free to use and can be accessed on any digital device. In a similar project, the UK Government has sanctioned £ 5.6 m to Scotland Museum to enhance the visitor experience. Indeed, these metaverse goals open access to humanity from many countries and regions.

6. Conclusion

Metaverse technology is expanding in numerous businesses to create a new world order. Metaverse is a 3D-based virtual reality in which varied economic activities are performed through avatars [13]. Experts say that it is "a world in which both reality and virtual world interact and co-evolve to create common value" [14]. The metaverse is an intact biome of virtual and physical space. Further Lee & Kim, [14] supported that Metaverse completed in three stages, namely (1) physical space and virtual models are created and developed synchronously; (2) Innovate and design of own digital avatars with the know-how of expertise in technology (3) co-life of both the worlds as a single boundaryless environment. Apparently in India, Metaverse is in its formative stage, where an online platform is used as a gateway to revive trade, attract zero-generation students, generate commerce, and engage social gatherings which have been undesirably affected by the lockdown and multiple COVID-19 waves. The embracing of technology like AI impacts the business in decision-making [20], marketing events [9], and micro-targeting [3] which can increase customer engagement.

However, new ventures, institutions, and industries may be prone to challenges related to work as Meta such as data security and privacy. The prime challenge is protecting the contents from any destructive act. The directive of laws related to Metaverse is crucially mandatory [9]. Furthermore, the challenges are not only limited to security risks but also

highly cost-oriented and expensive. The Indian government should vigorously address the balance solutions that reach the world equally.

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