

THE BUSINESS DIMENSION OF METAVERSE

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Purpose: This paper aims to identify the key business opportunities and potential threats to companies that arise as Metaverse-like platforms develop. The focus is on companies which can use the functionalities Metaverse offers and on the fact that their customers may soon be spending their time there in great numbers.

Design/methodology/approach: From a company perspective, the purposes set out in this paper are pursued under strategic analysis. In this context, SWOT analysis comes as an appropriate method. This paper does not pertain to a specific company or industry; therefore, the analysis will be confined to Opportunities and Threats that are, in essence, independent of the business sector and concern Metaverse's impact on the business world. The source materials for the said analysis derive from the latest research literature and reports of consulting companies.

Findings: This paper identifies the fundamental business opportunities in the context of the envisaged Metaverse development. They were confronted with issues and risks associated with the practical development and use of such platforms.

Research limitations/implications: Metaverse is in its initial development phase; therefore, the identification of opportunities and threats is tentative and it should be revised as the technology progresses and the practical solutions become established. Moreover, the analysis in question is based on the projected development of Metaverse, hence the ensuing conclusions should be approached with caution.

Practical implications: This paper provides a list of the fundamental business opportunities and threats which should be taken into account by companies devising their strategy concerning the use of Metaverse platforms.

Social implications: The pertinent threats fundamentally affect the situation of the society in the digital world. Hence, it is too important to be aware of the threats, pursue appropriate policies of privacy, ethical business, social responsibility, and finally to adopt relevant legal regulations on the state level.

Originality/value: One of the first research papers discussing the business potential and threats surrounding the development of Metaverse.

Keywords: Metaverse, E-commerce, Digital Transformation, Virtual World.

Category of the paper: General review.

1. Introduction

Metaverse became pronounced in public communication in the autumn of 2021 when Mark Zuckerberg announced a strategic shift in Facebook's development directions (Enter, 2023). This subject is far more serious than just being a remedy to salvage a digital giant. Market estimates show that the potential economic value generated by Metaverse-linked products and services will reach USD 5 trillion (10^{12}) in 2030, half of which will relate to e-commerce in the broad sense (McKinsey, 2022). This envisaged business potential implies immense interest on the part of business leaders and investors. As early as in 2022, the scale of investment reached USD 120 billion and it concerns both the digital market giants (Meta, Microsoft, Apple, Alphabet, etc.), venture capital funds (Andreessen Horowitz, Coatue, Soft Bank, etc.) as well as big corporations (Disney, Lego, Nvidia, etc.).

The concept of Metaverse was first articulated in sci-fi literature, in a book by Neal Stephenson, as a portmanteau of "meta" and "universe" (Stephenson, 1992). Ten years later, the virtual world platform Second Life was often described as the first metaverse. In the context of initial inspirations, it is also worth going back to a book entitled *Ready Player One* which is a 2011 science fiction novel, and the debut of Ernest Cline (2011). The book was a basis for an influential film of the same title which hit the cinema screens in 2018 and inspired many entrepreneurs who thought about creating a Metaverse in practice.

According to McKinsey (2022, p. 11) the metaverse should have three features: a sense of immersion, real-time interactivity and user agency. Additionally the full vision of the metaverse will also include the following: interoperability¹ across platforms and devices, concurrency with thousands of people interacting simultaneously and use cases spanning human activity well beyond gaming. From the technological point of view this concept is defined by (Lee et al., 2021, p. 1): we consider the metaverse as a virtual environment blending physical and digital, facilitated by the convergence between the Internet and Web technologies, and Extended Reality (XR). According to Milgram (Milgram et al., 1995) Extended Reality integrates digital and physical continuum to various degrees, e.g., augmented reality (AR), mixed reality (MR), and virtual reality (VR). It should be noted in the context of the latter definition that the understanding of the Metaverse concept should not be reduced to the mere use of VR headsets. Construing the concept as only regarding computer games is yet another misunderstanding. The success of such gaming platforms as Fortnite leads to Metaverse being quite naturally identified with them. That is, however, grossly oversimplified. Finally, the last myth is identifying Metaverse with Web3.

Web3 might potentially contribute to the Metaverse by espousing decentralization and potential interoperability. Being more specific: community governance through a foundation decentralized autonomous organization (DAO), digital assets that could be potentially owned

¹ Interoperability is a characteristic of a product or system to work with other products or systems.

through non-fungible tokens (NFT), and payments by cryptocurrencies and tokens. Milieus associated with blockchain and decentralized finance (DeFi) lobby extensively in favor of identifying Metaverse with Web3. However, it needs to be clearly emphasized that it is by all means possible to build Metaverse as a centralized platform with no touch of blockchain whatsoever. This strategic choice of a system managing Metaverse is absolutely critical to the future of this technological innovation. For now, it has not been resolved which approach (centralized vs. dispersed) will be commonly adopted. It seems reasonable to claim that the development of Metaverse will be subject to network effects, which will be briefly referred to in the conclusion to this paper.

This paper takes on the perspective of a company which, in the context of its strategic development, recognizes the topical technological trends. Thus, it was assumed that Metaverse will most likely reach its full functionality potential within the forthcoming 10-20 years. Therefore, instead of pondering over technological and business models of such platforms, we will turn to their impact on the development of companies planning to grow in the digital economy ecosystem. In this context, the SWOT analysis comes as an appropriate tool for company strategic analysis. SWOT analysis is a technique used to help a organization identify Strengths, Weaknesses, Opportunities, and Threats related to business competition or challenges in micro/macro environment. This situational assessment approach was firstly described at Harvard Business School (Christensen, 1965), and then extended with detailed procedure for doing a SWOT assessment by Kaplan and Norton (2008). This paper is not business sector/division specific, that is why SWOT analysis is restricted to Opportunities and Threats, which is basically domain independent.

Later in the paper, a brief review of related work will be made. Further, a range of business opportunities related to the emergence of Metaverse will be discussed with finance services as a representative example. The next chapter provides an overview of threats and technical issues. The paper ends with conclusions and summary.

2. Related Work

The concept of Metaverse has become immensely popular. In the last two years, more than 1100 peer-reviewed scientific papers were published on this topic (Google 2023). A very good, holistic approach to the subject is presented in a paper written by Lik-Hang Lee (Lee et al., 2021). A paper by Park and Kim, in turn, provides an incredibly in-depth analysis and a meticulous review of the literature (Park, Kim, 2022). In terms of the business potential and applications, a vast report by McKinsey (2022) comes as noteworthy. For at least two decades have been done a lot of research on technical architecture for virtual worlds in order to resolve scalability issues in the metaverse, such as balancing the workload for reduced response time

in multiplayer online games (Marzolla et al., 2012), or for unsupervised conversion of 3D models between the metaverse and real-world environments (Terrace et al., 2012). Important research field is user interaction across the physical and virtual environments. For instance an interaction technique for users to make high-fiving gestures being synchronized in both physical and virtual environments (Young et al., 2015). Another approach is proposed by Vernaza et al. which is an interactive system solution for connecting the metaverse and real-world environments through smart wearables (Vernaza et al., 2012). Metaverse development topic such are ubiquity, interoperability, scalability are described deeply by Dioniso (Dioniso et al., 2013). Finally it is worth mentioned the achievement in artificial moral agents (Zoshak, Dew, 2021).

3. Business Opportunities

3.1. General overview

In order to properly identify the impact of Metaverse on business development, the areas of human activity which will most likely fall within its functionality area should be defined. According to the report by McKinsey (2022, p. 24), such highly probable areas of activity are the following:

- Gaming, that actually has been driving the development of the metaverse.
- Socializing extends existing consumer behavior through platforms.
- Fitness which often marries gaming and connectivity.
- Remote learning remotely groups individuals in virtual classrooms.

Today virtual worlds, most of which are focused on gaming or social. In the near future there will be at least three business approaches that will populate the metaverse: first-party content, developer content, and user-generated or creator content. Brands are also likely to become creators and participate probably in a very different way from traditional advertising models. Obviously, in this way it is possible to define such industries as gaming or education which will determine the growth of Metaverse and, at the same time, benefit from the advancement of this technology. In turn, it is also possible to identify solutions for the improvement of business processes in other industries which will use Metaverse as a platform supporting their business activity or a place where their customers will be active. From this perspective, the following areas of application can be named:

- **E-commerce:** It creates an ecosystem for sales real and virtual goods and/or services. Table 1 presents the most popular examples product or services based on the extensive survey. It is well worth to distinguished two important dimension of Metaverse e-commerce:

- **Virtual product trading:** in the context of Web3 it might be considered using of trading platforms for cryptocurrencies and in some cases NFTs, such as OpenSea.
- **Virtual goods interoperability:** potential great opportunity of metaverse commerce might be an interoperability: users' feasibility to carry their possessions across different virtual worlds. Users can move around numerous virtual worlds to gain different immersive experiences as they desire.
- **Digital twins:** Digital representation of an intended or actual real-world objects that serves as the effectively indistinguishable digital counterpart of it for practical purposes. It might applied for:
 - **Human being:** Digital avatar related to specific person, which might be controlled remotely in the real time. For instance during participation in online meetings. It will be also possible to operate by a such avatar autonomously and being involved in interactions with others using large language models like for instance ChatGPT (Nvidia, 2023).
 - **Physical items:** Such as BMW's effort to build a digital factory twin on Nvidia Omniverse (Caulfield, 2021) which is expected to drive efficiency improvements across its supply chain. By building virtual replicas of physical settings and objects that generate data in real-time, far richer analyses can be generated than previously to enable improved decision making.
- **Remote work and collaboration:** In order to supplement the sense of space lacking in online solutions in B2B solutions and conferences, some companies introduced and supplemented the offline concept. In this way, the sound occurring in the office and physical elements (e.g., desks and conference rooms) is given a sense of space (Park, Kim, 2022). This potential due to an incremental improvement from 2-D screens to an immersive 3-D space as online meetings in the metaverse further enable remote work and potentially diminish the need for co-locating.
- **Learning and development:** Simulations of real-life settings and situations will allow for a far more captivating learning process, opening possibilities both in onboarding new colleagues and developing current personnel, which is increasingly important for organizations competing for talent on a global scale.
- **Product marketing:** Coca-Cola launched digital assets to support several marketing campaigns, such as auctioning NFT collectibles for International Friendship Day (Coca-Cola, 2023).
- **Customer engagement:** Gucci launched its Gucci Garden on Roblox, a set of brand-themed rooms that aligned with the launch of a similar physical space (McDowell, 2021).

- **Customer service:** Helpshift is rolling out solutions for customer-support tools in the metaverse, including user feedback, virtual identity verification, and VR support (Helpshift, 2023).
- **Recruiting:** The Havas Group launched a village within The Sandbox that hosts recruitment services for improved candidate and onboarding experiences (Gessa, Moriconi, 2022).
- **Simulation:** Actually the Metaverse might be applied as a simulation tool to predict the future business models. Based on that companies might see their differences from offline world and other social media and then utilize properly their potential (Kaplan, Haenlein, 2009).

Table 1.*Products/services bought in the Metaverse*

Product/Service	Contribution [%]
In-game purchases	47
Virtual cosmetic items	37
Real-word items	33
Nonfungible Token	20
Virtual real estate	13
Others	21

Those results are based on survey with an answer for the question: “When you are participating in activities in the metaverse, have you purchased any of the following products/services in past 12 months?”. Number of participants = 2,093.

Source: Intelli Metaverse Consumer Survey in Europe, the Middle East, and Asia (EMEA) and Asia–Pacif (APAC), Remesh Next Gen Consumer, Metaverse Survey in United States, 2021.

3.2. Finance industry as an example

In order to provide more detailed description let us focus on financial services as a representative example. First real live applications are as follows (McKinsey, 2022, p. 45):

- employee training, for example, Bank of America VR training (Bank of America, 2021),
- creating virtual “financial towns,” telecommuting centers, and interaction spaces such as South Korea’s KB Kookmin Bank (Zealelem, 2021),
- offering virtual investment advisory services (Park, 2022).

There is no shortage of financial services companies exploring the utility of the latest evolution of the metaverse. As its function transitions from primarily consumer entertainment to more commercial applications—and from niche social interactions to become a social network—the opportunities for the sector will only expand, including the following examples (McKinsey, 2022, p. 45):

- **Marketing:** Institutions may create digital branches in the metaverse to build their brand and credibility with users, demonstrate their ability to innovate, and even offer client interactions in a hybrid way with more traditional digital or even physical channels.

- **Infrastructure:** Financial institutions, especially more traditional ones, are uniquely positioned to bridge the trust gap that has traditionally held back wider adoption of services such as digital IDs, digital payments, or custody for NFTs, cryptocurrencies, or other digital assets.
- **Emerging products and services:** As cyber insurance for companies and similar services become more commonplace, insurers and cybersecurity companies are well positioned to capture parts of this emerging value pool, maybe even in novel collaboration and models.

As the metaverse potentially captures a larger share of day-to-day human interactions, digital versions of more sophisticated banking services could emerge to serve these users. Examples could include:

- Embedded bank-like services for wallet owners in native metaverse venues, such as multicurrency cash management.
- Back-end servicing for financial services, like virtual real-estate mortgage origination and warehousing.
- Funds and investing services for metaverse projects, such as metaverse-specific investment funds.
- Customer engagement enhancements, like gamified credit education and unique loyalty experiences.
- Financialization of everything, as more digital assets get created with utility in a metaverse context, such as being employed as collateral for loans

Growth in these use cases will depend on the extent to which the metaverse is adopted. And the value and convenience of financial services in the metaverse must exceed the current utility of online or bricks- and-mortar servicing. If engagement in the metaverse gains momentum, more and more financial service companies will need to decide between investing and entering at scale, establishing a minimal position, or doing nothing for now.

4. Technical Problems and Threads

4.1. Technical Issues

Overall, a technological dimension and an ecosystem can be distinguished in Metaverse. The technological dimension chiefly pertains to underpinning technologies: hardware, network, cloud, and edge computing, as well as application technologies, i.e., computer vision, artificial intelligence, IoT, etc. The ecosystem is made up of such phenomena as avatar concept, virtual economy, content creation, social acceptability, trust, security and privacy. Figure 1 comprehensively illustrates both dimensions of Metaverse. This subchapter focuses on

technology-related problems, whereas the next subchapter addresses the threats and risks within the ecosystem.

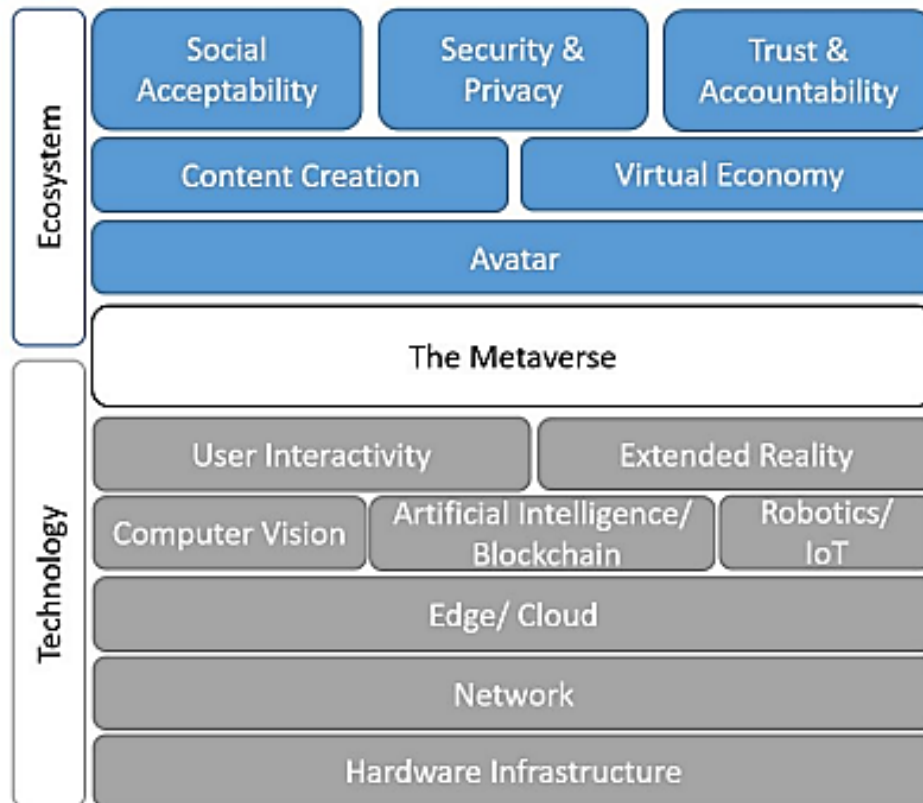


Figure 1. Technology and ecosystem of the Metaverse.

Source: Lee et al., 2021.

The fundamental technical threats and problems in Metaverse development are (McKinsey, 2022; Lee et al., 2021):

- **Hardware infrastructure.** Limits of concurrency today cap the few number of users. In a fully realized metaverse, many more users will need to be able to be online at once. In addition, low-quality rendering devices without graphics processing units (such as smartphones) cannot present the photorealistic environments required to drive immersion. Metaverse environments need to deliver real-time 3-D experiences at scale to millions of individuals.
- **Network throughput.** The metaverse will require massive amounts of bandwidth to transmit very high resolution content in real-time. Many interactive applications consider the motion-to-photon latency, that is the delay between an action by the user and its impact on-screen (Zhao et al., 2017), as one of the primary drivers of user experience. The throughput needs of future multimedia applications are increasing exponentially. The increased capabilities of 5G have opened the door to a multitude of applications relying on the real-time transmission of large amounts of data (AR/VR, cloud gaming, connected vehicles).

- **Network latency.** The most crucial issue is a high-latency “lagging” creates a sensation of video and/or audio being slow when using applications that require a high rate of frames-per-second. Latency is generally seen as the hard problem in delivering these immersive and interactive experiences. Additionally, these experiences will require computational efficiency to improve by two to three orders of magnitude, along with innovation across devices, edge computing, and cloud capabilities. As such, reducing latency is critical for the metaverse, especially in scenarios where real-time data processing is demanded, e.g., real-time AR interaction with the physical world such as AR surgeries (Rhienmora et al., 2010).
- **Interface interactivity devices.** Metaverse access today is primarily through flat screens: televisions, computers (PCs and laptops), and smartphones. But the real challenge is with transitioning to AR/VR and eventually extended reality (XR), and this is exactly the Meta Inc. approach based on the Oculus Quest which is a virtual reality headset (Meta Quest, 2023).

4.2. Ethical Threads

The envisaged development of Metaverse implies a number of ethical related issues. The simulation of a virtual world in real time will most likely completely delude the users into being inside a physical world, with them losing the ability to perceive actually crossing the demarcation line with the physical world. This could mean numerous addictions on a scale only comparable to drug use. Such a pathology can lead to entire societies ending up enslaved. It is an area which largely goes beyond the thrust of this paper; therefore, the focus is on three issues that have already been well examined and have a solid foundation in the research literature:

- Privacy and security are critical issues because Metaverse collects data on behavior that is more detailed than user conversations and internet history. In addition, surveillance actions (e.g., inappropriate chat room surveillance, censorship, and follow-up review) due to the surge in users suggest that organizations that play the same role as police and government are needed in the real world (Park, Kim, 2022). Researchers have already provided their insights on the economics of privacy (Acquisti et al., 2016), and the design for an efficient market for privacy trading (Pal et al., 2020).
- Excessive use with digital environments (i.e., user addictions) would be an important issue when the metaverse becomes the most prevalent venue for people to spend their time in the virtual worlds. In the worst scenario, users may leverage the metaverse to help them ‘escaping’ from the real world, i.e., escapism (Holsapple, Wu, 2007). Prior works have found shreds of evidence of addictions to various virtual cyberspaces or digital platforms such as smartphones (Lanette et al., 2018), VR (Rajan et al., 2018), AR (Ertel et al., 2017), and so on. User addictions to cyberspaces could lead to psychological issues and mental disorders, such as depression, loneliness, as well as user aggression (Jeong et al., 2015).

- Cyberbullying refers to the misbehaviors such as sending, posting, or sharing negative, harmful, false, or malevolent content about victims in cyberspaces, which frequently occurs on social networks (Chatzakou et al., 2019). We also view the metaverse as gigantic cyberspace. As such, another unignorable social threat to the ecosystem could be cyberbullying in the metaverse. Moreover, considering the huge numbers of virtual worlds, the metaverse would utilize cyberbullying detection approaches are driven by algorithms (Yan et al., 2021).

5. Final conclusions

This paper discusses the phenomenon of Metaverse from the perspective of company strategic analysis. It should be stressed that abandoning the platform is also a strategic decision. It seems that most companies will be closely following the development of Metaverse and making decisions to join it depending on how it grows and whether their customers show interest for it. It is a reasonable approach given the immense technological problems and high costs, of both maintaining Metaverse, as well as being within it. It should be noted that the economy of developing such platforms bears on the already mentioned network effects. Direct network effects arise when a given user's utility increases with the number of other users of the same technology. Finally a limited number of multiple equilibria or a market monopoly are two key potential outcomes in markets that exhibit network effects. What will actually happened will be clear in the nearest decade.

It is worth emphasizing the great significance this technology will have for the society, the economy and the environment. In this context, the ethical dimension and the legal environment are crucial. It follows that it is necessary to professionally examine the technology – not only in the traditional sense, as an early warning system for risk and threats, but also as an interdisciplinary diagnosis of opportunities and potential of new technologies based on the participation approach (Stankiewicz, 2010). What arises is a natural problem of constructing a proper economic and legal ecosystem which was formulated by David Collingridge (1980)².

Thus, the scale of challenges associated with a potential development of Metaverse is enormous. We are convinced that the impact on human psyche, behaviors and the development of societies will be far more important than the business context discussed in this paper.

² The Collingridge dilemma is a methodological quandary in which efforts to influence or control the further development of technology face two problems. Firstly an information problem: impacts cannot be easily predicted until the technology is extensively developed and widely used. Secondly a power problem: control or change is difficult when the technology has become entrenched.

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