MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
UKRAINIAN-AMERICAN CONCORDIA UNIVERSITY

Faculty of Management and Business
Department of International Economic Relations, Business & Management

Bachelor's Qualification Work

"METAVERSE IN INTERNATIONAL ECONOMIC RELATIONS"
(based on GmbH (Ltd) "Block Consult" case)

Bachelor student of the 4th year study
Field of Study 29 – International Economic Relations
Specialty 292 – International Economic Relations
Educational program – International Economic Relations

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Research supervisor **Buriak G.S**.
Ph.D. of Economics

Kyiv – 2024

Abstract

This thesis explores the role of the Metaverse in shaping international economic relations, with a particular focus on the Swiss consulting firm GmbH (Ltd) "Block Consult." It delves into how digitalization within the Metaverse influences business operations, marketing strategies, and management across borders. The study provides a comprehensive analysis of the theoretical underpinnings and practical applications of business development within the Metaverse framework. Through the case study of "Block Consult," it examines the integration of blockchain technology and the Metaverse in enhancing the firm's financial performance and international competitiveness. Furthermore, the research includes a public opinion survey to understand perceptions and attitudes toward the Metaverse, synthesizing these findings to offer actionable recommendations for businesses aiming to succeed in the digital landscape. The thesis highlights the transformative potential of the Metaverse to facilitate innovative international business practices, promote global market expansion, and redefine competitive dynamics in the digital era. Recommendations are provided for leveraging Metaverse capabilities to reshape modern business environments effectively.

Keywords: Metaverse, international economic relations, digitalization, "Block Consult", blockchain technology, business development strategies.

Анотація

У цій дипломній роботі досліджується роль метавсесвіту у формуванні міжнародних економічних відносин, з особливим акцентом на швейцарській консалтинговій фірмі GmbH (ТОВ) "Блок Консалт". Вона заглиблюється в те, як діджиталізація в метавсесвіті впливає на бізнес-операції, маркетингові стратегії та управління через кордони. Дослідження містить всебічний аналіз теоретичних матеріалів і практичного застосування розвитку бізнесу в рамках Метавсесвіту. На прикладі компанії "Block Consult" досліджується інтеграція технології блокчейн і Метамережі для покращення фінансових показників фірми та її міжнародної конкурентоспроможності. Крім того, дослідження включає опитування громадської думки для розуміння сприйняття і ставлення до метамережі, а також синтез цих висновків, щоб запропонувати практичні рекомендації для бізнесу, який прагне досягти успіху в цифровому ландшафті. У тезах підкреслюється трансформаційний потенціал метавсесвіту для сприяння інноваційним міжнародним бізнес-практикам, розширення глобального ринку та переосмислення конкурентної динаміки в цифрову епоху. Надано рекомендації щодо ефективного використання можливостей Метамережі для реформування сучасного бізнес-середовища.

Ключові слова: Метаверс, міжнародні економічні відносини, діджиталізація, "Блок Консалт", технологія блокчейн, стратегії розвитку бізнесу.

PHEE-institute «Ukrainian-American Concordia University»

Faculty of Management and Business
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Educational level: **Bachelor degree**
Specialty **292 "International Economic Relations"**
Educational program **"International Economic Relations"**

APPROVED
Head of Department _____

Prof. Zharova L.V.
"___" _____ 20___

TASK

FOR BACHELOR'S QUALIFICATION WORK OF STUDENT
Alisa Novak
(Name, Surname)

1. Topic of the bachelor's qualification work

Metaverse in international economic relations" (based on GmbH (Ltd) "Block Consult" case)

Supervisor of the bachelor's qualification work **Buriak Glib, PhD in Economics,**
(surname, name, degree, academic rank)
Which approved by Order of University from ***"25" September 2023*** № 25-09/2023-4к
2. Deadline for bachelor's qualification work submission "***25" April 2024.***
3. Data-out to the bachelor's qualification work
The materials are derived from an internship carried out in collaboration with company officials, as well as data obtained from public internet sources including articles and reports of international organisations and the official financial and economic reports of the enterprise.
4. Contents of the explanatory note (list of issues to be developed)
The Bachelor qualification work provides the necessary theoretical framework for understanding the concept of the Metaverse, blockchain, DeFi (decentralized Finance), and NFTs (non-fungible tokens), and establishing research goals. The work deals with definitions, specifications, and major areas of usage of these technologies in virtual environments and digital economies. There is also a focus on the connection point that exists between virtual economies of the Metaverse and international trade; to research the empirical methods of analysing statistical data of the elements of the Metaverse, based on the case study of "Block Consult" GmbH (Ltd).

5. List of graphic material (with exact indication of any mandatory drawings)
Graphs and figures for a detailed analysis of statistical data*; *visualisation of mechanisms of development and blockchain integration.
6. Date of issue of the assignment
Time Schedule

№	The title of the parts of the qualification paper (work)	Deadlines	Notes
1.	I part of bachelor thesis	*10.12.2023*	
2.	II part of bachelor thesis	*27.02.2024*	
3.	Introduction, conclusions, summary	*25.04.2024*	
4.	Pre-defense of the thesis	*30.04.2024*	

Student _____
(signature)
Supervisor _____
(signature)

Conclusions (*general description of the work; participation in scientific conferences/ prepared scientific article; what grade does the student deserve*):

Throughout the entirety of her bachelor qualification work, Alisa has consistently displayed an unwavering commitment and tireless work ethic. She has diligently met every deadline and consistently put forth a remarkable amount of effort at every stage of the process. Alisa's dedication to academic excellence and professional development has been evident throughout the whole journey. Through her internship experience, she has honed her skills in statistical analysis and gained valuable insights. Alisa has effectively demonstrated the practical implementation of theoretical concepts in her BQW from the experience acquired at Block Consult GmbH (Ltd). Alisa's exceptional capacity to analyse intricate economic connections and recognise significant patterns and trends is evident in her focus on the Metaverse, particularly in the framework of international ecnomic relations. In summary, her BQW demonstrate adeptness in critically evaluating of the complexity of economic relationships and international trade. With great potential and a promising outlook, there is a possibility for achieving an outstanding rating upon successful completion.
defense.

Supervisor _____
(signature)

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INTRODUCTION

During the last few years, the world has experienced a series of economic evolutions caused by the integration of technology, political decisions, and global realities. These alterations have had serious implications on cross-border economic relations, thus altering trends in trade, investment, and cooperation between nations. In addition, they have led governments to introduce measures that have never been seen before on this scale. These measures were taken on both levels of fiscal and monetary policies. That is why the implementation of beforementioned represents a radical change in economic policies and priorities. At the same time, as geopolitical tensions and trade disputes have deepened further into international economic relations, they have also become more complicated. Moreover, increasing protectionism and nationalism in some countries have imposed threats to the principles of free trade and multilateral cooperation. Thus, this trend toward protectionism has increased uncertainty as well as decreased predictability regarding global trade flows.

There has been a COVID-19 pandemic while this is happening, the impact has been to speed up the existing patterns and bring an entirely new view into the global economic landscape. The pandemic underscores the interconnection of world economies, as well as their weaknesses vis-à-vis global supply chains, through direct and indirect communication processes between firms. It should also be noted that digitalization happened very fast during the pandemic, which creates a wider potential zone for cyberattacks. Phishing scams, malware attacks, and data breaches targeting remote workers have become more prevalent. Ensuring robust cybersecurity measures and raising awareness about cyber threats became imperative.

Digital technology has been cited as one of the highly notable breakthroughs in the global economy. The introduction and adoption of artificial intelligence, automation, and data analytics into business processes have redefined industry setups, product development, and delivery approaches resulting in higher productivity and efficiency levels. However, at present, these tools are already forming a new concept because today, technologies and finance intersect in the digital world, offering almost

unlimited possibilities to create such non-trivial innovations as virtual reality that would provide new means of human communication.

So, it is understandable that the modern business environment has combined aspects of traditional international economic relations with the utilization of advanced technology. One such element is a concept known as the metaverse. In exploring the realm of virtual universes, many disciplines such as technology, sociology, economics, and cultural studies have ventured into this realm of study to understand and explore it. Even though Neal Stephenson coined the term in his science fiction “Snow Crash” published in 1992, that novel spread the message about a virtual space as numerous scientists and thinkers were already developing it.

Jaron Lanier, a computer scientist, and composer is a well-known scientist known to have produced much literature on the subject of the metaverse. Coined the term “virtual reality,” Lanier’s advocacy for virtual worlds’ transformative effects on society and human interaction has been widely noted. His books “You are not a gadget” and “The dawn of everything new: Encounters with reality and virtual reality” delve into the issues of the metaverse in its philosophical, cultural, and economic aspects.

Also, scientific publications, conferences, and interdisciplinary projects including computer science and human-computer interaction as well as digital sociology branches of learning facilitate a greater understanding of virtual universes. Pioneering work in this research field has been carried out by MIT’s Media Lab, Stanford University’s Virtual Human Interaction Laboratory, and the Virtual Worlds Association.

In addition to these recent developments of virtual reality, augmented reality, and blockchain, the study of virtual worlds has gained more speed. Organizations like corporations, think tanks, and industry alliances are continuously researching the technological, economic, and social aspects of virtual realities with their consequences on diverse industrial sectors.

The thesis has been outlined in the chapters in the following order: outline of the concept of the Metaverse as an element of international economic relations, the study of GmbH (Ltd) “Block Consult” and its competitiveness on the market, and consideration of ways of business development and enhancement in the framework of

rapid technological development. The first section provides the necessary theoretical framework for understanding the concept of the Metaverse, blockchain, DeFi (decentralized Finance), and NFTs (non-fungible tokens). Theories of critical concepts pertaining to the Metaverse, blockchain technology, decentralized finance (DeFi), and non-fungible tokens (NFTs) are discussed in this section. The section deals with definitions, specifications, and major areas of usage of these technologies in virtual environments and digital economies. There is also a focus on the connection point that exists between virtual economies of the Metaverse and international trade. It's looking at how virtual assets, digital currencies, and decentralized platforms contribute to border transactions, trade deals, and economic coordination in virtual environments. In addition, the discussion emphasizes how virtual economies bring together the Metaverse with old traditional international networks for trade. In the present work, it evaluates Metaverse-related regulatory challenges, jurisdictional issues, and compliance requirements that go along with virtual assets, digital transactions, and online interactions in virtual environments. Moreover, the paper delves into an analysis of how taxation and legal frameworks may shape and govern the development and regulation of the Metaverse ecosystem.

In the present work, it evaluates Metaverse-related regulatory challenges, jurisdictional issues, and compliance requirements that go along with virtual assets, digital transactions, and online interactions in virtual environments. The other subchapter examines the security threats that might arise during operations in a metaverse, while another chapter details strategies to build a malware-free virtual world. The research goes further to examine data breaches, identity theft, and cyber-crimes that occur in the metaverse, along with possible technological solutions, regulatory measures, and user awareness campaigns for fostering cybersecurity resilience in virtual environments. The second section provides a recollection of the internship experience at GmbH (Ltd) "Block Consult and offers a detailed analysis of the company's economic state and competitiveness on the market. The third section gathers all the previous data and analysis to establish ways of business development within the Metaverse, economic renovation, and enhancement, as well as establishes the understanding of the virtual reality in the public eye.

The purpose of this bachelor's thesis is to investigate the metaverse as an innovative idea with potentially profound influences on international economic cooperation, using Block Consult GmbH as a case study. Moreover, this paper will utilize the research information and consider some possible developments and improvements in the metaverse by carrying out a comprehensive analysis and survey of the public's opinions on the concept of the metaverse and suggesting recommendations.

Tasks:

1. **Theoretical analysis of business developments within the Metaverse:**
- Examine methods and strategies for business development within the framework of the virtual reality.
- Analyse theoretical perspectives on how digitalization influences various aspects of business operations, including marketing, operations, and management.

2. **Application of theoretical insights to international economic relations:**
- Investigate the potential effects of the Metaverse integration on international business practices and strategies.
- Explore how digital technologies shape international market entry, expansion, and competitive positioning.

3. **Case study analysis of "Block Consult" Ltd:**
- Evaluate the financial and economic aspects of the Swiss consulting, "Block Consult", in the context of the Metaverse.
- Assess the international management capabilities of the company, considering its adaptation to digital trends and global market dynamics.
- Analyse the competitiveness of "Block Consult" on an international scale.

4. **Public opinion survey and recommendations:**
- Conduct a public opinion questionnaire to gauge perceptions and attitudes towards the Metaverse.

5. **Synthesize research findings to formulate recommendations for businesses aiming to improve and develop within the digital landscape.**

6. **To provide different ways to reshape modern business environment within the blockchain technology integration, and the Metaverse.**

The initial research methods employed in the qualification work are: synthesis - for reviewing the economic activity of "Block Consult" and the overall trends of the global community in the framework of advanced technologies; generalisation for processing the information available in the scientific literature regarding the understanding of the economic content of innovative activity management; methods of observation and survey - for examining the actual state of the Metaverse and its potential; and analysis for processing the data available in the scientific literature regarding the understanding of the economic content of innovative activity management.

The introduction to the bachelor thesis has an elaborate structure, the thesis itself includes 3 chapters, a conclusion section, a list of references, and 2 annexes. Work is carried out in 109 sheets, containing 2 tables, 3 formulas and 33 figures. References include literature sources.

Scope of Work:

Total number of pages: 109

List of sections:

- CHAPTER 1 OUTLINE OF THE CONCEPT OF THE METAVERSE AS AN ELEMENT OF INTERNATIONAL ECONOMIC RELATIONS
- CHAPTER 2 STUDY OF GMBH (Ltd) "BLOCK CONSULT" AS A PART OF THE METAVERSE
- CHAPTER 3. METAVERSE PARADIGM SHIFT: CONSIDERATION OF WAYS OF BUSINESS DEVELOPMENT, ECONOMIC RENOVATION, AND ENHANCEMENT IN THE FRAMEWORK OF THE METAVERSE

List of graphs and figures:

CHAPTER 1 OUTLINE OF THE CONCEPT OF METAVERSE AS AN ELEMENT OF INTERNATIONAL ECONOMIC RELATIONS

1.1 Theoretical framework of the metaverse, blockchain and DeFi (decentralized Finance), NFTs (non-fungible tokens)

The term “metaverse” was coined in 1992, originating from a Neal Stephenson novel called "Snow Crash." The metaverse may be viewed as a high-level development of the internet, with VR headsets, blockchain technologies, and avatars being used to ensure that there are sustainable bridges between the real world and the virtual one. The metaverse, a concept found in both science and speculative fiction, though it seems intangible, holds a positive effect on the world. In theoretical view, the metaverse can be analysed through media theory, postmodernism, and network culture studies. The basic idea behind the metaverse is that it represents a shared virtual space where reality starts to melt into the digital landscape. Regarding the theoretical approach, the analysis of the metaverse can be accomplished with the help of media theory, postmodernism, and network culture studies. The key idea behind the metaverse is that it reflects a virtual space that goes further to represent an evolution of reality into a digital landscape. Theoretically speaking, metaverses can be seen through media theory’s perspective in relation to postmodernism and network culture studies. Inspired by writers such as Neal Stephenson and virtual worlds like “Second Life”, the metaverse represents an immersive and multi-dimensional domain where users have the possibility to interact not only but transact with each other in real-time.

Moving to "Second Life", a game platform, where users can create and share digital environments with each other just as they did in the Metaverse, a place described in Neal Stephenson’s novel "Snow Crash." Therefore, by linking parallels between "Second Life" and the theoretical framework from "Snow Crash," it is clear that both platforms influence the creation of digital personas and provoke debate about the line that separates real life from the cyber world. At first, it seems that virtual reality composure and decentralized governance are two topics that seem to have no correlation. However, the development of a single unitary state in VR represents a

certain degree of political direction to address issues related to the existence of all people within this complex world, based on their own norms and values. Another example of immersive environments is “Second Life”. Just as the Metaverse in Snow Crash, here you will be exposed to virtual spaces where you can roam, meet others, and design on your own. Visitors make their way through graphics-driven horizons and use action buttons to engage with other avatars in adventures that can vary from virtual concerts to pretend establishments.

One of the distinctive features of "Second Life" is a decentralized system of governance, where its users form their communities, establish social norms, and regulate themselves within their virtual realms. The inhabitants in "Snow Crash" also engage in cooperative behaviour through virtual communities, thus establishing identities and relationships contributing to the sense of home and shared culture. In order to better understand this theme, it is necessary not only to examine numerous studies dealing with different aspects of virtual communities but also to analyse them from theories of identity and visual representation.

In Neal Stephenson’s novel "Snow Crash" and Linden Lab’s virtual world, the creation of a digital avatar is one of the major ways by which an individual is to represent his or her “self” in the virtual world. These avatars are extensions of user identity as they express users’ self-assertion in the cybernetic space and allow them to interact with others there. "Second Life" provides wide choices of customization such as shape, clothing, skin, and hair among others so that individuals can create their unique avatars based on personal preferences. An amazing storehouse of virtual communities is found on “Second Life,” with some equivalent to bustling cities while others cater to niche subcultures. These communities provide users with a means of interacting, forming social networks, and participating in shared activities, events, and parties which build the sense of belonging to the community. "Snow Crash" is a perfect example that shows the world where people meet virtually as well as offline to spend quality time together and work on common projects that stimulate their creativity.

The main theme in "Snow Crash" and "Second Life" is digital escapism. They explore the appeal of virtual realms and their impact on socialization apart from real life. While freedom, creativity, and communication with the aid of virtual realities can

have their own benefits on one hand, there are barriers that may be experienced due to digital escape, disconnection from the real world, and the loss of boundaries between virtual reality and the physical environment. As far as corporate influence is concerned, it has been noted in "Snow Crash" where corporations dominate the Metaverse by controlling the design of its infrastructure as well as its economic base. In the same way, "Second Life" has suffered from problems associated with commercial ownership and control, forcing debates concerning the encroachment of virtual worlds into private realms and creating a digital commodity market.

Worth mentioning that scientists such as Jean Baudrillard and Marshall McLuhan explored the concept of hyperreality, in which the fine line between reality and simulation becomes blurred. This idea is applicable in the online world where people can have their way around, assume an identity, and participate in socio-economic life without reference to physical constraints.

The Metaverse is a virtual world that can be effectively understood with the help of Jean Baudrillard's theoretical framework developed in his book "Simulacra and Simulation." It is crucial to note the concept of hyperreality, which implies that there is no clear distinction between the real world and its representation in virtuality. According to Baudrillard, signs and symbols have lost their sense of meaning to become simulacra that render reality as an unreal event replaced by simulation. Hence, symbols no longer have the power to represent any underlying reality; they rather create their own. According to him, in a media world like this, simulations become more real than reality. This is why Baudrillard states, "It is the generation by models of a real without origin or reality: a hyperreal." (Baudrillard, 1994, p. 1). The same idea can be referred to as the metaverse, which is a virtual space where artificial landscapes and data-based graphics produce boundless interaction that suspends the reality/virtuality dichotomy. In this system, individuals communicate with computer-generated worlds and cyberspace personalities who often outweigh their physical selves as living subjects, thus embodying Baudrillard's concept of hyperreality. Baudrillard analyses the growth of a simulated world in today's society, in which replicas and duplications substitute originals. He claims that simulations appear real and thus lead to meaninglessness and the erasure of truth.

Within the Metaverse, this viewpoint echoes the notion that virtual worlds and digital portrayals generate images of physical reality, ranging from interactions to trade. Users in the Metaverse move in layers of simulation wherein the border between what is genuine and what is imaginary gradually melts away. Baudrillard underscores the supremacy of signs and symbols in shaping the understanding of reality. According to him, during postmodern times, signs ceased to be a representational act but rather moved within a self-referential system where they became important for signifying meaning. Speaking about it, Baudrillard states that, "It is not about an imitation anymore, nor even redoubling or parody. It is rather about exchanging signs of the real with the real." (Baudrillard, 1994, p. 35). The ideas found in this analysis can be easily extended to the Metaverse in which digital representations and virtual environments act as signs and symbols that shape our perceptions and influence our experiences and interactions with others. The people who are on the Metaverse deal with digital realities created with the help of numerical codes and visual components – this way Baudrillard's concepts about signs replacing reality are realized.

On the other hand, spatiality, identity formation, and social interaction are implicated by theories about virtual worlds in their most real sense. When people walk through various virtual landscapes, they create spatial storylines, communicate with each other, influence social behaviour, and design digital identities, enabling the complicated birth of these virtual communities. In this manner, metaverses serve as an arena for understanding issues like control, representation, and agency in technologically enabled environments.

The Metaverse can be conceptualized with the help of McLuhan's theories, notably those proposed in his influential book "Understanding Media: The Extensions of Man." McLuhan stresses the role played by media and technology in shaping human awareness, intelligence, and conduct. Given this, it is fitting to see how McLuhan's ideas can illuminate our understanding of the Metaverse. To demonstrate technological determinism in his work, Marshall McLuhan employed the metaphor "global village," signifying electronic media as a hub that brings people together across boundaries.
He asserted that the technologies of electronic communication, especially television and the internet, neutralize spatial and temporal barriers between people, making them

experience a sense of a global community. (10) The well-known quote in which McLuhan states, “The new electronic interdependence recreates the world in the image of a global village” (McLuhan, 1994, p. 63).

The Metaverse implies the possibility of establishing contact and interacting with other users around the world at any time, through virtual reality spaces and digital media. The Metaverse functions in a similar way to McLuhan’s global village idea by creating connections that go beyond distances and contribute to the formation of a shared digital society. “The medium is the message,” asserted McLuhan – he meant that the means of transmitting information also define its content in an important way. According to him, varying media forms and formats change our perceptions, processing strategies, and thus understandings of information. The statement "The medium is the message," which McLuhan wrote, points out that when new scales through each of the extensions or any novel technology get into action in our lives, they have personal as well as social effects on us (McLuhan, 1994, p. 7).

This view can also be related to the Metaverse, which has distinct properties based on the enveloping character of virtual worlds and digital platforms that make content and actions exist as something original. In the Metaverse, the means of virtual reality and digital communication define modes of communication, social interaction, and cultural exchange that affect the perception and experience of information by users. It was in the work of McLuhan that he delved into how media technologies led to new types of social order and their creation of an identity. He contended that electronic media played a pivotal role in creating “tribal” communities where interests, beliefs, and values are shared. According to McLuhan, “The new electronic interdependence recreates the world in the image of a global village” (McLuhan, 1994, p. 63). This viewpoint may be used with regards to the metaverse where virtual communities and digital subcultures revolve around common interests and identities, including hobbies. In the metaverse, users build relationships and associations with tribes that are not defined by geographical borders or traditional social structures through digital connections.

It is clear that the concept of the metaverse and its impact on society that it has transformative power even in the physical world and not just virtual experiences. The combination of immersive digital environments and highly networked ecosystems found within the Metaverse creates a new frontier for changing all aspects of human life, including but not limited to socialization, communication, as well as the modes by which we exchange value with one another. We thus make this switch – from the ethereal landscapes of the metaverse to the technological backbone behind its economic affairs – blockchain technology.

I explore the vast and complex idea of the metaverse in my thesis—a digital cosmos that combines various facets of technology and human interaction in a virtual setting. The figure that follows functions as a basic analytical tool and summarizes the essential elements that make up the metaverse's framework. It communicates the wider effects of this digital environment on daily activities and social conventions in addition to showing how different elements are connected to one another.

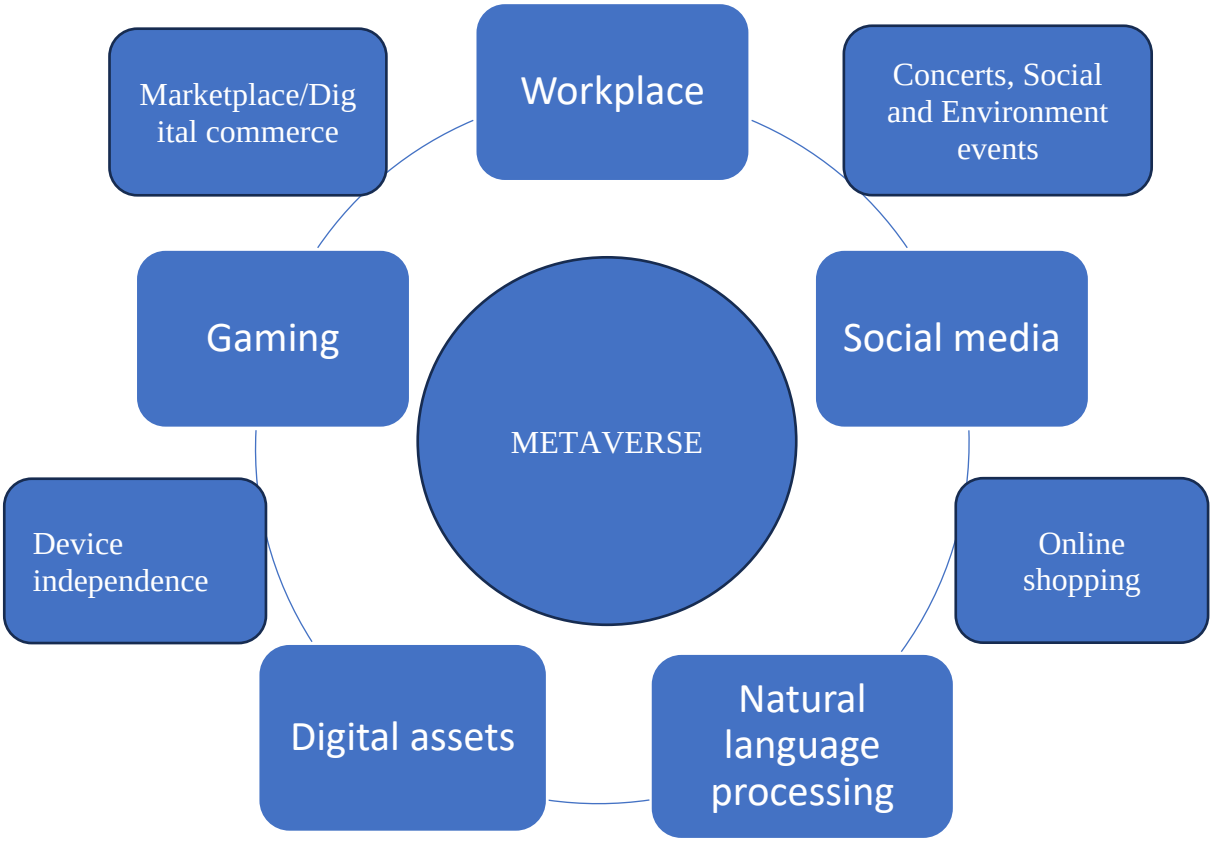


Fig. 1.1.1 Elements of the Metaverse

Source: compiled by author based on Gartner.com database

The diagram I'm examining offers a thorough visual representation of the elements that take together to construct the metaverse. The word "MET AVERSE," which emphasizes its crucial function as the center of interconnected digital realms, is central to the concept. The broad reach of the metaverse is depicted in this graphic, which includes domains including the workplace, gaming, digital assets, and other types of digital commerce.

The workplace and social media sections in the upper portion of the diagram allude to the metaverse's ability to facilitate virtual social and professional interactions. These features draw attention to the possibility of remote collaboration in a virtual setting as well as the evolution of social connection, where social networking and interactions are no longer restricted by traditional physical and geographic boundaries.

The metaverse's origins in video games and its growth into commercial transactions are indicated by the links to the left between its gaming and marketplace/digital commerce components and the metaverse's central concept. This implies that entertainment and business will be seamlessly merged into a single digital continuity.

The inclusion of device independence and natural language processing below demonstrates the technological foundations that enable the metaverse to be usable and accessible. Intuitive human-computer interactions are made possible by natural language processing, while device independence denotes the platform's adaptability to various hardware configurations, guaranteeing wider accessibility.

The graphic concludes by highlighting the integration of digital assets, which are essential for developing a customized and financially sustainable virtual presence. These resources, which give users a stake in the metaverse's developing digital world, are what give it its economic structure and depth, whether they be virtual products, services, or real estate.

The metaverse and blockchain technology are interconnected, they have this connection that is deeply rooted in their ideology of decentralization, transparency, and easy transactions. What is remarkable the metaverse is able to overcome the physical barriers of reality by creating a digital world, which is the main prerequisite for communication between different technologies and actions based on blockchain.

Foundational elements and principles of Blockchain Technology include decentralization, which is the foundation of blockchain technology, where data is spread through a series of nodes or a network that makes it unnecessary to have any central authority or intermediaries. The result of this architecture is transparency, resilience, and censorship resistance that altogether empower transactions as well as peer-to-peer interaction. In the same way that blockchain is built upon cryptographic techniques to bring into existence an unchangeable register, which has in its structure timestamped records of all transactions sequentially interlinked by blocks.

A block, once it is written, is permanent and can never be modified or changed in any form. Hence, this not only provides a high level of integrity but also makes the data easily auditable with guaranteed availability. An example of this is how blockchain networks employ consensus algorithms to reach a shared agreement about the ledger's state. This kind of transition towards Proof-of-Stake, as well as other transformations in consensus mechanisms, also makes them more secure, decentralized, and helps ensure consensus without central authorities.

Decentralized finance (DeFi) is another sector emerging with great promise in the blockchain and cryptocurrency world. Its disruption has not spared financial systems that have seen some transformational changes through this concept. DeFi tries to bring decentralized access to financial services using blockchain technology in creating an open and permissionless infrastructure for finance. The abolition of barriers and facilitation of banking services to the unbanked or underbanked people will ensure DeFi helps to increase global financial inclusion and thus strengthen economic empowerment. DeFi protocols allow people to interact with one another directly, without using any middlemen like banks or brokerage houses. With this being said, by giving the possibility for customers to get information and work directly with financial services without the presence of central authority, DeFi lowers dependence on centralized authorities and promotes higher levels of financial freedom and independence. Programmable Finance or FinTech use DeFi systems with smart contracts, DApps, and automated protocols, which in turn are used for handling essential operations of the financial market such as lending and borrowing, trading, and asset management.

The blockchain technology is the main body and back structure of the decentralized finance system since it provides the safe, secure, and auditable database with features like tamper-resistance to construct decentralized financial applications on. With the help of the decentralized structure peculiar to blockchain and cryptographic primitives, DeFi protocols manage to make sure the reliability and safety of financial transactions as well as assets. DeFi is seen as the vanguard of the development of blockchains that make people do even more than was being done by traditional finance and set forth to explore programmable finance far beyond. DeFi protocols lead with unique financial products and services into uncharted waters, inspiring adoption and innovation within the blockchain ecosystem that draws users, developers, and investors similarly. The blockchain technology and the development of DeFi have a symbiotic evolution, in that they are interconnected and impact each other's growth and development. The progress of blockchain technology helps to create appropriate conditions for the expansion of DeFi applications, while DeFi platforms as well as various use cases push the adoption of blockchain technology that results in enhanced innovation across industries.

Different types of blockchain networks			
Public	Private	Permissioned	Consortium
A Public blockchain, like Bitcoin, allows anyone to join and participate. The disadvantages may include the requirement for a significant amount of computational power, little or no transaction privacy, and weak security. These are important factors to consider for enterprise blockchain use cases.	A private blockchain network, like a public blockchain network, is a decentralized peer-to-peer network. However, the network is governed by a single organization, which decides who is allowed to participate, implements a consensus protocol, and maintains the shared ledger. This can significantly boost participant trust and	Private blockchain networks are typically created by businesses. It is worth noting that public blockchain networks can be permissioned as well. This restricts who and what transactions can take place on the network. To attend, participants	Multiple organizations can manage a blockchain. Who can submit transactions and access the data is determined by these pre-selected organizations. When all participants must be authorized and share

	confidence, depending on the use case. A private blockchain can be run behind a corporate firewall and even hosted locally.	must first obtain an invitation or permission.	responsibility for the blockchain, a consortium blockchain is ideal.

Fig. 1.1.2 Different types of blockchain networks
Source: National Library of Medicine

NFTs are unique digital assets that can be considered distinguished, and non-interchangeable. Each NFT has its own features and cannot be duplicated or substituted, unlike cryptocurrencies (e.g. Bitcoin or Ethereum), which are fungible and exchangeable. Given these points, NFTs are based on blockchain technology, and this is how they ensure that a digital object belongs to someone and has an owner. The use of a transparent and unchangeable ledger in keeping a record of ownership details, as well as transaction records, assures NFTs' origin and veracity, allowing clients to authenticate and track digital assets' owner.

The technical framework of NFTs is divided into two major areas: the platform layer and the token standards layer. The platform layer includes those technologies and protocols that enable the creation, issuance, and management of NFTs on various marketplaces such as Ethereum or Flow Blockchains. The token standards layer, in turn, defines the digital signature procedures as well as all other requirements for the possession and transfer of tokens, including their uniqueness and indivisibility, which are ensured by smart contracts usually deployed on a blockchain network. Regarding blockchain standards, NFTs usually rely on the blockchain platforms that have been designed to support smart contracts and tokenization standards that are widely adopted, such as ERC-721 (Ethereum) or ERC-1155.

The specified standards govern the form and nature of non-fungible tokens in terms of, among other things, transferability of rights to NFT, storage of metadata, as well as the degree to which the latter can be shared across platforms. When NFTs

digitalize assets such as arts, music, videos, collectibles, virtual property, and in-game items that are tokenized to allow for verification of scarcity, rights of possession, and transferability, the establishment of the same leads to further new ways through which they can monetize their works, thus enhancing their value. As a matter of fact, the economic aspect that underlies NFTs is very important too. Regarding scarcity and value proposition, NFTs' scarcity, accompanied by their individuality and genuineness, determines how attractive these assets are. NFTs, in their turn, can be priced according to the artwork's aesthetic, artistry, cultural weight, a celebrity in question, or community push-pull for fair pricing, which is followed by highly variable dynamics of sales and market trends. An alternate mode of the digital market where NFTs are traded can be the digital marketplaces and trading platforms that deal with purchases, sales, and trading of NFTs in which users can find, buy, and collect NFTs. These markets play the role of ensuring liquidity, transparency, and availability of the NFT market for creators, collectors, and investors who would want to contribute to the digital asset economy. NFTs are seen as a tool in fostering community engagement and cooperation between producers, collectors, and fans. Social media sites, online forums, and virtual communities act as gathering places where NFT enthusiasts can meet each other, exchange ideas, and even work together on art, memorabilia, cultural projects.

1.2 Virtual Economies: bridging the metaverse and international trade

The Metaverse and blockchain technology have a profound connection, which is not confined only to virtual exchange but also leads to economic activity in the actual world. When the digital assets and virtual economies that are being developed and recognized in the Metaverse emerge into regular markets and financial systems, this situation brings about a fusion between physical commerce and digital trade. In this interconnection, the seamless relationship between asset tokenization as well as automation of financial processes with blockchain technology leads to new ways for cross-border transactions and investments. A system where blockchain technology serves as the essential component to revolutionize international trade and commerce is established as two cooperative constituents supporting one another with no drawbacks in the modern epoch (Johnson et al., 2023).

In this relationship, the basis is the ideology of free trade, a value rooted in economic theory and international relations. Free trade promotes the eradication of impediments in transacting goods, services, and intellectual property, thereby encouraging the unison of countries into economic prosperity along with cultural exchange worldwide. When applied to the Metaverse and blockchain technology, however, the notion of free trade undergoes transformation in that it does not only refer to physical borders but also overcomes governmental regulations in facilitating swift payment transactions within countries and from one country to another. The user can participate in virtual trade as there are also users who create, use, and sell digital items, goods, or services within the Metaverse environment. As a way of providing an underlying structure for secure, transparent transactions that happen inside the Metaverse, blockchain technology is used, and it brings with it decentralized infrastructure and smart contract capabilities (Buterin, 2013). However, through the use of blockchain technology, the Metaverse allows its users to conduct business directly with other users without intermediaries and thus facilitating effortless peer-to-peer commerce.

In a world of connectivity, free trade provides an illuminating way forward, promoting systems of openness, transparency, and inclusivity both within the Metaverse and in the outside world. The interplay between the Metaverse and blockchain can empower digital commerce at its core, bring about deeper economic links, and lay the foundation for a truly global economy that is accessible to all (Casey & Vigna, 2018). According to the research paper "Understanding ‘Gold Farming’ and Real-Money Trading as the Intersection of Real and Virtual Economies" by Richard Heeks, gold farming and real money trading (RMT) have been found by Richard Heeks to be the point at which the real-world economies integrate with virtual ones. The term gold farming refers to the practice of gaining digital currency or items through playing online games or living in virtual worlds, while RMT involves using virtual currency or goods for obtaining real money (Heeks, 2005). In his research, Heeks addresses the socio-economic aspects of gold farming and RMT such as their influence on economic growth, labor markets, and regulation.

Heeks has recognized the buying and selling of digital currency along with goods as a vital process in the virtual economy. Gold farming has been experienced within online games and virtual worlds where players can accumulate virtual currency or even items that will eventually be transformed into real money through RMT platforms. This exchange erases the boundary between virtual and real economies, establishing the connection between the Metaverse and international trade. Heeks investigates the labor aspects of gold farming, with an emphasis on how virtual labor markets are an integral part of the digital economies. Frequently, these gold farmers are situated in developing nations where they complete monotonous jobs to earn electronic money or material things, and then, these items are sold to wealthier region players. The involvement of different countries' players in RMT transactions is a crossroads of this virtual labor market and international trade (UNCTAD, 2021).

No wonder Heeks outlined some of the regulatory challenges brought about by gold farming and RMT, accentuating the aspects that center on intellectual property rights, tax, and consumer protection. The fact that virtual economies cross borders makes it more difficult to regulate them as different countries have their own legal frameworks regarding virtual transactions. These intricacies further show the importance of international collaboration in controlling virtual economies as well as RMT operations. In the online gaming community, especially in the World of Warcraft game, gold farming enterprises can be found in China and Vietnam where people play the game tirelessly for weeks on end, or even longer periods of time to amass quantities of virtual gold or items. Such virtual currency is later purchased by Western players through digital trade sites, thereby creating a virtual marketplace that is worldwide.

For RMT, some prominent examples of its enabler in the form of platforms are eBay and PlayerAuctions from where players can conveniently sell their virtual currency and assets for cash, making players earn money by monetizing their game success. An integration between virtual and real worlds in the economy, which is represented by digital space, has its own background influencing some controversies about the legal nature and rules of these commercial exchanges, but also a connection between international trade and economic development. The work of Richard Heeks helps to explain the interplay between real and virtual economies by examining gold

farming and RMT. Based on his investigation of the socio-economic effects of virtual economies, Heeks has provided some useful thoughts about their potential role in international trade with the Metaverse as an intermediary. Although studies have distinctively defined and quantified mobile technology, they agree that it has positively influenced the economies of different scales, whether at a global level or local sphere and across several definitions and measures. (Lau Christensen, Alex Robinson “The potential global economic impact of the Metaverse”).

In terms of global GDP, mobile technology represents a significant proportion contributing around $5 trillion nowadays (4.5 % of global GDP in 2021(see fig.).This figure includes both direct contributions from mobile operators as well as those coming from the “rest of the mobile ecosystem” and from “additional indirect and productivity benefits”), according to GSMA. The “mobile ecosystem”, as defined by GSMA, comprises handset and device makers, software companies, equipment providers, and internet companies, as well as organizations in adjacent industry sectors. At least in part, new growth in GDP can be attributed to the contribution of mobile technology to GDP. In 2022, the mobile technology sector directly employed roughly 12 million people globally (e.g., employees working directly for mobile operators, distributors, retailers) while indirectly it had another 14 million workers around the world working in related industries such as those in nearby sectors). (GSMA)

In the context of my research into the economic impact of the metaverse, it is imperative to analyze how this emerging technology contributes to job creation both directly and indirectly. The diagram below, Figure 1.2.1, succinctly encapsulates the employment opportunities fostered within the metaverse, using data compiled from GSMA Intelligence research. This visualization not only quantifies the jobs but also contextualizes their broader significance in the global job market.

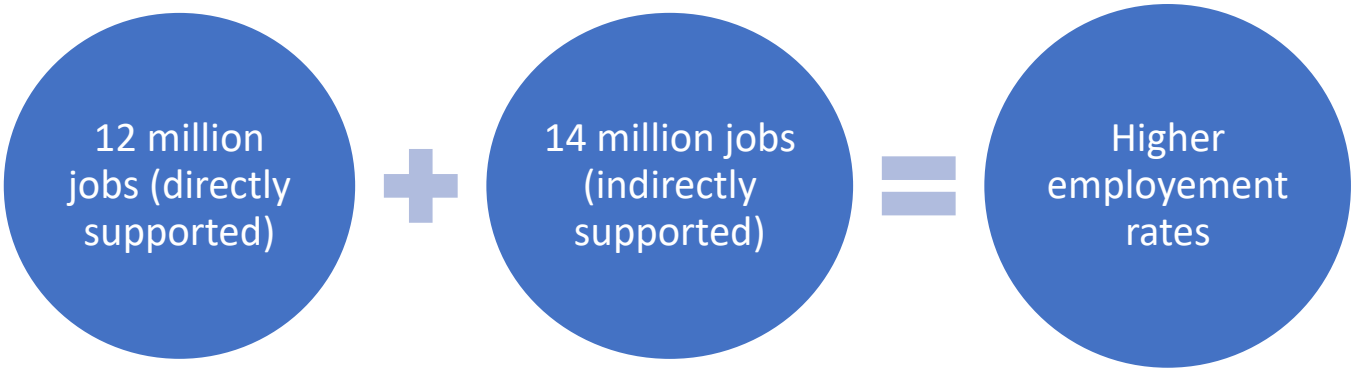


Fig.1.2.1 Employment within the Metaverse

Source: compiled by author based on GSMA Intelligence research data

Directly supported and indirectly supported jobs are the two main types of employment created by the metaverse that are depicted in the diagram. It indicates that 12 million jobs—including those made expressly for its upkeep and management, including software developers, digital architects, and system managers—are directly backed by the metaverse. These responsibilities are essential to the metaverse's basic structure and operation.

The graphic also displays 14 million employment that are indirectly supported, or those that have developed as a result of the metaverse's growth. These include jobs in adjacent fields like telecommunications, hardware manufacturing, and other service companies that profit from the metaverse's economic activity. This section emphasizes how technology improvements ripple out to ancillary businesses, extending the reach of employment beyond the core digital infrastructure.

In the exploration of the economic impact of technological advancements on global scales, one cannot overlook the pivotal role played by the mobile industry. The following diagram, Figure 1.2.2, presents a detailed visualization of the global mobile industry’s contribution to the Gross Domestic Product (GDP) from 2014 to 2030. The data compiled from the Statista database underscores the increasing economic significance of mobile technology, projecting its future implications on the world economy.

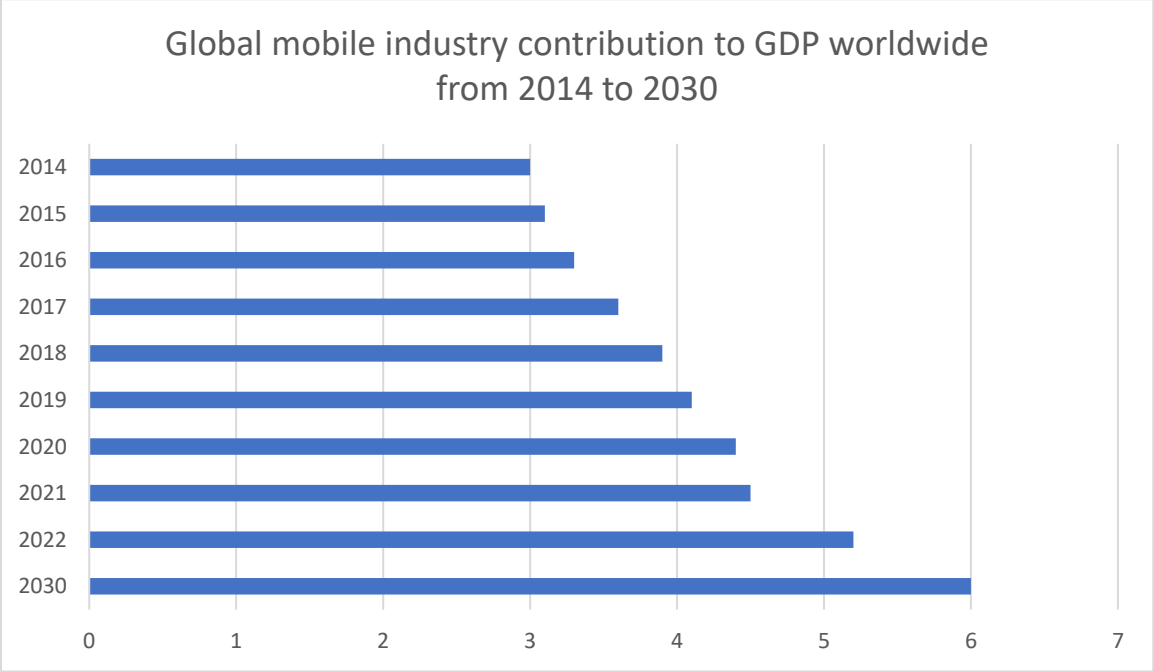


Fig. 1.2.2 Global mobile industry contribution to GDP worldwide (in trillion USD)

Source: compiled by author based on Statista database. https://www.statista.com/statistics/1100651/worldwide-mobile-industry-contribution-gdp/#:~:text=In%202022%2C%20the%20mobile%20industry%20contributed%20with%205.2,up%20to%20six%20trillion%20U.S.%20dollars%20by%202030

The annual GDP contribution of the worldwide mobile industry, represented in trillions of US dollars, is shown in the bar graph. The bars' lengths show an upward trend in the economic output produced by the mobile sector starting in 2014; this development was especially notable in the years before 2021. This growing trend highlights how the mobile business is becoming more and more integrated into the framework of international trade.

Notably, the estimates for 2022–2030 point to a sustained and faster increase in the mobile sector's economic contribution. The projection that the mobile industry will become a more significant part of the global economy is represented by progressively longer bars. This foresees not only the growing significance of mobile technology in daily life but also its impact on a number of economic domains via connectivity, cutting-edge services, and the digitization of enterprises and services.

The figure is an essential component of comprehending the more general economic trends that are impacted by technological advancement, particularly in the mobile sector. It provides insights into future economic potentials in addition to illustrating previous and present contributions, implying that the mobile industry will remain a major force behind global economic growth.

Overall, this depiction contributes to a better understanding of the economic impact of the mobile industry and is consistent with the larger themes of my thesis concerning the revolutionary potential of digital technologies in the context of global economics.

The examination of mobile adoption trends is crucial to my thesis, which examines the development of mobile technology and its worldwide effects. A summary of the significant changes that will occur in the mobile technology landscape between 2022 and 2024 may be found in Figure 1.2.3. This graphic, which was created using research data from GSMA Intelligence, illustrates the quick uptake of newer mobile technologies and the slower downtake of older ones, providing insights into the fluidity of mobile connectivity around the world.

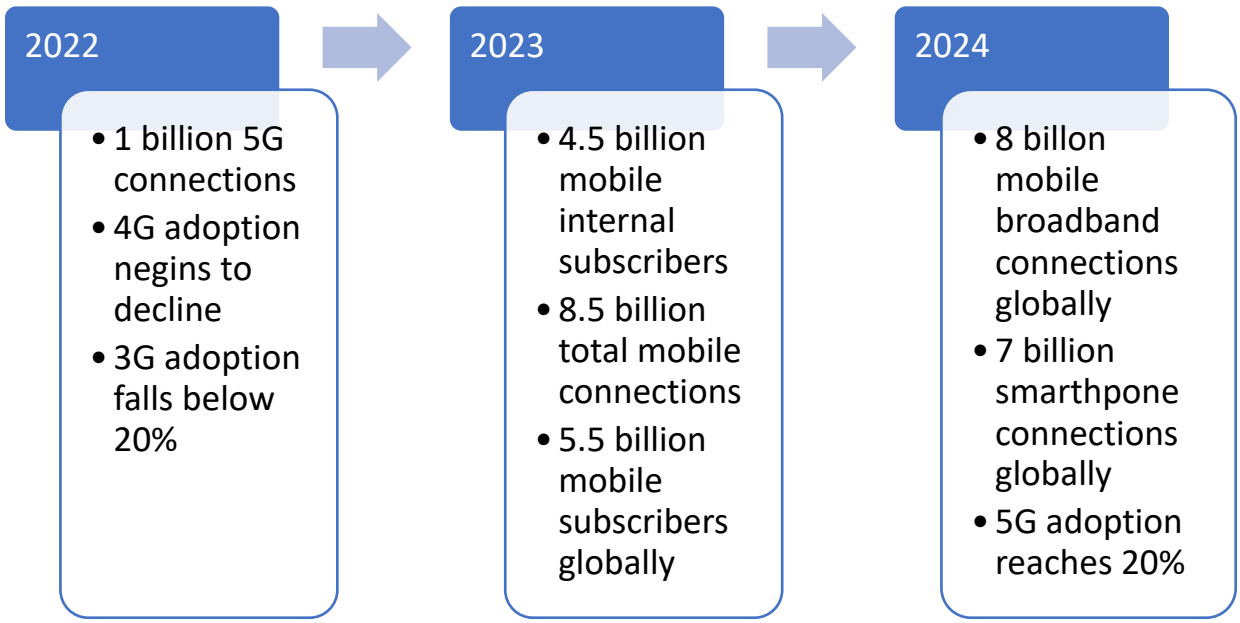


Fig. 1.2.3 Mobile adoption continues to rise globally

Source: compiled by author based on GSMA Intelligence research data (https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-economy/wp-content/uploads/2022/02/280222-The-Mobile-Economy-2022.pdf)

The diagram is set up in the style of a timeline covering three years, each of which is identified by key turning points in the use of mobile technology. The research shows that in 2022, there will be one billion 5G connections, indicating that 5G networks are being quickly deployed and adopted. Simultaneously, it observes that the use of 4G is starting to wane as consumers switch to faster 5G networks, and that 3G usage is declining to less than 20%, signaling a phase-out of the older technology in favor of more sophisticated alternatives.

With 4.5 billion mobile internet users and 8.5 billion mobile connections overall in 2023, the diagram shows a significant rise in worldwide connectivity. Additionally, it shows that there are 5.5 billion mobile customers worldwide, highlighting the increasing reliance on mobile technology for business, entertainment, and communication.

The figure predicts that mobile broadband will continue to grow, reaching 8 billion connections globally by 2024. It forecasts a notable rise in smartphone connectivity to seven billion connections and estimates that 20% of all mobile connections worldwide will be 5G enabled. This pattern demonstrates how 5G technology is becoming more globally standardized and enabling a new generation of connectedness and technical innovation.

I provide a thorough examination of the mobile economy in Sub-Saharan Africa as part of my investigation into how mobile technology is affecting developing markets in this region. The GSMA Intelligence graphic presented in Figure 1.2.4 offers a clear visual representation of the present situation and anticipated development of mobile technology in Sub-Saharan Africa between 2021 and 2025. This visualization provides insight into the swift technical advancements occurring in the area and their effects on social and economic growth, in addition to serving as a data representation.

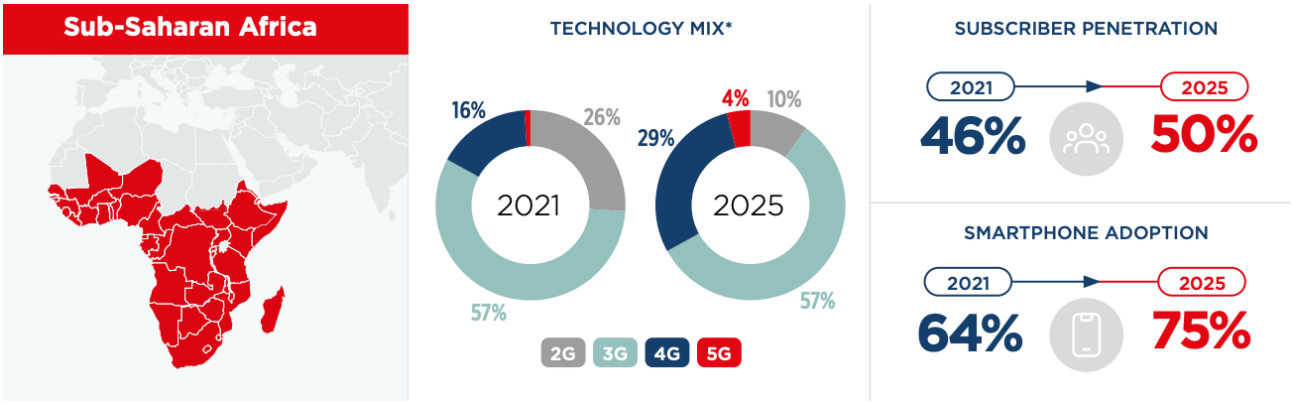


Fig. 1.2.4 The mobile economy in Sub-Saharan Africa

Source : GSMA Intelligence (https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-economy/wp-content/uploads/2022/02/280222-The-Mobile-Economy-2022.pdf)

The map in the first section of the diagram places Sub-Saharan Africa in red and places the continent in a global context. The focus of the following statistics is emphasized by this geographical depiction, which highlights the region's particular potential and limitations in adopting mobile technology.

Two pie charts that compare the technology mix in 2021 with the estimates for 2025 are located next to the map. 2021 saw a tiny percentage of mobile connections attributable to 4G (16%) and 5G (1%), with the majority of connections coming from 2G (57%), followed by 3G (26%). It is predicted that by 2025, 2G connections will have drastically decreased to 29%, while 3G and 4G will control 26% and 29% of the market, respectively, and 5G will rise to 10%. This shift represents a quickening pace of technological development, as more people adopt quicker mobile technologies and more bandwidth, both of which are essential for enabling more sophisticated services and applications.

Bar charts showing smartphone adoption rates and subscriber penetration are displayed in the diagram's right section. It is anticipated that the percentage of people with mobile connections would rise from 46% in 2021 to 50% in 2025, indicating a rise in the population. Simultaneously, it is anticipated that the percentage of people using smartphones will increase from 64% in 2021 to 75% in 2025. This indicates a

notable change towards increasingly advanced mobile devices, which are necessary to access a wider variety of services and applications.

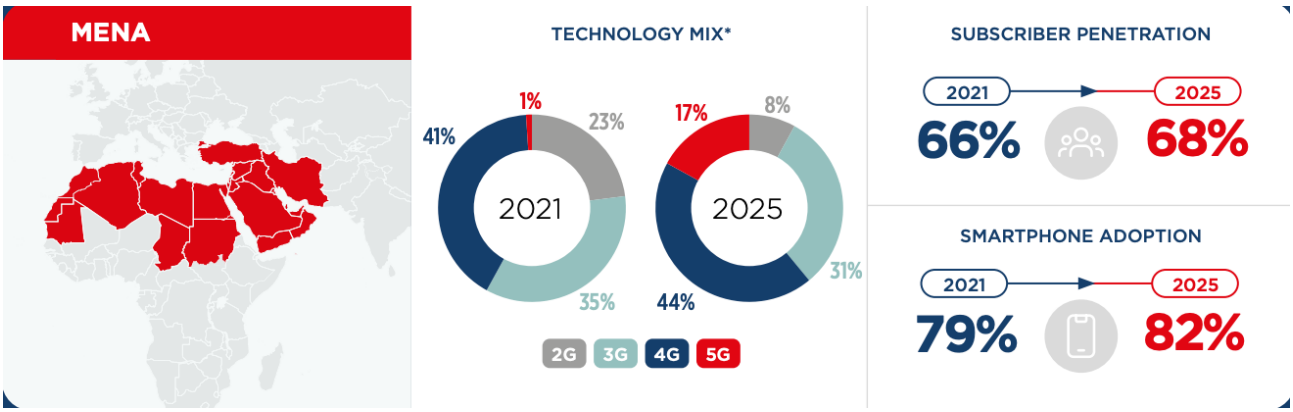


Fig. 1.2.5 The mobile economy in MENA region

Source : GSMA Intelligence

In most developing countries, the increase in information accessibility through mobile technology has led to a decline in the dispersion of prices for agricultural commodities and increased welfare among their population. At the same time, mobile technology has enhanced financial inclusion in some African countries. Apart from helping people get jobs, increasing the information flow, and mobile technology may contribute to economic development in less developed economies by reducing firms' inefficiency; decreasing household risk by improving communication within their social networks; delivering financial, agriculture, health, and education services through mobile applications or platforms. The phrase "mobile technology" is used here in terms of mobile phones. A lot of research that has been conducted on mobile technology indicates that the net positive economic impact is possible with the use of new technologies; however, new technologies also increase existing inequalities. On the other hand, some studies have shown that technological innovations can help in mitigating this problem by "amplifying already successful development efforts or positively inclined intent" in developing economies.

The study results indicate that the metaverse can have an economic impact of 2.8% of the global gross domestic product (GDP) during the 10th year after its establishment. For instance, if it began in 2022, then by 2031, it would add over $3 trillion to the

world's GDP. (Lau Christensen, Alex Robinson "the potential global economic impact of the Metaverse").

In the broader scope of my thesis on the economic impacts of the metaverse, I investigate its projected contribution to the global economy by 2031. The table presented in this section, derived from comprehensive data, encapsulates the expected economic impact of the metaverse across various global regions, providing a clear depiction of its influence on regional economies in terms of both percentage of GDP and absolute financial value.

Region	**Metaverse's share of 10-th Year GDP**	**Metaverse's total contribution to GDP in 2031**
Asia-Pacific (APAC)	2.3%	$1.04 trillion
United States	2.3%	$560 billion
Europe	1.7%	$440 billion
Middle East, North Africa, and Turkey (MENAT)	6.2%	$360 billion
Latin America (LATAM)	5.0%	$320 billion
India	4.6%	$240 billion
Sub-Saharan Africa (SSA)	1.8%	$40 billion
Canada	0.9%	$20 billion
Global impact	2.8%	$3.01 trillion

Fig. 1.2.6 - Projected contribution to the global economy by 2031.

Source: compiled by author based on the study by Analysis Group.

https://markets.businessinsider.com/news/stocks/new-report-estimates-the-metaverse-could-contribute-2-8-to-global-gdp-in-its-first-decade-1031463726#:~:text=If%20started%20in%202022%2C%20adoption%20of%20the%20metaverse,a%20%243-trillion%20contribution%20to%20global%20GDP%20in%202031.

The percentage of the metaverse's GDP that each region contributed in the tenth year of its significant economic activity is shown in this table, along with the projected total dollar contribution in 2031. Significant effects are anticipated in regions like Latin

America (LATAM) and the Middle East, North Africa, and Turkey (MENAT), where the metaverse accounts for 5.0% and 6.2% of GDP, respectively. In comparison, the metaverse is expected to contribute only 0.9% of GDP to industrialized nations like Canada, where its effects will be more muted. It is projected that the metaverse will contribute roughly $3.01 trillion, or 2.8% of the world economy, on a worldwide scale. The aforementioned distribution highlights the varying degrees of acceptance and economic significance of digital environments among diverse socio-economic contexts. It also highlights the opportunities and obstacles associated with the integration of the metaverse into distinct regional economies.

Examining the revenue distribution among various worldwide locations is crucial to my thorough examination of the metaverse's economic environment. Based on their revenue share in the worldwide metaverse market for 2021, the largest regions are visually shown in Figure 1.2.7, which is retrieved from Ken Research Analysis. This map makes it easy to grasp how various locations contribute to and engage with the metaverse economy.

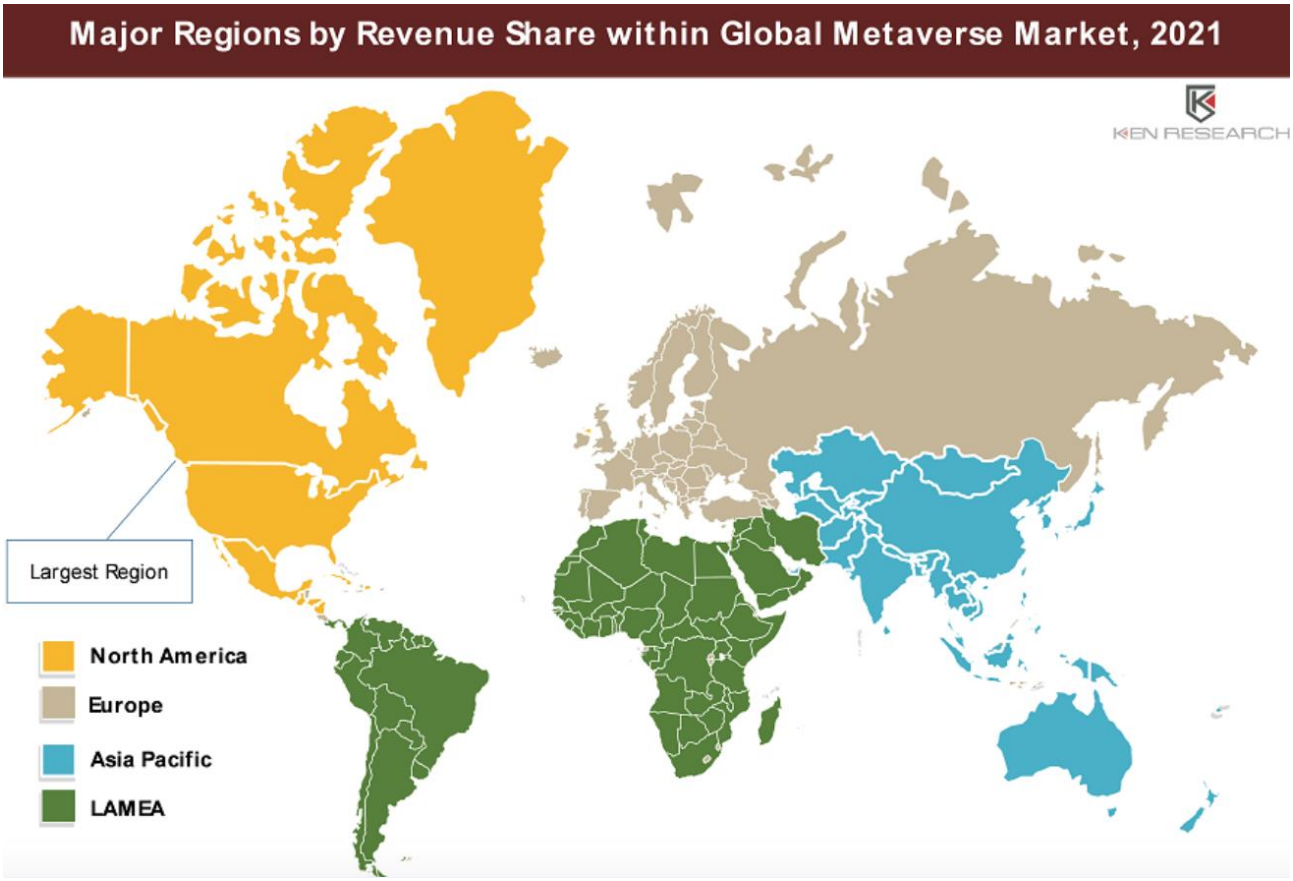


Fig. 1.2.7 Major regions by revenue share within global metaverse market, 2021

Source: Ken Research Analysis

Based on their respective revenue shares in the metaverse market, these four key regions of the world are colored-coded on this map: North America, Europe, Asia Pacific, and Latin America, the Middle East, and Africa (LAMEA). The region with the most revenue generation is North America, which is represented by the darkest hue. This suggests that North America is at the forefront of the research and application of metaverse technology. Significant contributions are also made by Europe and Asia Pacific, which demonstrate a strong use of metaverse platforms and technologies. LAMEA is highlighted on the map as a rising player, indicating a rise in interest and a slow assimilation into the metaverse economy. This geographic representation not only shows the current revenue distribution, but it also implies that different locations have varied levels of technological adoption and financial investment in the metaverse. It provides an essential visual help for comprehending the global metaverse market dynamics by highlighting the advantages and disadvantages of various regions within this emerging digital ecosystem.

1.3 Taxation and legal framework of the Metaverse landscape

The complexity of taxation in the Metaverse is constantly developing and is defined by the particular properties of digital assets, democratic governance, and worldwide commercial exchanges. An issue for tax authorities is the determination of the valuation of virtual assets like Non-Fungible Tokens (NFTs) and virtual currencies. Innovative methodologies coupled with a strong valuation framework should be adopted in order to determine the fair market value of digital assets which are highly susceptible to rapidly evolving markets. Virtual assets identification: Tax authorities come up with classification puzzles when trying to determine which category of the virtual assets should be considered for taxation. Are NFTs classified as collectibles, securities, or digital goods? Are virtual currencies referred to as currency, property, or commodity? For the accurate calculation and adherence of taxes, it is critical to clarify how we perceive virtual assets in terms of classification. Enforcing tax compliance in the Metaverse is complicated and filled with logistical and technical obstacles. It's challenging for tax bodies to trace income, gains, and transactions due to decentralized platforms and pseudonymous transactions. Developing

enforcement mechanisms that are effective necessitates collaboration between regulators, technology providers, and industry stakeholders (Brastíková, 2022).

Tax and regulatory authority jurisdiction issues in the Metaverse would arise regarding which nation has the right to tax and control. For instance, this form of international digital sphere may have difficulties with respect to the identification of tax domicile for a certain person or legal entity, and it can result in jurisdictional problems such as double taxation. International tax treaties and agreements play a significant role in resolving such disputes between different jurisdictions, thus bringing them to a common understanding on tax matters in cross-border contexts (OECD, 2017).

In the digital economy, established tax systems fail to keep up with the modern technological changes that have brought about new businesses not limited by geographical parameters, like companies dealing on the internet or e-commerce and characterized by online transactions without physical contact. Meanwhile, tax authorities are now searching for strategies for digital taxation like global minimum taxes and digital services taxes to ensure that they can generate revenue from all activities done digitally in their domains (UNCTAD, 2021).

The enforcement of tax compliance within the Metaverse is difficult and has many logistical and technical barriers. It is especially problematic for revenue agencies to trace profits, transactions, and gains given the decentralization of platforms and anonymity of transactions. Effective enforcement means developing regulations in close coordination with technology developers as well as all industry participants (Swartz, 2021).

Conflicts of jurisdiction in the Metaverse relate to territorial disputes between countries that possess legal authority to levy taxes and establish control. The resolution of a tax residency issue for an individual or an entity is not simple in a world without boundaries and can result in conflicts involving dual tax claims that might be multiplied by other sources like double taxation. It is also international tax treaties and agreements that have an important role to play in resolving conflicts regarding jurisdictions, ensuring equal treatment of taxes across jurisdictions. Sometimes, some situations may require treaties between two parties or among many parties concerning how taxes should be distributed, as well as anti-avoidance or evasion measures by authorities to fix matters (Garbers von Boehm et al., 2022).

The expanding use of decentralized financial (DeFi) protocols raises the veil on regulatory uncertainty and tax administrators' compliance problems. DeFi technologies

involve peer-to-peer borrowing, lending, trading, and yield farming, which defies conventional financial services from protocols in a decentralized manner. Establishing the legal position of DeFi activities is crucial to ensure taxation administration. Deciding the tax treatment of DeFi transactions, such as liquidity provision, staking, and yield farming, can raise some questions. In which class should DeFi rewards be considered: income, capital gains, or staking rewards? Are DeFi protocols subject to withholding tax, reporting requirements, or anti-money laundering (AML) regulations? Resolving these issues necessitates cooperation among tax authorities, policymakers, and industry players (Mihailov et al., 2021).

Now is an opportune moment to assess the preparedness of EU legislation in addressing the potential for tax optimization in this new digital realm. The objective of this article is to illuminate the intricacies of tax evasion within the Metaverse and propose potential remedies that align with the existing legal framework of the European Union. According to the authors of the European Parliament's report on the impact of the Metaverse on the Single Market, issued in June 2023, it is widely accepted that the decentralized nature of the Metaverse will result in a transfer of wealth and resources away from individuals and states. This shift will allow for significant movements and concentration of profits without the need for redistribution through taxation. The purpose of taxation in this context is to prevent monopolization and ensure that the benefits generated within the European Union remain within the relevant jurisdiction for fair distribution (European Parliament, 2023).

Additionally, the report highlights that Ireland, where many major metaverse players are headquartered, is well-known for its tax laws that facilitate profit shifting and aggressive tax planning by these companies. (Government in the metaverse: Requirements and suitability for providing digital public services) https://www.sciencedirect.com/science/article/abs/pii/S0040162524001422

When someone buys an NFT, they gain possession of the token itself, which acts as a virtual proof of ownership linked to a particular digital asset. This ownership is established on the blockchain and cannot be effortlessly transferred or relinquished by the new owner unless accompanied by supplementary rights connected to the copyright license. Therefore, if the digital artwork is not sold with any extra rights, the new owner lacks the power to pass on or get rid of the NFT. There is currently a gap in legislation when it comes to the concept of ownership and the resulting tax responsibilities

associated with NFTs. The legal definition of NFT possession is derived from existing laws, which leads to significant differences, especially between common law and European continental law. Common law generally allows for the acquisition of ownership rights and copyright over the underlying work of an NFT, often due to its reliance on contract regulation. On the other hand, European continental law takes a different approach. For example, according to the Czech civil code, an NFT would be classified as an intangible thing, considered a movable asset that cannot be divided or transferred. However, the increasing popularity of NFTs has given rise to the principle of irreplaceability, especially with the introduction of fractional NFTs. Fractional NFTs allow for the division of an NFT into smaller pieces, giving more individuals the opportunity to own a portion of a specific NFT. To put it simply, it entails obtaining a partial stake in an NFT (Cejkova, 2022). Consequently, Czech legislation would acknowledge the legal possession of an NFT to some degree.

From the perspective of the European Union, taxation in the Metaverse presents an interesting challenge. In Germany, for example, NFTs cannot be recognized as physical objects or property under civil law. This is because NFTs lack a physical form and exist solely as digital tokens. As a result, the traditional concept of ownership, as defined by § 903 of the German Civil Code, which applies to tangible and spatially definable objects, does not apply to NFTs. Moreover, the principle of numerus clauses in property law generally prohibits the extension of property rights to intangible assets. However, there is an ongoing debate about whether § 903 of the German Civil Code can be analogously applied to NFTs, taking into account their unique characteristics. The acquisition of rights to use the work associated with an NFT under EU law is contingent upon the agreements established between the buyer and seller. If no specific agreements are in place, the buyer will not possess any rights beyond those granted for private use as outlined in Article 5 No. 2 b) of Directive 2001/29/EC. This directive focuses on the harmonization of copyright and related rights in the information society. (Book Power in Communication, Sociology and Technology Ed. Angela Repanovici, Manolis Koukourakis, Tereza Khecyoyan Series: Philosophy, Communication, Media Sciences)

The legal and regulatory landscape surrounding NFTs in Europe is riddled with discrepancies, resulting in a lack of consistency when it comes to the classification of these digital assets for tax purposes. Different countries have varying interpretations, with some considering NFTs as intangible assets, others categorizing them as forms of intellectual property, and even some viewing them as financial instruments. This lack of uniformity creates opportunities for companies to exploit these variations and employ tax planning strategies to minimize their tax liabilities. Companies have the opportunity to optimize their tax situation by strategically arranging their NFT transactions in different jurisdictions. This allows them to benefit from more advantageous tax treatments by leveraging jurisdictions with lower tax rates, exemptions, or targeted incentives for specific transaction types. Through manipulation of transfer pricing, companies can, for example, choose to conduct the sale or transfer of an NFT in a jurisdiction that either has no capital gains tax or offers a reduced tax rate. This approach effectively minimizes their tax obligations for the transaction, assuming that a suitable jurisdiction can be identified.

The risk of tax evasion is heightened by the lack of clear guidelines and ambiguity surrounding the taxation of NFTs. Companies can take advantage of this uncertainty to engage in aggressive tax planning strategies. They may manipulate the allocation of profits or costs related to NFTs among different entities within their corporate structure, capitalizing on jurisdictions with more relaxed tax regulations. Furthermore, the absence of specific guidelines exacerbates the situation. The extensive reporting and disclosure requirements associated with NFT transactions pose a significant challenge for tax authorities in terms of detecting and ensuring compliance. The regulatory landscape surrounding NFTs remains uncertain, as the market for these digital assets continues to evolve. There are two potential scenarios that warrant consideration: If the NFT market continues to expand and gain popularity, regulatory measures may be introduced to address the legal implications associated with them. On the other hand, if interest in NFTs declines rapidly, there may be no need for the legal system to respond to this phenomenon. At present, it is difficult to determine whether NFTs are merely a passing trend or if they will establish themselves as a long-lasting presence in the realm of alternative investments. (Martin Petrin, 2018)

The issue of virtual land, which is even more intricate, presents a comparable dilemma - the very term "virtual real estate" suggests the inherent complexity. Virtual land pertains to the idea of possessing and trading virtual plots or parcels of land within a metaverse. These digital representations of space in virtual environments allow users to construct buildings, establish enterprises, and partake in diverse activities. Typically, virtual land operates on a decentralized blockchain system, utilizing NFTs to establish and monitor ownership rights.(Teresa Čejková, 2023)

When it comes to the development and enforcement of tax standards in the metaverse, both the EU and the OECD bring unique strengths to the table. The EU, with its well-established regulatory knowledge, ability to foster regional collaboration, and mechanisms for cross-border cooperation, offers a strong foundation for handling this task. On the other hand, the OECD takes a more global approach, drawing on its expertise in international tax matters and considering broader policy implications. It is important to note that both organizations have a track record of working together, although sometimes their tax policymaking efforts have been influenced by certain biases. Nonetheless, they share a common understanding that a fair and efficient international tax system is crucial for promoting economic growth and prosperity. Under Article 115 of the Treaty on the Functioning of the European Union (TFEU), the EU possesses the authority to govern direct taxation.(Umut Turksen, Adam Abukari. 2021).

This authority has been employed to establish directives pertaining to various direct tax subjects, including the taxation of dividends, interest, and royalties, as well as the taxation of cross-border mergers and acquisitions. Within the framework of its Convention on the Organisation for Economic Co-operation and Development, the OECD is entrusted with the task of advancing the cause of effective governance in the realm of taxation. This responsibility encompasses the formulation of guidance on combating both tax avoidance and evasion, as well as the establishment of mechanisms to guarantee the fairness and effectiveness of tax systems. (OECD Taxation Working Papers, 2016)

A variety of resources and strategies exist to facilitate effective governance in the realm of taxation as a result of this collaboration. These include the widely accepted

OECD Model Tax Convention, a standardized tax treaty that has been embraced by more than 130 nations. Additionally, the OECD BEPS Project offers a comprehensive set of measures designed to combat tax avoidance and evasion perpetrated by multinational corporations.

• The OECD Tax Policy Forum serves as a platform for officials from EU and OECD member countries to engage in discussions and formulate suggestions for new regulations or guidelines concerning direct taxation.

• Established in 1996, the Joint Tax Policy Forum facilitates discussions and the formulation of proposals for new regulations or guidelines on direct taxation by officials from the EU and OECD.

Tereza Čejkova, at the age of 23, has made great use of the EU-OECD Code of Conduct on Transfer Pricing. This code serves as a comprehensive guide that outlines the principles and regulations for establishing fair transfer prices for goods and services exchanged between affiliated companies.

The exchange of tax information between EU and OECD member countries is facilitated through the framework established by the EU-OECD Convention on Mutual Administrative Assistance in Tax Matters.

1.4 Securing the Metaverse: cybersecurity challenges

The interconnectivity of the Metaverse represents an open avenue that may result in data breaches where cyber hackers use their vulnerabilities to break in and take private or otherwise sensitive information. Advanced Persistent Threats (APTs), malware, and social engineering tricks attack virtual environments, social networks, and e-commerce sites, consequently, users' data and privacy are at stake. Privacy concerns in the Metaverse emerge from the diversity and sophistication of data, which is collected, used, and shared. Behaviours such as user movements or their co-location with others are captured within these virtual worlds, thereby generating a wide range of user information containing details such as biometric identifiers among others, meaning that it becomes important to have strong privacy controls and data protection mechanisms that will ensure the rights of users' privacy are respected.

Phishing attacks are a well-known Metaverse scam that has been going around where criminals pretend to be trusted institutions aiming to manipulate the trust of users and trick them into sharing their sensitive details. These impersonations—spear phishing, vishing (voice phishing), and smishing (SMS phishing)—aim at users within virtual platforms, gaming communities, and social media networks since human weakness is exploited and these attacks lead to identity theft or fraud. One of the types of cyber-attacks that should be pointed out is account takeover attacks, which apply stolen passwords, easily guessed passwords, and social engineering methods to gain unauthorized access to users' accounts. Virtual platforms as well as cryptocurrency wallets and decentralized applications can be subjected to credential stuffing, password spraying, and brute-force attacks that lead to compromising user identities, making it possible for criminals to use them for their purposes.

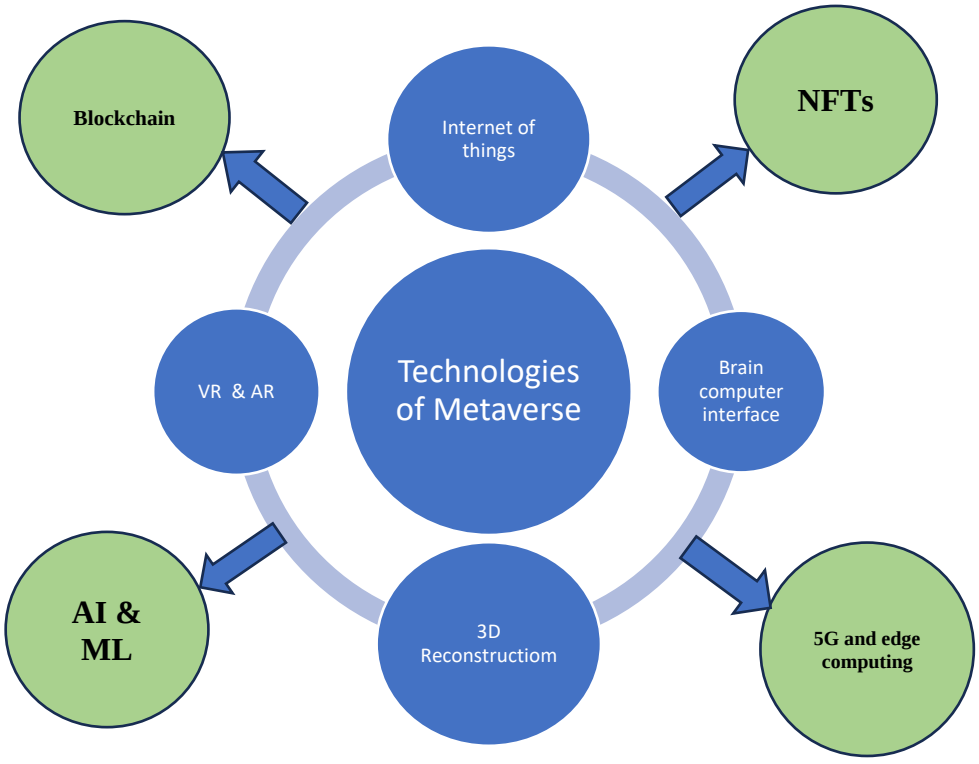


Fig. 1.4.1 Technologies of the Metaverse

Source: compiled by author based on SITE research data https://www.itu.int/en/ITU-T/ssc/Documents/balahmadi_metaverse.pdf

The incidence of virtual crimes involving theft, vandalism, and property disputes are among crimes that occur in the Metaverse, which harms the security and trust of

virtual communities. Hackers take advantage of weaknesses in virtual systems and game worlds to rob digital treasures, mar artistic efforts with ugly graffiti, and inflict virtual harm. Virtual infrastructure, networks, and services are a significant threat to the Metaverse's stability and security as cyberattacks focused on this segment also bring high risks. Distributed Denial of Service (DDoS) attacks, ransomware attacks, and supply chain attacks break virtual markets, expose customer information, and subvert virtual economies.

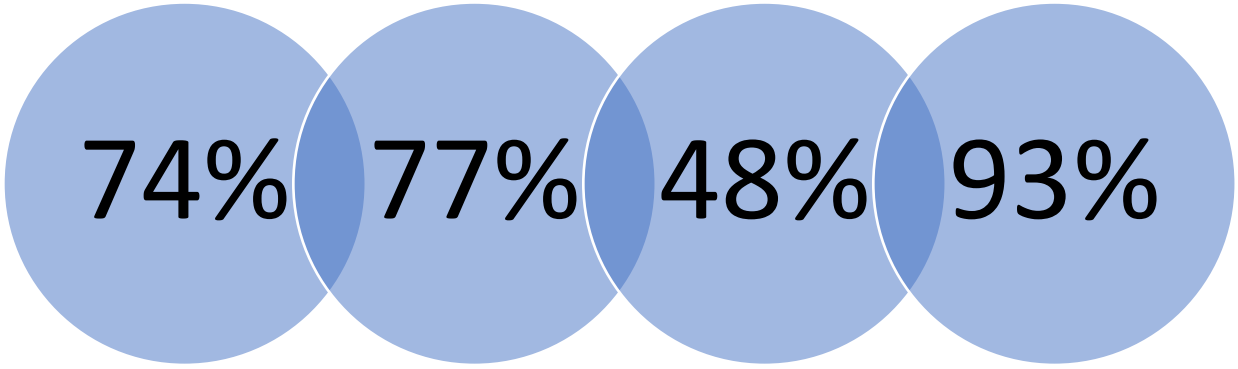


Fig. 1.4.2 Metaverse cybersecurity

Source: compiled by author based on Tenable report, The Metaverse Promises Big Opportunities and Even Bigger Cyber Risk, 2022

One of the technological solutions is blockchain security. It's essential to note that blockchain technology has built-in safety characteristics, such as cryptographic encryption, decentralized consensus, and immutable data storage that are essentially reliable for improving cybersecurity in the Metaverse. The resistance to virtual

platforms increases with the use of blockchain-based security solutions like decentralized identity management, secure smart contracts, and tamper-proof data storage, and reduces cyber threats. Data protection measures, like GDPR and CCPA, make it mandatory for virtual platforms and service providers to put data protection controls in place. To ensure adherence to the rules of data protection regulations, one must follow transparent ways of handling data processing, employ ways to get user consent and create appropriate tools that will protect the rights of users concerning their private lives. To combat these new hazards and emerging risks associated with the Metaverse, legislative bodies, and regulatory agencies all over the world have started to introduce cybersecurity laws. Cybersecurity laws such as the Cybersecurity Act of 2021 and the Digital Services Act have brought about mandatory standard incident reporting, breach notification, and security risk management protocols aimed at enhancing cyber resilience in addition to accountability within virtual domains.

An important measure for increasing security levels in the Metaverse can be regarded as user education and awareness: cybersecurity training programs. With all the risks, dangers, and ways of dealing with them learned by heart, the users become aware of what is possible in terms of security in the Metaverse and are more resilient to cyber threats. At this point, cybersecurity training programs are implemented; awareness campaigns are launched; and interactive workshops are organized, which will help users build their skills in recognizing phishing attacks, securing their accounts, and protecting digital assets from malicious cyber threats. Enhanced security and partnership between virtual societies will greatly help develop shared defence systems that are vital in combating cyber-attacks. Sharing experiences, exchanging views about incidents, and holding joint projects via online forums, social networks, and virtual events contribute to the higher security of the Metaverse.

CHAPTER 2 STUDY OF GmbH (Ltd) “Block Consult” AS A PART OF THE METAVERSE

2.1 Analysis of the company’s environment, organisational structure, financial and economic indicators

When moving to the multidimensional landscape of the Metaverse, it is crucial to situate our journey in a wider field of phenomena that are constituted by organizational dynamics and financial frameworks. In the process of exploring the issues and strategies, it should be stressed that an analysis of the external environment, organizational structure, financials, as well as economic indicators must be considered in detail. The knowledge about these fundamental factors allows for an adequate assessment of a company’s strengths and weaknesses. Moreover, this information helps to define strategic goals aimed at enhancing the efficiency of a company’s digital activities in the Metaverse. By analysing this research, it will be possible to delve deeper into the diverse facets encompassing organizational resilience, financial sustainability, as well as economic viability in the digital age within the Metaverse’s parameters (Johnson et al., 2023).

Block Consult Ltd. is a young, energetic, and innovative company that operates in the crypto and blockchain space and has its headquarters located in Zug, Switzerland. Founded in 2019, it testifies to the growing importance of this region for the technological and cryptocurrency revolution. Today, as an independent entity, Block Consult Ltd. is leading the way for blockchain innovation by assisting its customers to stay ahead of all the latest developments in this state-of-the-art technology. The core of Block Consult's mission is providing top-level blockchain advisory services to clients from all over the world. The staff and board of experts always deliver relevant expertise based on thorough research and profound analysis,

giving high-quality assistance to those interested in unlocking the power of blockchain technologies and digital currencies (Casey & Vigna, 2018).

The company's operational activities encompass diverse tasks and involve a broad spectrum of actions. Although their main area of expertise is advisory services, it also conducts vigorous research and profound analysis on blockchain and cryptocurrency markets. Such a multi-dimensional approach helps the company develop products that meet customer requirements exactly. Whether its clients are new entrants into the world of blockchain technology or well-established market players trying to maximize their strategies, this range of options allows customers to get what they want out of a market analysis project. Regarding regulatory compliance, Block Consult has a strong commitment and believes in accountability. Based on Swiss jurisdiction of Zug, referred to as 'Crypto Valley' because of its friendly policies towards blockchain, the company follows all required state legislations and regulations without fault. Thus, its activities are characterized not only by ingenuity but also by full observance of principles of legality and ethics (European Commission, 2021).

Decision-making in Block Consult is facilitated by the ownership and governance mechanisms put in place. The owners are responsible for defining the strategic direction of the firm, a mandate that enables them to respond quickly to market dynamics prevailing in the blockchain space. Further to the owners, there is a board of directors as well as other management organs. These bodies meet often to deliberate on numerous issues that go from defining the company's vision to addressing practical day-to-day concerns. The corporate structure of Block Consult is characterized by a top-down approach with a strong chain of command. A number of divisions and groups constitute the organization of this company, and each has its own specific scope and responsibilities. Employee roles, duties, and authority are well-defined in agreements and position papers as a way of offering guidelines on personal and joint work. The organization also ensures that all regulation is observed, leading to proper coordination among various teams in achieving the overall goals and objectives. On the other hand, instructional, normative, and methodical materials are of importance in the organization's operation. These resources are used for the purpose of teaching, updating, and showing staff how to give their best in offering excellent advice to

clients. The level of these materials is regularly checked and improved so that experts in blockchain from this company would be the leading ones (Swartz, 2021).

In the world of blockchain technology, there is a large domain full of applications in different fields and industries. One thing that distinguishes Block Consult from other players is their extensive knowledge in this topic area, allowing clients to explore the fascinating world of blockchain technology with simplicity and clarity to enable them to make informed decisions. Its focus is providing individualized and strategic advice, considering the individual needs and ambitions of its clients. This individualized technique ensures that the solutions proposed completely adhere to the vision and objectives of their clients. Cryptocurrencies are just one of many uses for blockchain technology; Block Consult helps its clients delve into various blockchain applications, namely supply chain management, digital identity, and smart contracts. Through skilful analysis and clear exegesis, Block Consult is an expert in understanding and explaining the complex structure of blockchain networks, including public and private blockchains. Such expertise enables clients to choose an appropriate type of blockchain according to their requirements, while considering which benefits may follow from it. Realizing the data privacy issue in relation to the blockchain system, Block Consult can offer appropriate strategies and solutions that help ensure the safety of sensitive information managed by customers. Security is the main concern. In particular, the organization has extensive knowledge and hands-on experience in dealing with blockchain security best practices, vulnerabilities prevention, and safeguarding data reliability on blockchain networks. Block Consult boasts of staying up to date with the current happenings and trends in blockchain technology. This covers knowledge of different types of blockchains like public, private, consortium, and hybrid blockchains, plus the utilization of these different blockchain types in today's applications. In addition, the company has good expertise in contemporary algorithms, for example, PoS (Proof of Stake) and DPoS (Delegated Proof of Stake), which are very common nowadays due to their energy-saving capacity as well as scalability. Knowing the paramountcy of interoperability between different blockchain networks, Block Consult also masters cross-chain solutions allowing transferability of data and assets across chains. To stay relevant in this era of DeFi,

Block Consult has incorporated decentralized finance into its repertoire. It covers a range of subjects such as DeFi protocols, liquidity pools, yield farming, and governance tokens in its knowledge base. In addition to our area of specialization, which is NFT marketplaces and other related topics of interest like NFT standards and legal considerations about the sale or ownership of NFTs, I'd also be happy to discuss more artistic and fun applications regarding NFTs, such as using them in the gaming or entertainment industry. A decentralized application, also called a DApp, is an application that runs on a blockchain or a decentralized network, in contrast to being built on and dependent on a centralized server or infrastructure. DApps play an important role in the blockchain industry, and they are developed with the aim of taking full advantage of decentralization benefits.

Regarding privacy issues in today's blockchain world, Block Consult has extensive knowledge about cryptographic privacy techniques like zero-knowledge proofs and secure multi-party computations that ensure transactional confidentiality without the disclosure of sensitive information. Since blockchain regulations are constantly changing and developing, the company makes sure it is always aware of new legal obligations. It implies, among other things, the awareness of provisions referring to digital identity verification, anti-money laundering rules, and know-your-customer obligations.

Within the local blockchain network, there are three essential components: ganache, truffle, and smart contracts. Ganache serves as a personal Ethereum blockchain that operates within our memory, allowing for the safe and deterministic development, deployment, and testing of DAPPs. Furthermore, ganache grants us access to 10 external accounts, each preloaded with 100 counterfeit ether and possessing addresses on our local Ethereum blockchain. Moving on to the next component, the truffle framework empowers us to construct decentralized applications on the Ethereum blockchain. It encompasses a comprehensive set of tools specifically designed for writing smart contracts in the solidity programming language. Remarkably, the truffle framework also facilitates the testing and deployment of smart contracts on the local blockchain. [62] Lastly, the most crucial component of the local blockchain network is the implementation of smart contracts. In essence, smart

contracts are programs that reside on the blockchain and execute once predetermined conditions are met. Their primary purpose is to automate agreement execution, ensuring all parties involved can immediately ascertain the outcome without requiring the involvement of intermediaries or experiencing any delays. Once the predetermined conditions have been verified, the system will proceed to execute the specified actions, which may include registering a medicine or conducting digital transactions using ether. Once the transaction has been finalized, the blockchain will undergo an update that is immutable. Developers have the ability to create smart contracts using the solidity programming language. Additionally, the functions within the smart contracts serve as a means to document the various actions performed by stakeholders.

Programming in modern smart contract languages, such as Solidity for Ethereum-based contracts and Rust for the Polkadot system, is one of their areas of expertise.
A comprehensive analysis of this kind will definitely find its appreciation in regard to modern financial models and instruments facilitated by blockchain technology, in particular, decentralized exchanges (DEXs), yield farming, liquidity provision, and decentralized autonomous organizations (DAOs). While Block Consult GmbH has profound knowledge about tokenization of assets such as real estate, art, and commodities, it requires a deep understanding of token standards like ERC-20 and ERC-721 besides emerging standards for security tokens (STOs).

A primary focus of Block Consult's finance and economics offerings is a high-quality research and analytics team. The company invests heavily in thorough investigations of emerging patterns, market structures, and possible blockchain and crypto assets to speculate on. This knowledge is crucial for customers who want to beat the competition in the fast-changing world of digital transactions. The research team of Block Consult GmbH is a major unit that specializes in identifying investment opportunities in the field of blockchain. In particular, they evaluate new projects through an analysis of whitepapers, team reviews, and technology development to determine the investment potential. The studies undertaken by Block Consult facilitate decision-making for their clients based on actual data. One such research brings into focus a highly promising project cantered around a decentralized identification system. Analysis indicates that this innovation has the power to transform the digital identity

market and create an attractive investor's offer. The purpose of this data is not just for the investors to know their potential profit but also to provide them with a risk assessment in order for them to think ahead and mitigate.

The commitment of the company to ensure they stay updated is expressed through timely updates in the markets which make clients very prepared to alter their strategies according to the changes in the blockchain industry. Results of the company's research are based on data collected, which help customers to make reasonable and informed decisions. These insights include market capitalization trends, trading volumes, and the rise of new blockchain projects and cryptocurrencies. Also, in Block Consult, the practice of investigating the field is well-established with a goal to determine the future of potential investment opportunities for their clients. Such investigations involve the analysis of Initial Coin Offerings (ICOs), token sales as well as blockchain projects that show high promise in terms of return on investments.

The pandemic accelerated the adoption of cryptocurrencies worldwide, and even in Switzerland, traditionally known for its conservatism, more people have ventured into crypto trading and NFT investments, embracing these digital assets as a means of financial diversification. Block Consult engages in meticulous financial planning to ensure efficient allocation of resources. This involves creating budgets, forecasting revenues and expenses, and setting clear financial goals aligned with the company's mission and vision. The company strategically allocates its capital to support various activities, such as research, educational services, business development, and maintaining operational excellence. This allocation aligns with the company's growth strategy and market opportunities. The primary source of revenue for Block Consult is its wide range of blockchain consulting services. These services cater to the diverse needs of clients, including blockchain strategy development, regulatory compliance consulting, and technology adoption. The company generates additional revenue by offering research publications and market reports. These reports provide clients with valuable insights into the ever evolving blockchain and cryptocurrency landscape.

Economic planning includes strategies for acquiring new clients. Block Consult employs a business development team to identify potential clients and partners, explore collaborations, and attend industry events. Block Consult's strategic budgeting aligns

with its goal of becoming a leader in blockchain consulting. To achieve this, the budget allocates resources for the expansion of service offerings, the development of educational materials, and participation in international blockchain conferences.

The company's strategic budget extends over a three-year period to support its vision of long-term growth. For instance, it plans to invest in advanced blockchain research, aiming to position itself as a trusted source of cutting-edge information in the blockchain space over the next several years. Block Consult's strategic budgeting aligns with its goal of becoming a leader in blockchain consulting. To achieve this, the budget allocates resources for the expansion of service offerings, the development of educational materials, and participation in international blockchain conferences.

A significant portion of the strategic budget is allocated to the research and analysis team. This investment supports ongoing monitoring of market trends, identification of investment opportunities, and analysis of emerging blockchain technologies. For instance, the budget includes resources for hiring additional researchers and acquiring premium data sources. Block Consult's strategic budget is designed to adapt to rapidly changing market conditions. If a new trend, such as a surge in NFTs, emerges, the company can reallocate budget resources to prioritize research and services related to NFTs.

Certainly, no one would disagree that human resource management plays an absolutely crucial role in any enterprise. In the case of Block Consult, being a prominent blockchain technology consulting firm, there is hardly any chance for the effectiveness of HR practice to go unnoticed. Given the rapid pace at which the blockchain industry is developing, it becomes essential for an organization to ensure its continuous growth and competition through the possession and preservation of competent staff. We will now further explore what HR entails in Block Consult. One of the core strengths at Block Consult is its HR department, where seasoned professionals with years of experience and specialization in recruiting, talent nurturing, and compliance with Swiss labour laws work together to ensure the perfect fit between available human resources and specific staffing needs. The HR staff closely communicates with department heads regarding their individual personnel demand, thus making sure that the recruitment efforts are tightly matched to the business-wide

strategic goals. The quantitative and qualitative composition of the HR Department: In Block Consult, the HR department has eight employees with specific professional qualifications covering diverse tasks as per organizational needs. This team includes HR managers, recruiters, training specialists, and legal experts. Remarkably, all these team members are HR management certified while others have in-depth experience in the blockchain and technology sectors.

Block Consult prides itself on the basis of its HR operations in respect to compliance and adherence to legal standards. Following an array of normative documents as well as internal policies helps the company to run HR activities not only according to Swiss labour law but also considering the company's specifics. Such documents include employment contracts, codes of conduct for the company, anti-discrimination policies, and data privacy regulations in line with Swiss legislation.

The company employs about 100 workers that serve various departments; this is due to the diversity of its activities. Some of the functional divisions here include blockchain consulting, research, administration, and support.

In this company, roles and responsibilities are divided within the workforce. About sixty percent are in technical positions, an indication of a strong emphasis placed on technical expertise. Thirty percent work in administration areas that provide essential support to operations, and the remaining ten percent are managers and executives who guide the organization's strategic decisions.

One of the values that Block Consult upholds is gender diversity and, in return, an environment where everyone is included.

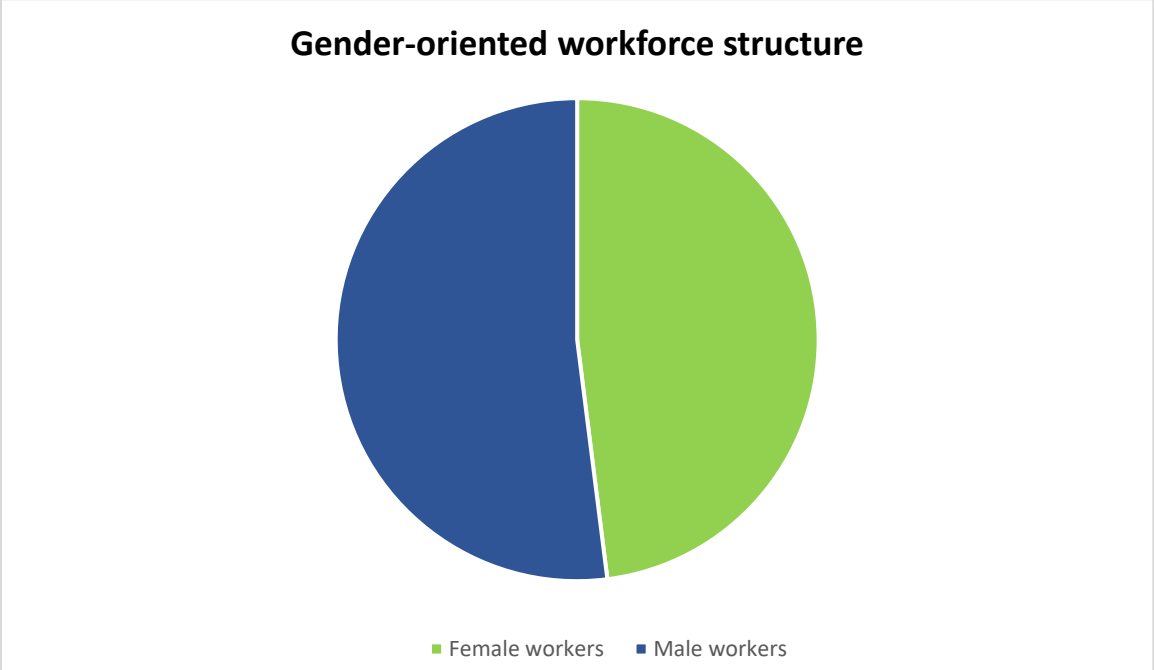


Fig. 2.1.1 Gender-oriented workforce structure

Source: compiled by the author based on financial report data

Almost half of their workforce comprises male employees while female workers contribute to 48% of the total number of staff which indicates an almost equal gender distribution. In acknowledging the importance of workforce diversity, the company strongly believes in age inclusivity and appreciates the advantages offered by having a multi-generational team. Workers are across different age ranges from young talent, less than thirty years old to professionals at the peak of their careers in their mid-forties which makes a healthy mix of experience and innovative ideas to contribute towards a better result. The company's HR policy at Block Consult reflects the values of continuous learning, innovation, and employee welfare. This policy is an all-inclusive one that considers the whole person to promote well-being and satisfaction among employees.

The HR department is well-known for their efforts to diversify technical skills among employees in the company. They understand that keeping pace with the latest trends in technology is important so that recruitment of talents is therefore strategically targeted. An example of this is when they recently hired a blockchain expert which has greatly expanded the range of services offered and built up the company's reputation as an industry leader. The employee-active company puts internal mobility into

practice that allows the employee to understand other roles and responsibilities in the organization. To illustrate this is an analyst who transitioned easily to a managerial position.

The company's IT department is working closely with other units to ensure that there is correct identification of the data needs of the company, with proper information flow and efficient decision-making. The IT department performs a thorough examination of the current IS structure in order to detect areas for improvement and optimization. Block Consult has installed several distributed servers that allow zero downtime, data redundancy at the highest level, and scalability. Each server has an upgrade on hardware to facilitate high throughputs with data. The company makes sure that all internal and external communications happen without any hitches or delays by using equipment that is both fast and secure.

The company employs both relational databases as well as NoSQL, which are optimized for quick data retrieval and storage, a crucial aspect of blockchain transactions. Block Consult's IT management team consists of professionals who possess broad knowledge of information systems such as databases, CRM software systems, and blockchain platforms. A few measures of return on investment (ROI) are used by the IT department in order to consider important points like higher effectiveness, lower costs, and clients' satisfaction. An example is that the use of a new CRM system has led to a 20% increase in customer involvement which is being tracked by the IT staff. Intelligent systems are one key aspect of IT today. These systems apply artificial intelligence (AI) and machine learning (ML) to automate processes, support data analytics, and give clients useful information. Block Consult has realized the significance of staying updated and therefore invests heavily in collaboration with technology giants; these collaborations ensure that Block Consult always possesses state-of-the-art tools and methodologies. As regards to developing and sustaining intelligent systems that are at the leading edge of innovation and applicable, this role is undertaken by the IT management team. The corporation, known as the tech behemoth, IBM, has constantly been an innovator in technology. And by unveiling its IBM Blockchain platform, it effectively entered the blockchain sphere. If Block Consult can establish a possible joint effort with IBM, this would change the game for

good! By working together, it means that Block Consult could benefit from advanced blockchain consulting expertise offered by IBM that will boost the quality of solutions delivered to their customers. Additionally, through IBM's large international network, Block Consult would be able to access a wider range of clients and opportunities. A number of companies have benefited from the introduction of Oracle into blockchain as a result of its blockchain cloud service.

By providing a full-service distributed ledger cloud platform, Oracle has become a valued resource for firms that want to streamline their workflows and mitigate potential risks. Having teamed up with Oracle, Block Consult GmbH will be able to achieve quicker deployment lifecycles with the use of Oracle's highly efficient cloud solutions and the integration with blockchain systems on a much more coherent level than ever before. Consensus is a force to be reckoned with in the blockchain industry, especially when it comes to developing Ethereum-based software. Block Consult GmbH could greatly benefit from their developer tools and platforms. If Block Consult were to work together with Consensus, they would have the opportunity to explore the Ethereum blockchain further and discover solutions that are decentralized and transparent at an even greater level. This kind of collaboration can undeniably contribute to expanding the versatility of their range of products. R3's Corda and the Fintech Landscape. While in other blockchains each transaction is published to the network, Corda confirms information with trusted entities that have a legitimate need for it. The privacy-driven design minimizes unintended data spread that otherwise happens in many systems. The smart contracts are referred to as "CorDapps," which stands for Corda Distributed Applications.

The following diagram is an essential explanatory tool in the context of my thesis, which examines the technological architecture and operational flow within distributed ledger technologies (DLTs). It illustrates how transactions move through a blockchain network visually, paying particular attention to the interactions between various parts and procedures that go into carrying out and documenting transactions. This facilitates comprehension of the intricate workings of DLTs and their useful use in actual situations.

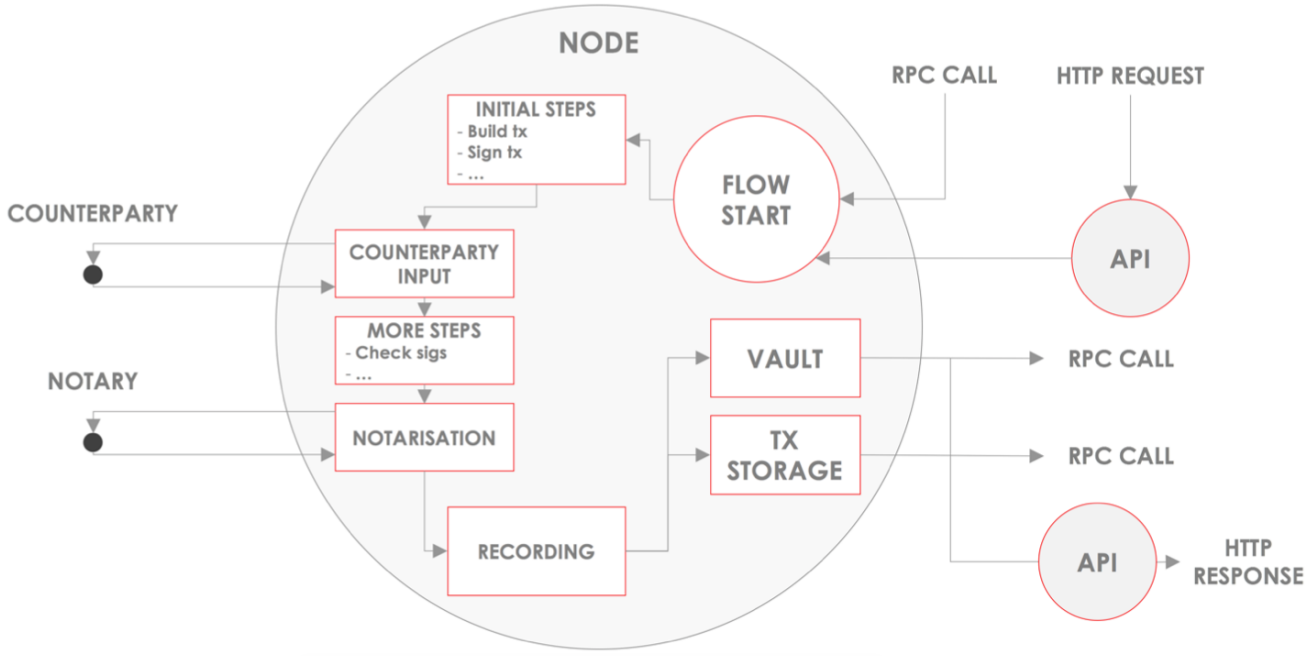


Fig. 2.1.2 What is a CorDapp?

Source: R3 Documentation

The figure illustrates how a blockchain network node processes transactions. "Initial Steps" is where a transaction is created and signed at the beginning. To guarantee the transaction's integrity and legitimacy, this stage is crucial. Subsequently, the "Counterparty Input" stage entails the counterparty nodes verifying their agreement with the transaction data. The transaction is then sent for "Notarization," during which a chosen notary node verifies that there hasn't been any double-spending in order to preserve transaction uniqueness. The transaction enters the "Recording" phase after it has been notarized and is entered into the distributed ledger. A sequence of Remote Procedure Calls (RPC) to the network's API are made during the process, signifying communication between the node and outside apps. The "Vault" and "TX Storage" are the node's safe mechanisms for storing and retrieving transaction data, guaranteeing data security and persistence. The methodical procedures involved in processing blockchain transactions are summarized in this flowchart, which also emphasizes the strong security standards and the methodical approach to reaching consensus and recording in DLT systems.

A Corda Distributed Application (CorDapp) addresses a particular issue by making use of the Corda framework. The CorDapps are stored on the Corda nodes and

are run on the Corda network. This way of distributing the application allows it to be executed on several systems at once— unlike common apps, which rely on a single system to carry out any given task. By letting nodes talk to one another and come to an agreement regarding updates on the ledger through defining flows that owners can invoke over RPC, CorDapps achieve consensus among Corda node operators. An app is a set of jar files that contains class definitions in Java and/or Kotlin. This set of definitions acts as a blueprint or prototype from which all objects are created and represents the properties shared by all objects of one type.

Common elements in these class definitions typically include:

- Flows
- States
- Contracts
- Services
- Serialization whitelists

Block Consult, the consultancy company in blockchain technology has a highly impressive annual revenue amounting to nearly CHF 15 million. The principles underlying the financial and accounting of such an organization are closely related to its core functions. Through a comprehensive examination, we will find out about the functioning of these systems, the main services provided by them, and the main guiding principles behind their success in financial performance. The basis of Block Consult's accounting system consists of the coordination between human skills, high-level modern technical equipment, and knowledge of financial procedures: handling about 3k transactions per month, this solution corresponds in a perfect way to Swiss financial regulations as well as world accounting standards. Besides, it's a well-matching part of the company's strategic framework in financial management which helps to enhance optimal resource utilization and better results.

Based on a decision to make a notable investment of CHF 250.000, the business has unveiled a cutting-edge accounting software. It is through this high-end technology that any real-time data is captured and subsequently analysed and reported accordingly, thus making automation processes which would take time to be completed by

employees be done faster and more efficiently. There are about 15% improvements in terms of fewer human errors resulting in overall accuracy when it comes to finance. The approaches adopted demonstrate respect for global benchmarks as Block Consult follows both GAAP and IFRS standards. Using the double-entry bookkeeping system, which has proved to be efficient through time, Block Consult can secure that less than 0.5% of the errors occur in our monthly transactions. The financial services department stays at the forefront and, every year, receives a budget of CHF 1.2 million in salaries and benefits, from which fifteen professionals – five skilful financial analysts, seven experienced accountants, and three compliance experts with deep knowledge in blockchain – make up its core team. They have an average of more than 8 years of working experience and ensure that all outputs provided are trusted sources for any type of financial data.

This department achieved an all-time high in the previous fiscal year when it generated 45 comprehensive analytical reports, aided in the development of strategic frameworks for 12 financial planning documents, and established oversight through a 120 system of control forms. The fact that its financial engine handles approximately CHF 800.000 worth of transactions every month attests to its flexibility and reliability. One of the company's prides is its payment options which involve 60% bank transfers and 30% digital currencies, targeting the technology-savvy while 10% prefer check payments. Trust between the organisation and its partners through business collaboration is further enhanced by a 98% ratio for timely supplier payments that nurtures trust and ensures mutual sustainability. The high level of efficiency displayed in the establishment of a registered capital amounting to 5 million CHF serves as evidence of their proactiveness, responsiveness, and commitment to regulatory compliance.

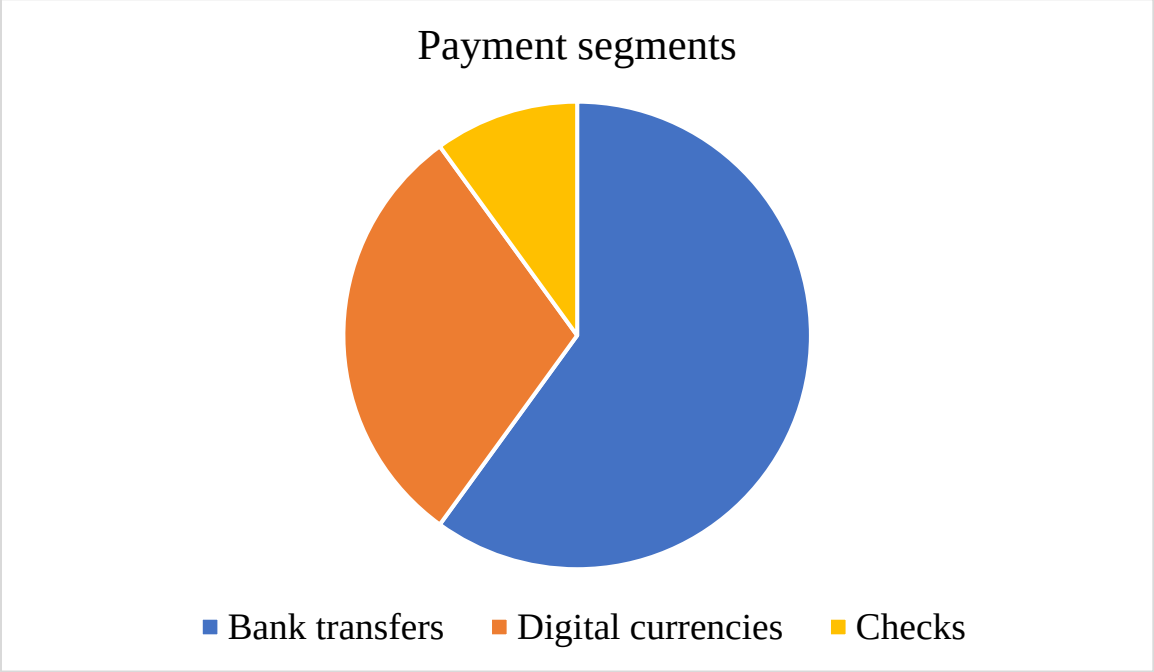


Fig. 2.1.3 Payment options distribution

Source: compiled by author based on financial report data

Every month, Block Consult manages to easily handle its creditor settlements, which total over CHF 400.000. The 97% success rate in such settlement cases reflects the organisation's financial prudence and commitment towards maintaining an amicable relationship with all stakeholders in the industry. Last year, the company, by demonstrating its civic responsibility, managed to contribute a colossal CHF 1.8 million as taxes and other obligatory payments. Firmly positioned on solid footing, the company demonstrates an unyielding capacity to manage immediate fiscal obstacles thanks to its sturdy solvency ratio of 1. 8. The preceding year marked its aggressive growth, whereby it managed to secure an additional 120 new clients, further reinforcing its dominance as a blockchain consulting expert. An indication of skilful financial planning and keen market understanding was demonstrated by Block Consult GmbH reporting a 20% operating margin that is considered successful within the industry.

By implementing such approaches and making these promises, the firm is securing its stable financial position as well as a reliable regulatory environment and is not compromising its future success in the cryptocurrency consulting space.

Table 2.1.1,

The net balance for the year ended period: December 31 (2022)

Description	Amount (in CHF)
Revenues:	
Cryptocurrency Sales	8 457 299,80
NFT Sales	4 386 712,16
Cryptocurrency Trading Commissions	1 250 640,75
Licensing and Royalties from NFTs	530 780,00
Total Revenues:	14 625 432,71
Operating expenses:	
Employee Salaries and Benefit	3 140 850,76
Office Rent and Utilities	260 870,00
Marketing and Promotion	1 542 743,00
Platform Maintenance and Development	829 578,45
Transaction and Wallet Fees	871 890,32
Legal and Compliance	698 400,50
Customer Support	164 235,07
NFT Artist Collaborations and Pay-outs	3 384 812,44
Total Operating Expenses:	10,893,380
Net Income Before Taxes:	3,740,894
Taxes (Estimated at 25%)	935 223 67
Net Income After Taxes:	2,805,671.00

Source: compiled by the author based on financial reporting data.

Table 2.1.2,

Balance sheet for the year ended period: December 31 (2022)

(amounts in CHF)

ASSETS		LIABILITIES	

Current assets		**Current liabilities**	
Cash and cash equivalents	2.685,412 .-	Accounts payable	953.467 .-
Accounts receivable – net	1,382,957 .-	Short-term debt	476,234.-
Inventory (hardware)	889,034 .-	Accrued liabilities	285,740.-
Prepaid expenses	684,629 .-	Unearned revenue	381,659.-
Total current assets	**5,642,022 .-**	**Total current liabilities**	**2.097,100.-**
Non-current assets		**Long-term liabilities**	
Property, plant, and equipment	2,136,584.-	Long-term debt	954,219.-
Long-term investments (e.g.,		Deferred tax liabilities	286,266.-
blockchain ventures)	4,063,497 .-	Total long-term liabilities	1.240.485.-
Intangible assets		**Total liabilities**	3.337.585.-
Goodwill	3,448,782 .-		
Total non-current assets	982,324 .-	**Shareholders' equity**	
Total assets	**10,631,187 .-**	Common stock	963,497.-
	16,273,209 .-	Additional paid-in capital	1,926,994.-
		Retained earnings	3,145,133.-
		Total shareholders' equity	**6.035.624.-**
		Total liabilities & shareholders' equity	**9,373,209.-**

Source: compiled by the author based on financial reporting data.

Considering the beforementioned data, I believe that calculating the return on assets (ROA) and return on equity (ROE) is a great idea, as these ratios demonstrate the scale of effectiveness of the company's assets usage to generate profits, and how well it is providing returns to shareholders.

1) ROA = (Net income/Total Assets) x 100 = (2,805,671/16,273,209) x 100 ≈ 17.24%
2) ROE = (Net income/Total shareholder's equity) x 100 = (2,805,671/6,035,624) x100 ≈ 46.49%

The Return on Assets (ROA) is an indicator that tells us how well a company can use its property and generate income. It is rated at 17.24%, which is quite high — notably for a consulting firm. The implication here is that the company makes excellent use of their assets to churn out revenue at a very effective rate. Generally, an ROA

above 5% is deemed favourable across many sectors; thus, this substantial ROA bodes well for operational efficacy in such service-based industries as consultancy firms.

ROE: Return on Equity (46.49%)

The Return on Equity (ROE) is an indicator of the extent to which a company can make use of its owners' equity share capital to generate profit. This high ROE value of 46.49% is typically very positive, and its presence often signals good news for investors. It means that the company not only makes large profits in relation to the equity but also through effective management, shareholders can expect substantial returns. In the consulting sector, low leverage implies that a high ROE underscores the effective utilization of invested capital without much debt financing. The substantial ROA points to high efficiency levels for asset conversion into profits at this firm, a boon especially beneficial within an industry like consulting which places significant emphasis on operational cost control alongside optimization of asset productivity.

The exceptional profitability indicated by the very high ROE means that the company is highly efficient in generating profit which can be a significant attraction for more investors looking to make substantial returns on their investments.

Sustainable growth is backed up by high ROA which demonstrates that the company can expand effectively without having to grow its asset base at the same rate, an indication of efficiency that can support both organic growth and acquisitions.

Return on Equity (ROE) is used as a measure of financial stability: it is a good signal to the strength of the company's financial standing, implying ability to resist economic recessions and competition pressure with resilience. Moreover, it can offer leverage for the company to find new investments without having to borrow too much. Return on assets (ROA) is another measure that makes the company attractive to investors: having both high ROA and ROE would mean that investors are likely to put their money into such businesses because they are able to use their capital effectively in generating returns which leads to possibly high valuation of the company's stock. Although a high return on equity (ROE) typically signals strong financial performance, it is important to investigate the drivers behind this ratio as high ROE can be a result of high financial leverage which in turn magnifies risks associated with investing in a particular company. Yet within the realm of a consulting firm, substantial levels of leverage

would seem less probable when juxtaposed against other sectors. The reliance on upholding these high-performance measures could force the organization into assertive tactics, which must be controlled so as not to engender operational or strategic hazards.

A substantial structure with a great impact, the DuPont analysis unravels the various determinants of Return on Equity (ROE) and divides them into three distinct components (DuPont 3 step method). This dissection offers a more profound understanding of how an organization can use its business dealings, asset control, and fiscal architecture to enhance its productivity. Here are the steps through which a company can adopt the DuPont approach for gauging ROE:

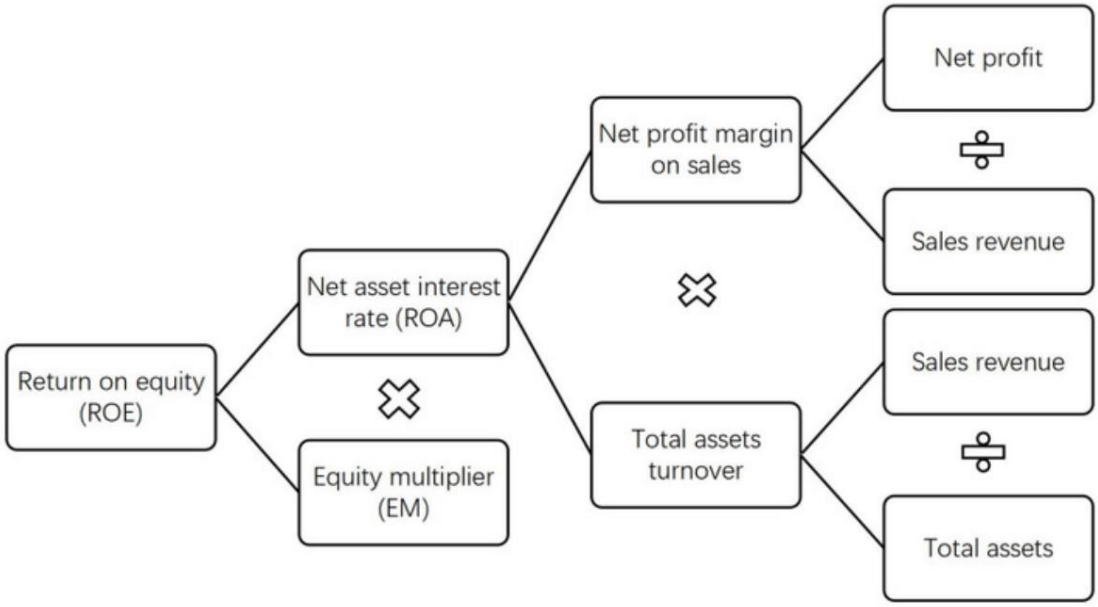


Fig. 2.1.4 DuPont analysis logic diagram

Source: ResearchGate.

Components of the DuPont model:

1. Net profit margin - measures how much profit a company makes for each dollar of sales.

Profit margin = (Net income / Revenue)

2. Asset turnover - measures the efficiency of a company in using its assets to generate sales.

Asset turnover = (Revenue / Total assets)

3. Equity multiplier: reflects how a company uses debt to finance its assets.

Equity multiplier = (Total assets / Shareholder's equity)

DuPont Formula for ROE

ROE = Profit Margin x Asset Turnover x Equity Multiplier

Calculation:

Net Income: CHF 2,805,671

Revenue: CHF 14,625,432.71

Total Assets: CHF 16,273,209

Shareholder's Equity: CHF 6,035,624

1) Profit margin:

Profit margin = 2,805,671 / 14,625,432,71 = 19.19%

2) Asset turnover:

Asset turnover = 14,625,432,71 / 16,273,209 = 89.9%

3) Equity multiplier:

Equity multiplier = 16,273,209 / 6,035,624 = 26.9%

The ROE using the DuPont model:

ROE = 0.1919 x 0.899 x 2.697 = 0.4649 (46.49%)

In this DuPont analysis, it can be clearly seen that although the company has a relatively high-profit margin and is able to use its assets efficiently, the greater part of its ROE relates to its use of leverage, as can be observed from the equity multiplier. This strategy indeed increases the profitability of equity but at the same time leads to higher risk due to a significant amount of debt financing. The model offers a detailed examination on how profitability, efficiency and financial leverage are related among each other through which they jointly define the company's performance.

2.2 Research of strategic management, innovative management, and competitiveness on the market

Block Consult paints a picture of tomorrow where blockchain not only redefines but transforms industries all around the globe. Providing expert guidance plus strategic insights to those embarking on this transformative journey as clients. They show their

commitment through such collaborations, partnering with global financial institutions in this case exampled by one particular partnership where they are working hand-in-hand with a global financial institution towards developing a blockchain-based platform for cross-border payments which significantly reduces transaction cost.

At the highest level, the Board oversees and gives final approvals for strategic initiatives based on the company's long-term vision and mission. The CEO plays a central role in crafting, articulating, and driving the overall strategy of the company, ensuring it aligns with the business model and the industry landscape. Chief Strategy Officer (CSO) or Head of Strategy focuses on the strategic planning processes, working with various departments to align corporate strategy with operational goals. Departmental Heads oversee strategy at a departmental level, ensuring that individual departmental goals align with the overall company strategy.

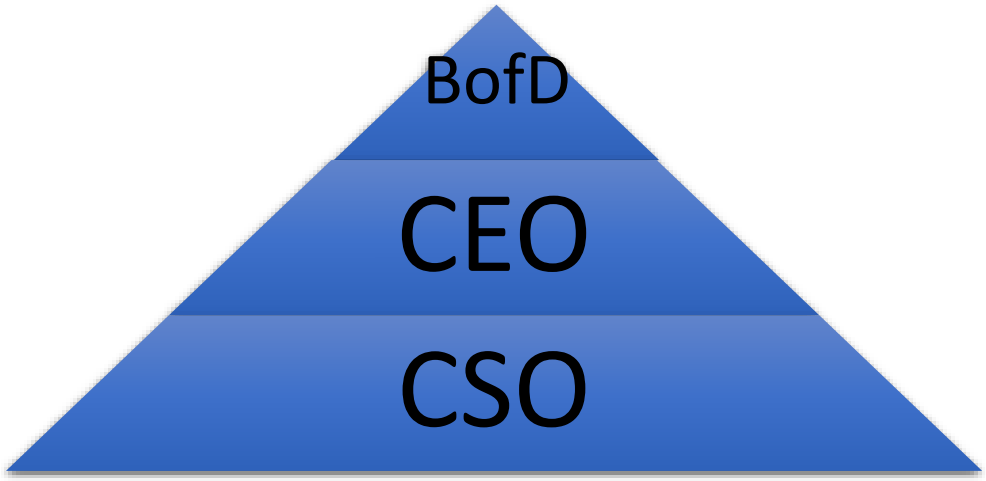


Fig. 2.2.1 - Block Consult's governing hierarchy

Source: compiled by author based on the company's analysis.

Block Consult operates in the blockchain technology and cryptocurrency consulting domain. Their primary activities include providing consulting services to businesses seeking to integrate blockchain technology, offering advisory services for cryptocurrency investments and trading, and conducting workshops and training sessions on the latest trends in blockchain technology. While working there I have identified the SWOT matrix of the company, see SWOT matrix.

Block Consult GmbH strongly believes in the revolutionary potential of blockchain for any business. Entry into new markets will be facilitated through partnerships, strategic alliances, and potentially mergers and acquisitions. The firm leverages cutting-edge blockchain platforms such as Ethereum, R3's Corda, and Hyperledger. The emphasis is also on integrating AI and big data analytics for enhanced service delivery.

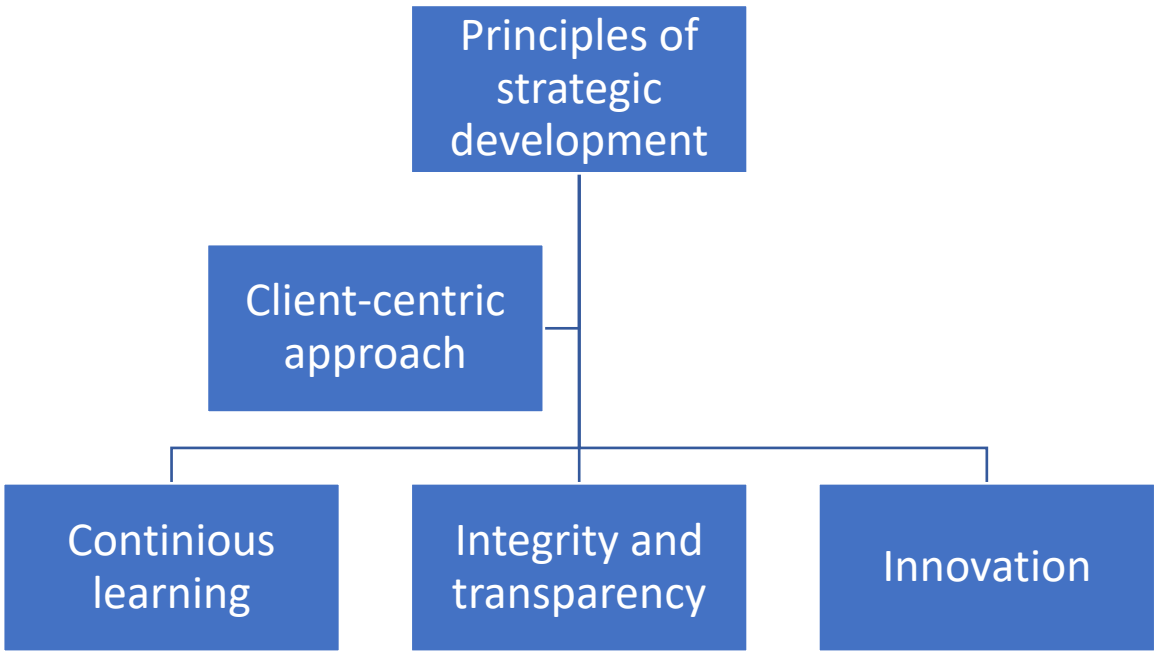


Fig. 2.2.2 - Principles of strategic management of Block Consult

Source: compiled by author

• Client-centric approach – ensuring services meet the specific needs and objectives of each client.

• Continuous learning – staying updated with the latest in blockchain and related technologies.

•Integrity and transparency – ensuring all advisory and consultancy services are delivered with the utmost integrity.

• Innovation – prioritizing R&D to find novel solutions for clients.

The nucleus of all new and revolutionary at Block Consult GmbH lies within the innovation and research division. The spearheading power of this revolution is the chief innovation officer. He does not work in silos with other departments but infuses

innovation into every nook and cranny of the organisation. Recently, Web3 technologies have surfaced as a decentralized web seeking user control over data, introducing such leading-edge technologies only cements the company's stand in these tech terrains. Introducing agile methodologies to project management has been acknowledged as an effective approach towards achieving more flexibility and adaptability to changes in technology. In order to foster innovation, Block Consult has created a work culture where all employees can present their creative ideas through an open platform known as the “Innovation Hub.” This is a platform where members can introduce new concepts, tools, or processes. As noted from some key performance indicators, the introduction of innovative projects at Block Consult GmbH has led to notable returns: both Web3 and NFT consultancy services have achieved a 20% ROI (return on investments) in their first quarter while there has been a 15% increase in new clients, specifically looking for NFTs and decentralized web solutions. Participation rate at the Innovation Hub stands at 60% showing strength in internal innovation culture.

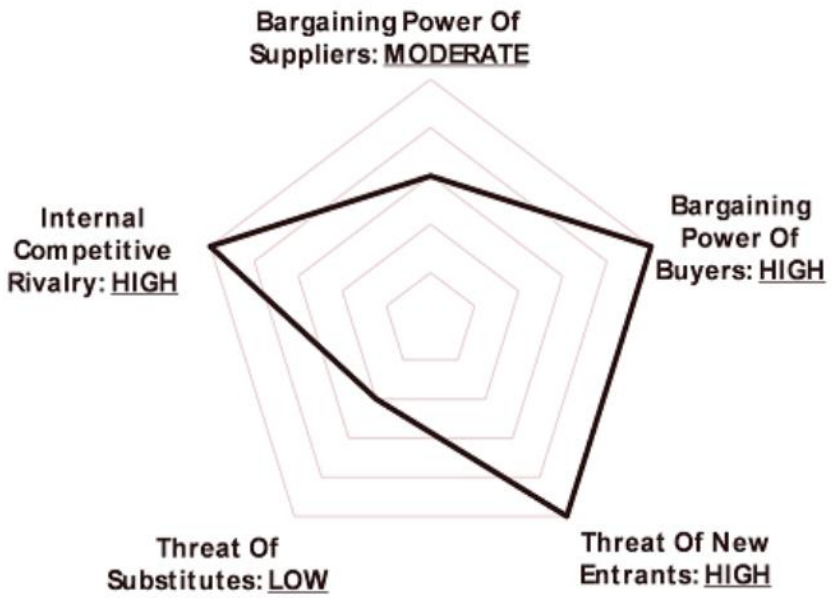


Fig. 2.2.3 - Porter’s 5 forces analysis of the operating industry

Source: compiled by author based on research.

2.3 Role in international economic relations and economic impacts

In the metaverse, Block Consult Ltd acts as a major player in facilitating cross-border transactions, using blockchain technology and DeFi protocols, making it accessible for users irrespective of their geographic location. By being able to take part in global trade through the platform, users can easily access financial services plus transact with digital assets. The reach into these sectors has a ripple effect towards underserved communities in different parts of the world by narrowing down geographical boundaries between traditional and digital economies.

Being present within the metaverse does more than just expand its market reach geographically, it delves into a digital audience made up of consumers interested in virtual products plus investors without physical borders and partners connected through virtual environments. To promote its services, Block Consult Ltd uses social networks plus digital marketplaces which provide more insights from international stakeholders leading to partnerships. Block Consult GmbH develops its global recognition through a profound understanding of aspects that make the company unique among its competitors. In the metaverse, Block Consult GmbH plays a significant role in fostering unity among nations through trade relations. It encourages collaboration between nations where they can pool together resources and information via cross-border partnerships, joint ventures, and ecosystem collaborations. The aforementioned is leading to mutually beneficial relationships with international partners that form virtual trade networks. These networks then lead to supply chains (virtual) which further result in economic clusters designed for the integration and resilience of virtual economies at large. Throughout its history, the company has been a magnet for foreign direct investment (FDI) and capital infusions from around the globe. The buoyant market potential of Block Consult innovative solutions catches the eye of funds from all corners of the financial world. This infusion of capital into growth horizons acts as fuel for efforts towards expansion— an eventual producer of wealth, not only for those involved in virtual economies but even job seekers at such platforms.

Regulatory compliance and risk management take a central role when Block Consult Ltd, as a metaverse participant, steers its way through international economic relations that have varying compliance laws. The company ensures it does not wait for these regulations to be imposed upon them but rather it goes out to meet the regulators

as well as experts from different sectors to establish their own compliance with evolving frameworks including tax laws and licensing requirements. Block Consult Ltd combines strong measures with risk management, acting as a shield to their business operations, in order to address reputation risks.

In the metaverse initiatives, an economic paradise takes root thanks to Block Consult Ltd, injecting large amounts of wealth into virtual economies. The company creates demand for digital products fuelling consumption even more through an innovation drive that sees investments flowing towards entrepreneurial efforts in digital assets and wealth creation within virtual realms. Blockchain technology has potential: to evolve, to exceed its introduction into the use of cryptocurrencies. Economic resilience through wealth creation via job opportunities, thus social development, let alone wealth accumulation resulting from value addition back to stakeholders in both metaverse and global community remains hallmark features stemming out of what they are doing within their virtual environment.

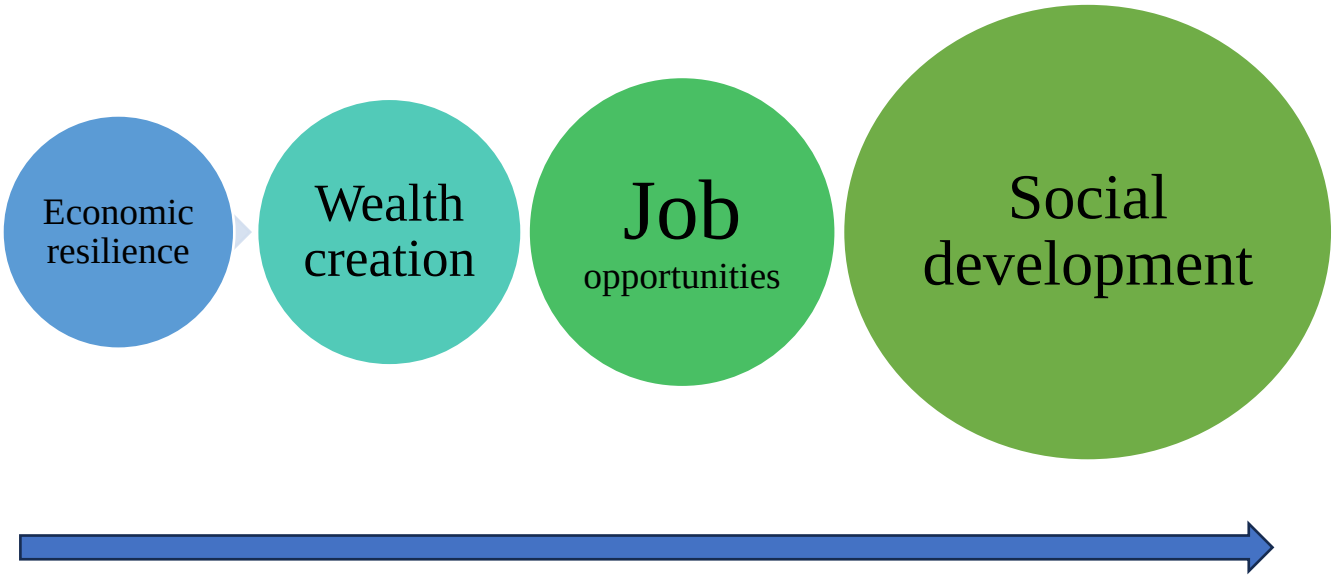


Fig. 2.3.1 The potential of virtual environments
Source: compiled by author

CHAPTER 3. METAVERSE PARADIGM SHIFT: CONSIDERATION OF WAYS OF BUSINESS DEVELOPMENT, ECONOMIC RENOVATION, AND ENHANCEMENT IN THE FRAMEWORK OF THE METAVERSE

3.1 Research of public opinion on the Metaverse, Web3, and its foundation for the improvement of business development

The Metaverse has been a substantial concept that has gained much popularity in the past few years, especially due to advancements in virtual reality (VR), augmented reality (AR), and blockchain technologies. The business as they move into the Metaverse, a space for new experiences, alongside the expansion of operations into the virtual sphere, needs to be aware of what people think about this emerging platform, hence public opinion about this platform is crucial. This study seeks to determine public sentiment and perceptions towards the Metaverse, and effect this may have on further development of business. In this section, the paper will provide the results collected from the answers and a detailed analysis of those responses illustrated in figures as well as a summary and breakdown of the open questions. The aim of the survey was to focus on understanding people's sense of awareness regarding the existence of the Metaverse and its impact on business development.

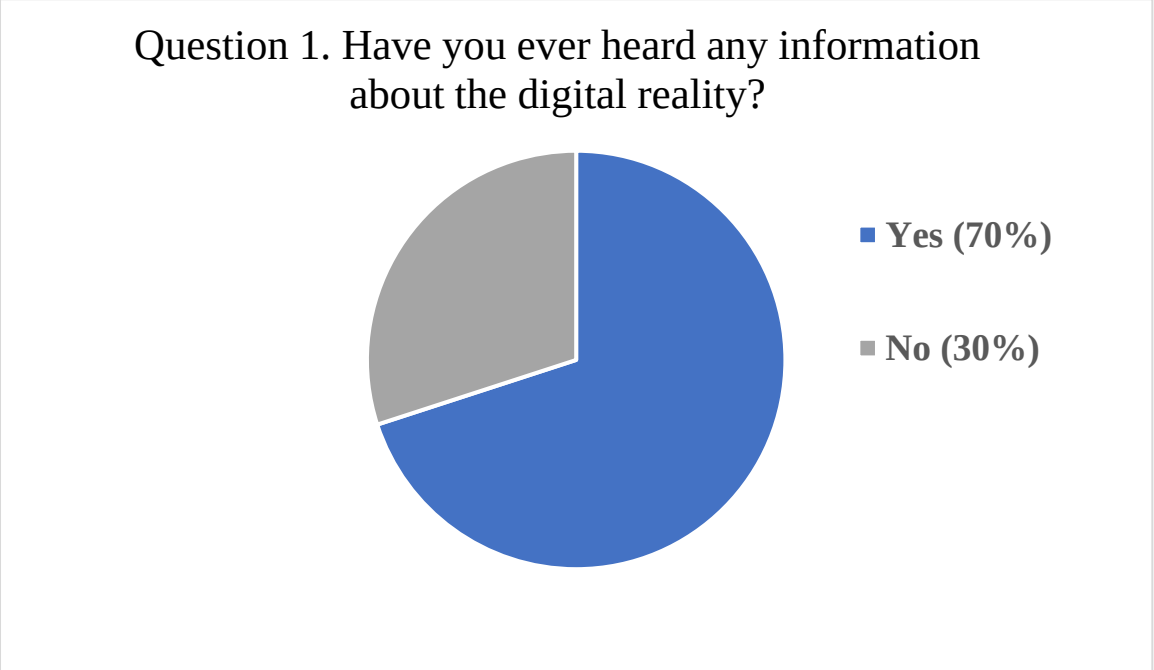


Fig. 3.1.1 Percentage of responders on their opinion about the digital reality.

Source: compiled by author based on the previously created poll with the help of Type form.

As demonstrated from the pie chart above, 3 people out of 10 participants were unfamiliar with the Metaverse, while 7 others got to be aware of the term.

Although the term digital reality has been established quite a while ago and the phenomenon itself has been discussed on many platforms and in an array of fields, there were still three people who did not know the term or perhaps did not know the deeper meaning behind the term. Even though the three answers suggest the lack of knowledge in this area, the users still completed the survey fully.

The response to this question could imply different scenarios: one group of individuals may have no idea about digital reality (not grasping the full concept) or be completely unaware of the term. Another group might be aware of the virtual reality but oblivious to the existence of the term. Yet another group may have some knowledge about it, but not as sufficient as needed to consider themselves well-informed.

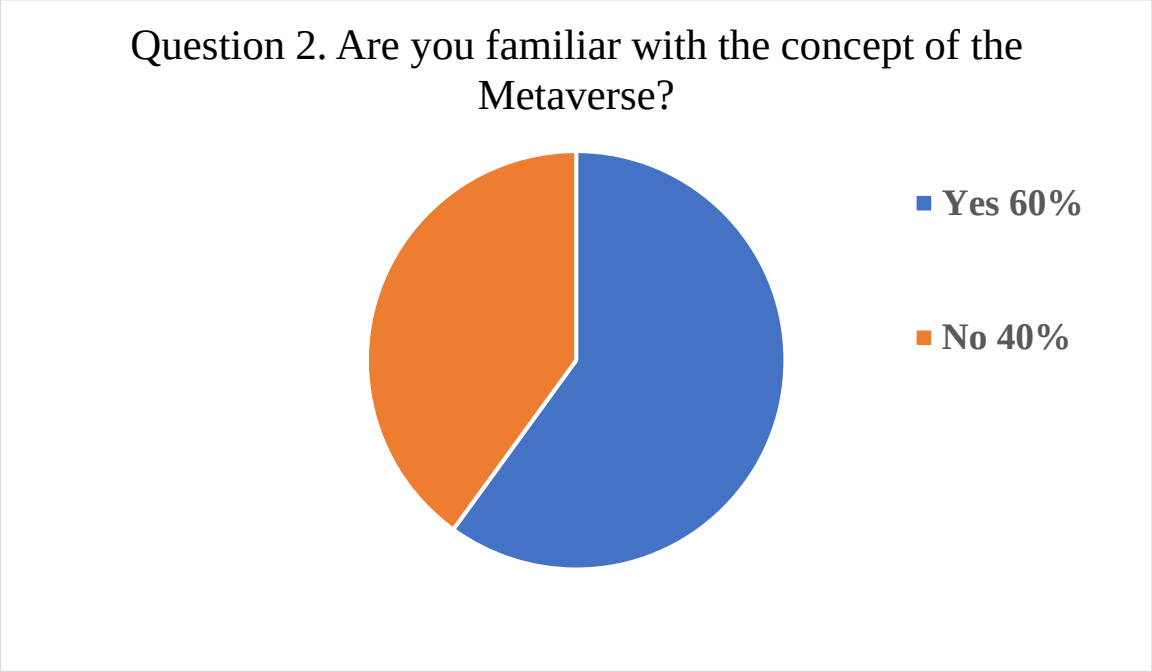


Fig. 3.1.2**.** Percentage of responders on their opinion about the Metaverse

Source: compiled by author based on the previously created poll with the help of Type form.

As we can observe from the figure 3.2, for the second question, 4 out of 10 participants did not know the meaning behind the term metaverse, accounting for 40% of survey participants, with 60% being familiar with the Metaverse.

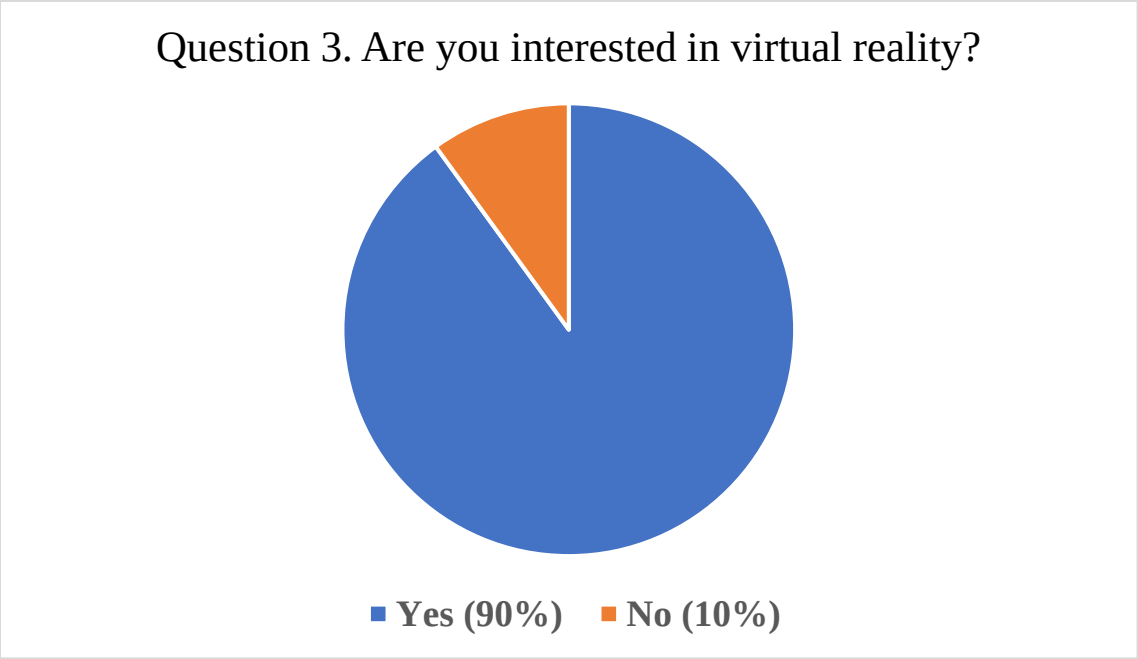


Fig. 3.1.3. Percentage of responders by the scale of excitement

Source: compiled by author based on the previously created poll with the help of Type form.

As shown at the figure 3.3, the third question in my questionnaire represents how excited people are about the virtual reality. Only 1 out of 10 participants showed a lack of interest, which, in its turn, underlines the urgency of the VR. The high interest level suggests that the potential of the market is significant.

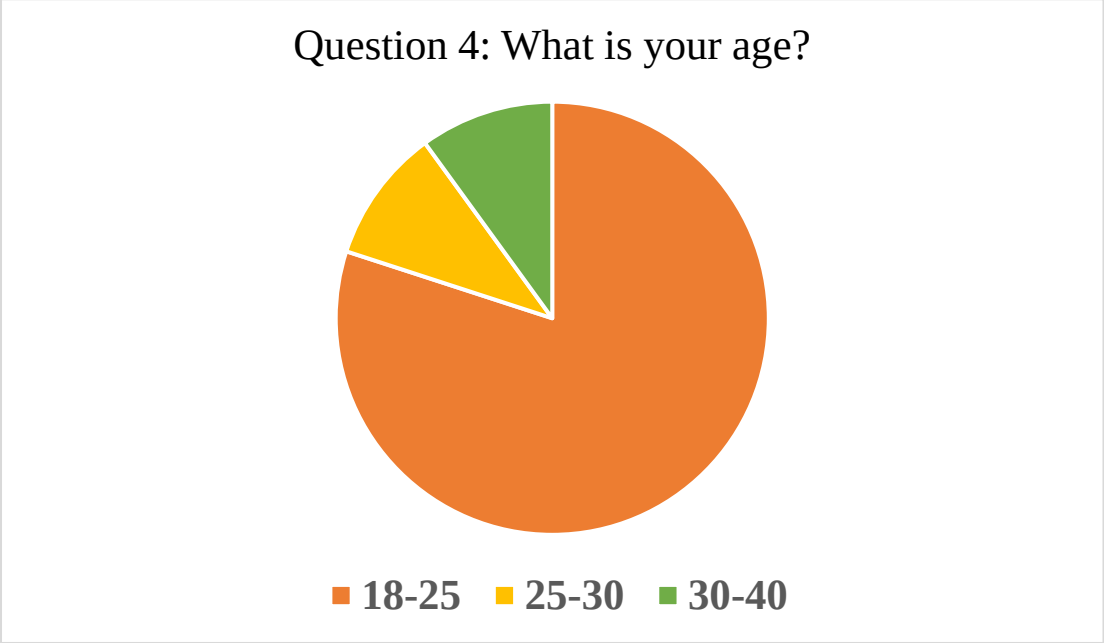


Fig. 3.1.4. Demographic insights

Source: compiled by author based on the previously created poll with the help of Type form.

From the survey we can see that the interest levels could vary across different age groups. Typically, younger audiences show greater interest in technologies like VR. In our case, most of the participants are 18-25 years old, so this age group appears to be the largest demographic in the survey.

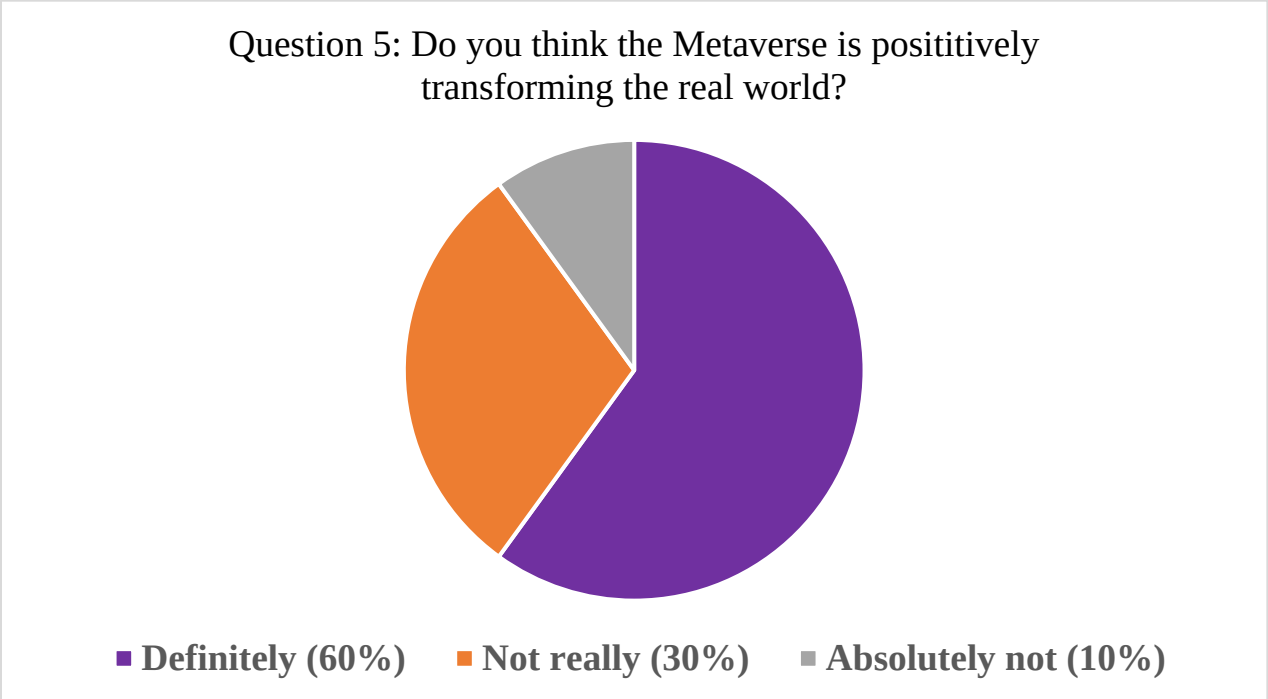


Fig. 3.1.5. Percentage of respondents' opinions about the influence of the virtual world

Source: compiled by author based on the previously created poll with the help of Type form.

The pie chart reflects respondents' opinions on whether they believe the Metaverse is positively transforming reality. The largest segment of the pie chart represents the respondents who believe the Metaverse is undoubtedly having a positive effect on reality. The majority indicates optimism about the potential applications of VR. The second group consists of those who are quite sceptical about the positive impacts. The proportion reflects a cautious perspective. A smaller fraction denies any positive transformation of the real world by the Metaverse.

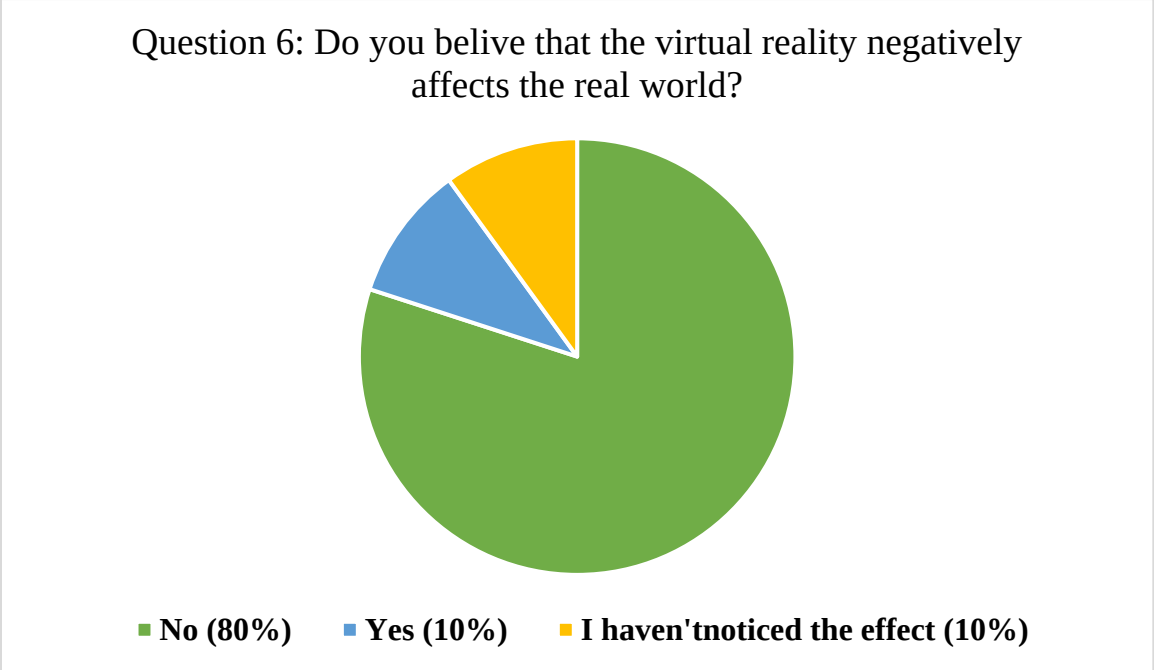


Fig. 3.1.6. Percentage of respondents' opinions on the negative impacts of VR

Source: compiled by author based on the previously created poll with the help of Type form.

As demonstrated from the pie chart above, the majority of respondents suggest that there are no negative effects of VR application in reality, meanwhile the minority believes that VR does negatively affect the reality. Another small segment admits that barely any effect has been noticed.

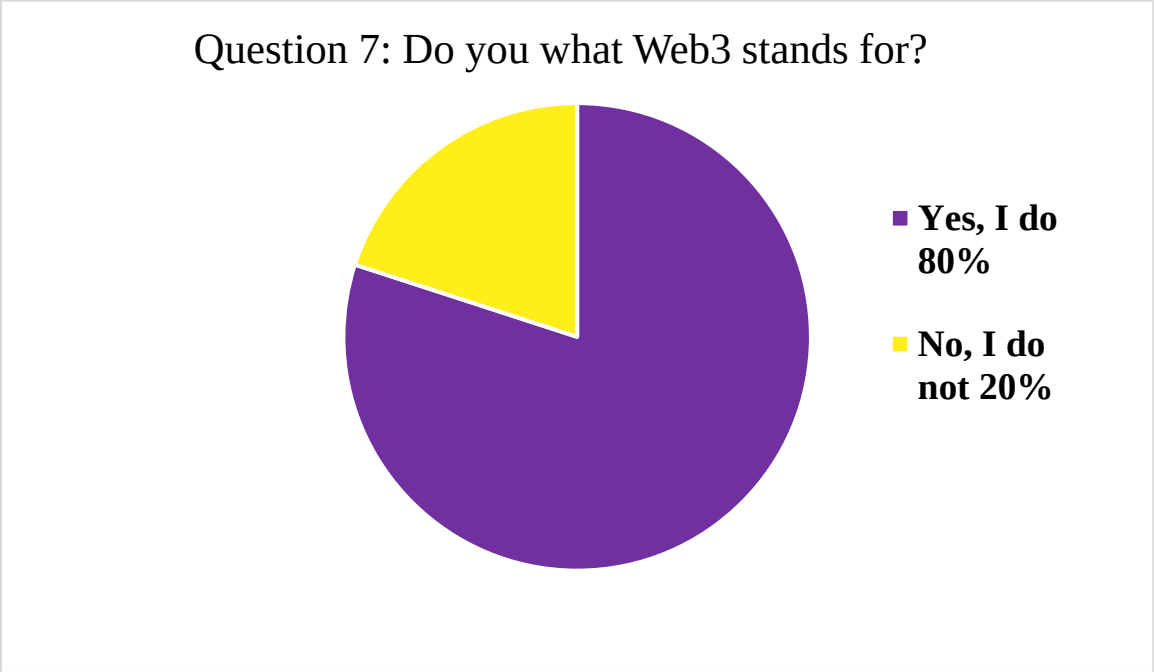


Fig. 3.1.7. Percentage of responders on their opinion about Web3

Source: compiled by the author based on the previously created poll with the help of Type form.

The pie chart reflects opinions about Web3, the high level of awareness underlines that the concept of Web3 is understood among the participants. Web3, which is interconnected with blockchain technology, decentralisation, and user-empowered internet, appears to gain public recognition.

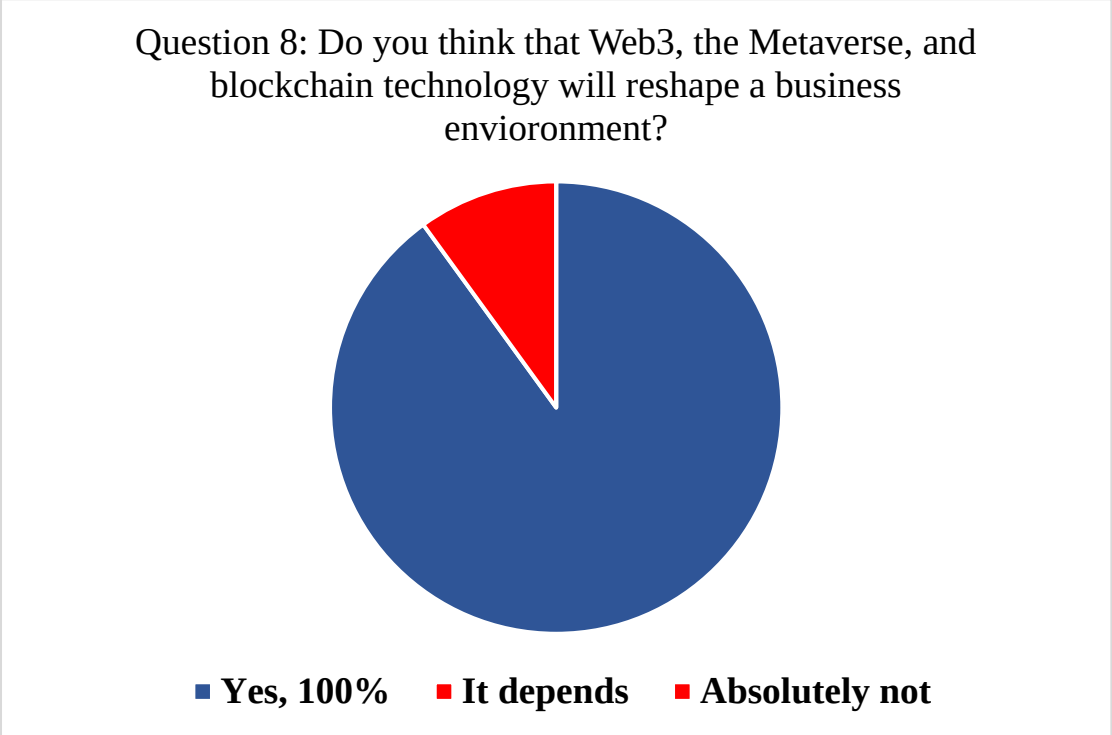


Fig. 3.1.8. Percentage of responders on their opinion about the future business environment perspectives

Source: compiled by the author based on the previously created poll with the help of Type form.

As demonstrated from the pie chart above, the majority of respondents believe that integration of Web3, the Metaverse, and application of blockchain technology will reshape the modern business environment. The minority believes that business transformation depends on multiple variables. However, not a single negative opinion has been shared, which underlines that no one among participants believe that these technologies will “Absolutely not” reshape the business environment in the future.

Hence, on the basis of the conducted research and following newest trends, it becomes clear that the Metaverse is gaining momentum. A virtual realm where you can conduct business in a stunningly lifelike 3D environment, that is the promise of the metaverse, where you can trade goods and services, negotiate contracts or even find your next top employee all while connecting with customers on a whole new level. For some tech visionaries, this isn't about big platforms controlling every bit of data or decision— it's about empowering users (both individuals and businesses) to carry their identity, wealth, and valuable experiences wherever they tread. And unlike the transient

web pages we know today, this digital expanse will persist even in our absence, ensuring that there's always a place waiting for us to return.[54]

An example is using the metaverse to visit a factory halfway across the globe by donning a virtual reality (VR) headset. You can see its machines without leaving your desk, even make a digital handshake with the local supervisor. Consider sending one version of yourself to the factory while another attends a board meeting, coordinating production between a virtual and actual factory. In this way, customers transition from one virtual car store to another by feeling the impact of wind as they test-drive vehicles, will ensure that each departmental store provides support for incoming drivers with new virtual cars. Many younger consumers are already trying out virtual clothing in their gaming environment stores, surrounding themselves with virtual products bought from those settings where they will be used. [55]

Companies are already looking to the metaverse to:

- Enhance the customer's experience.
- Introduce virtual products that can only be found in the metaverse.
- Collect new customer information.
- Market both physical and digital goods and services.
- Payments and finance in the metaverse should be supported.
- Provide hardware and software to support metaverse activities

It seems that Meta's metaverse will primarily take the form of a social network. I mean, what good is a virtual "reality" if users can't engage in any way? This sure includes bitcoin exchanges and NFT transactions but it's also about good old-fashioned socializing. [56] Roblox, an online gaming platform, serves as a great example. In 2020, more than half of all kids under 16 in the US played Roblox. It's a platform where users can play games created by other users, they have over 20 million games in their collection. Roblox players are able to socialise by playing games and using avatars. Ultimately, it creates a space where budding game developers can showcase their skills, connect with like-minded individuals, and even throw a virtual party. Roblox serves as an instance of metaverse networking. Professionals have been using social media for networking purposes for a long time, the metaverse acts as an extension to that idea but in newer and more interesting way.

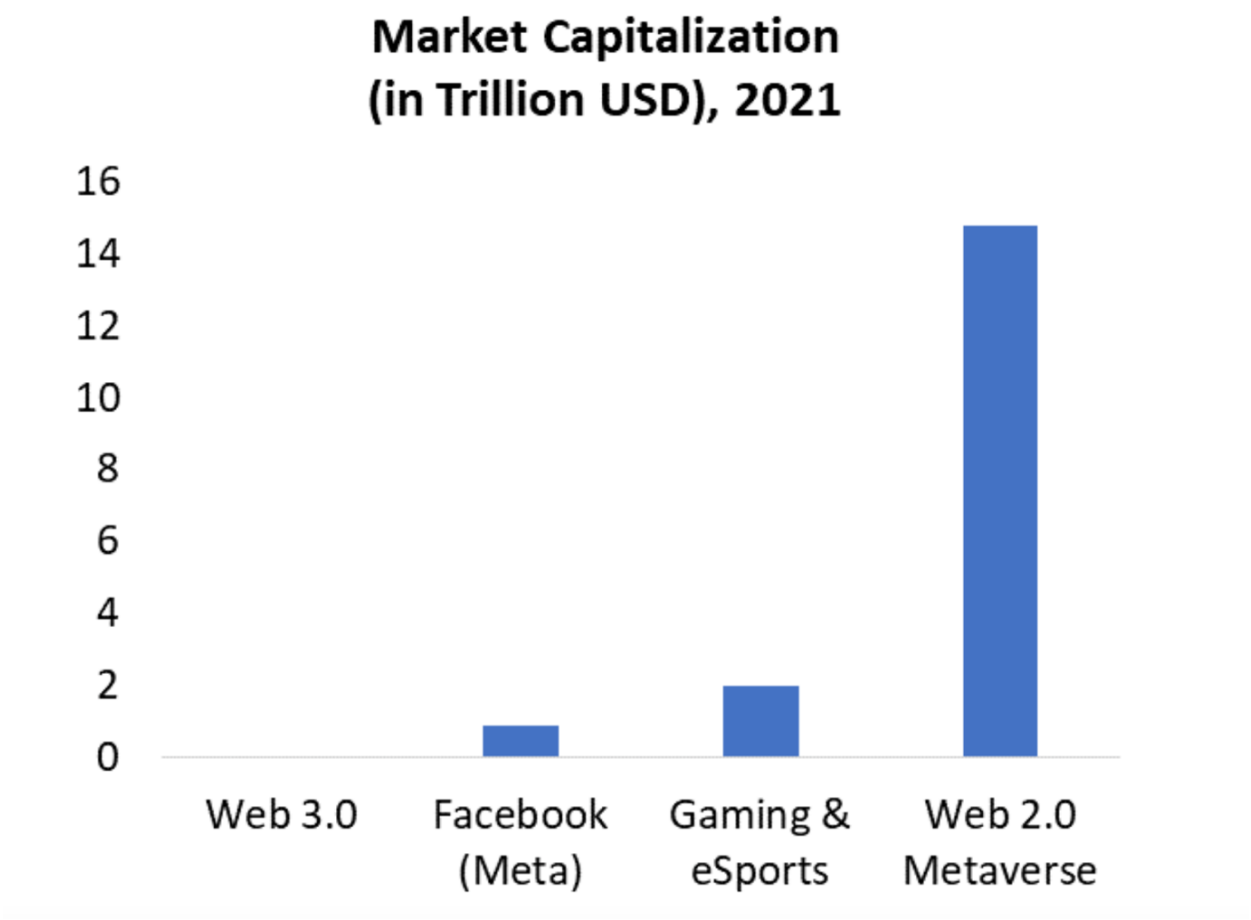


Fig. 3.1.9 Market capitalisation

Source: retrieved from Maximize Market Research

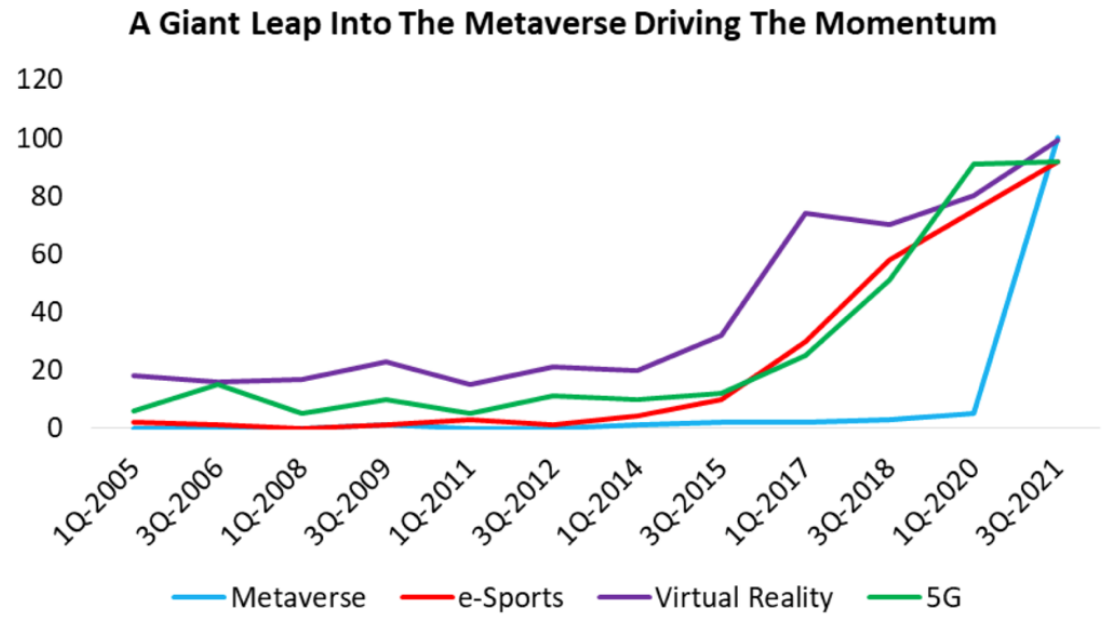


Fig. 3.1.10 A giant leap into the Metaverse gaining the momentum

Source: retrieved from Maximize Market Research

The new realm of immersive experiences that captivate users like never before is where innovation meets opportunity for businesses. Let me give you an example to illustrate this point further, in a virtual store setup, retailers can showcase their products visually so that customers can see what they are buying before any actual purchase takes place. As implied in the aforementioned discussion, retail merchants can establish online platforms where customers can visually peruse products just like they would in a brick-and-mortar store. Potential buyers can see the items from various dimensions, peruse product descriptions, and even envision how the products would appear within their personal spaces using Augmented Reality.

In both fashion and beauty sectors, virtual try-on encounters enable clients to virtually sample clothing, accessories, or makeup before sealing the purchase deal. This not only enriches their online shopping adventure but also lowers the chances of them returning the goods. The provision of virtual tours by real estate firms enables prospective buyers to inspect houses or apartments without physical presence at the site. This results in time saved for both the buyers and agents, thus making it easier for buyers to make a shortlist of their preferences without having to meet physically with agents. In place of typical conferences or trade shows, firms can organise virtual events that enable attendance from any part of the world. Such events may feature the presentation of keynote speeches and workshops (which could be interactive) plus networking opportunities through a virtual platform that everyone has access to from wherever they are in the world. The use of virtual reality in the training program can teach employees about driving, and it would have been difficult to do so without physical resources. Customer education or employee immersive training programs can be created using VR technology. In virtual reality gaming, game developers create games that allow players to experience gameplay like never before. This includes transporting them to virtual worlds where they can participate in incredible stories and other activities presented. To view art pieces from different parts of the world would typically require traveling long distances; however, with digitalization, this is possible through a virtual museum visit. A walk through an exhibition hall portraying artifacts from various cultures worldwide would also be an impossibility if not for a similar resource.

A great example of the metaverse integration that comes to mind is an AI-driven avatar a virtual representation of an individual or character propelled by artificial intelligence algorithms, allowing users to be engaged through assistance, recommendations, and customer service. An AI-driven avatar can study user data, preferences, and behaviour and then offer personalized help. In a scenario like e-commerce, for instance, the avatar can suggest products that match past purchases or browsing history plus demographic information. This personal touch ensures customer satisfaction as the user receives recommendations based on their specific needs and interests. Avatars can provide recommendations based on users' interests. In the case of products or services, this personalization ensures that the AI-driven avatars are constantly adapting and improving due to user feedback. This conversational data informs the algorithms driving these recommendation systems. With a chatbot as its representative, customer service acquires a whole new look. The ability to provide a human-like conversation allows such AI-driven avatars to easily answer most common customer queries, help customers through the process of resolving their problems, or inform them about each step in a detailed way, all leading towards decreasing manual workload while increasing turnaround time for customer inquiries. AI-driven avatars can provide help and support any time during the day, as they do not sleep or have working hours. This ensures that customers can get help whenever they need it, which leads to happier customers who tend to be more loyal. As opposed to a human agent who can attend to only one client at a time, AI-driven avatars are able to handle multiple interactions simultaneously, thus making them highly scalable. This level of scalability is especially useful for businesses dealing with large numbers of customer inquiries (or peak hours) and where many other activities must take place concurrently. Invariance in all dealings: irrespective of the number of times they interact with clients or the time of the day, AI avatars give consistent responses and service quality. Such uniformity fosters trust and dependability from customers; this can be seen to have an optimistic impact on the customer experience as a whole. Even though there might be some costs involved in setting up AI avatars, it is cost-effective for businesses in that by eliminating the need for large customer service teams, operational efficiency is enhanced leading to eventual savings for the company.

For instance, recently launched AI-generated foreign ministry spokesperson of Ukraine – Victoria Shi, introduced herself as a “digital person”. It was reported by the foreign ministry’s press service that the remarks provided by Shi would not be generated by AI. Instead, they would be written and validated by actual individuals. “It’s only the visual part that the AI helps us to generate,” Dmytro Kuleba, the Ukrainian foreign minister, said, adding that the new spokesperson was a “technological leap that no diplomatic service in the world has yet made” (The Guardian). According to him, the primary purpose behind her creation was to "save time and resources" for diplomats. The individuals responsible for developing Shi are a group known as the Game Changers, who have previously produced virtual-reality material centred around the conflict in Ukraine.

The Metaverse can reshape the modern business environment by transforming its marketing. Businesses can achieve a level of engagement with their audience through virtual events, which are hosted in a digital environment. The types of these events vary widely from product launches and special previews to virtual concerts and interactive experiences. Through organisation of virtual events, businesses are able to address a global audience, build a community around their brand that participates actively, and spark interest around what they have to offer even more. In the online world, companies can design and introduce the exclusive products which only exist virtuallyб such as digital limited-edition collectibles (skins or items for use in gaming/virtual reality environments). The fan engagement driven by these unique virtual items is sure to create an aura of exclusivity surrounding the owners and be successful for businesses as a new revenue channel. Virtual environments are emerging arenas through which brands may craft virtual worlds that provide the user with an individual and unique experience of their product or service. As an illustration, suppose it is a clothing brand, they could come up with a virtual dressing room where users have the opportunity to fit virtual clothes using augmented reality technology. Such interactivities serve as indelible imprints on brand encounters and customer loyalty in ways far better than words alone.

When taking into consideration the development of Block Consult, given that the organisation was birthed on blockchain technology and has hit major strides in Web3

plus NFTs, it is more than just a possibility but rather a rational discussion for Block Consult to birth a new strategy. An exhaustive examination hints that investment needs to be raised, particularly for R&D on emerging blockchain technologies as well as training initiatives. But it also should be noted that the expected return on investment (ROI) and the market which is growing day by day support this funding. Block Consult GmbH should include DeFi consultancy within its range of services after DeFi: going mainstream. As a part of DeFi consultancy, it might involve setting up NFT markets or reaching out to artists in specific partnership arrangements.

It is essential to ensure that staff are trained on these new technologies, thus make sure they are up-to-date and highly knowledgeable so that they can contribute effectively towards positioning Block Consult GmbH as an industry pacesetter. This calls for establishment of collaborations with prominent tech companies, academia, and research institutions as a way of enriching the innovation ecosystem. An investment in high-end hardware plus software tools is warranted to guarantee the organisation remains well-equipped with capabilities to deliver cutting-edge solutions, hence keeping pace with industry dynamics.

3.2 Metaverse opportunities: blockchain technology implementation

Cryptocurrencies are the major indicator of blockchain technology coming into its own. Implementing a simple yet effective adoption strategy could completely overhaul various sectors. A great example of this is the healthcare sector. A tamper-proof and distributed ledger system with distinct features that address data security from a different perspective, which in turn fosters patient care while streamlining the operational workflow within organizations. There are some primary spheres in health care where even a small change by blockchain would result in a notable positive impact: supply chain, medical records, and data security, among others.

Within the healthcare industry, the supply chain encompasses the acquisition of resources, the management of supplies, and the delivery of goods and services to patients. This intricate network spans across various teams, stakeholders, and geographical boundaries. Unfortunately, due to its complexity, the healthcare supply chain is susceptible to fraudulent activities, erroneous data, and a lack of transparency.

These illicit actions not only result in financial losses for businesses but also pose a threat to public health. To combat these challenges, it is imperative to implement a decentralized track-and-trace system that covers the entire healthcare supply chain. Unlike centralized systems, which jeopardize the safety of both medications and data, a decentralized approach offers a more secure solution. The development of an unchangeable record in every trade throughout the supply chain is a major use case of blockchain technology. It helps ensure that fake products are not introduced in the market. It ensures that only verified and authentic products reach consumers. Every transaction and movement of goods can be easily tracked with blockchain, thereby assisting in automatic verification against the regulator's rules or laws, which ensures compliance, and reduces the administrative burden on healthcare providers and vendors (Jackson, 2013).

In his recent publication, Mike Seed (2021) highlights the COVID-19 pandemic as a convergence of circumstances that presents ample opportunities for counterfeiters to exploit the urgent demands for medications. Seed stresses the significance of implementing a comprehensive approach to address these illicit activities. Notably, in March 2020, authorities from 90 nations collaborated in an Interpol operation to combat such practices, leading to the confiscation of illegal drugs and medications valued at $14 million. Additionally, Chinese authorities successfully intercepted over 3000 counterfeit Covid-19 vaccines during the height of the pandemic (Roberts, 2012).

The demand for vital medications and essential medical supplies on the black market has experienced a substantial surge, as stated in a report from the BBC released on April 26 by Vikash. Drug prices have skyrocketed, with increases of two, three, or even four times their original cost. Notably, even oxygen cylinders were being sold on the black market in New Delhi at inflated prices compared to standard ones. The BBC ensured the credibility of the information by independently confirming the sources through direct communication with the suppliers, as detailed in Table (Li & Patel, 2011).

Price hike of essential medicines during Covid-19		
Item	Usual price	Black market price
Oxygen cylinder (50 litres) Oxygen concentrator Remdesivir drug (100 Mg) Tocilizumab drug (400 Mg) Fabiflu drug (17 tablets)	$80 $330-930 $12-53 $540 $15	$660-1330 $2000-2660 $330-1000 $2000-4000 $66-133

Fig. 3.2.1 Price hike of essential medicines during Covid-19

Source: Pandey V (2021) "Covid-19 in India: Patients struggle at home as hospitals choke," BBC News, Delhi

In the realm of developing countries, these issues hold significant importance. A report from the World Health Organization (WHO) reveals that one in every ten medical products in low-income and developing nations is either substandard or falsified. Since 2013, WHO has documented 1500 instances of falsified medical products, with 42% originating from the African region, 21% from the WHO Region of the Americas, and 21% from the European region. However, numerous cases remain unreported, with a mere 8% of reports coming from the Western Pacific region and 2% from Southeast Asia. Dr. Mariângela Simo, WHO's Assistant Director-General for Access to Medicines, emphasizes the devastating impact of substandard or falsified medicines on individuals and their families, as well as the threat they pose to antimicrobial resistance, further contributing to the concerning trend of diminishing treatment efficacy. Limited tools and technical capacity to enforce quality standards in manufacturing, supply, and distribution allow substandard medical products to reach patients. In contrast, inadequate regulation and governance, combined with unethical practices by wholesalers, distributors, retailers, and healthcare workers, enable the circulation of falsified products. In situations where the resources and capabilities

necessary to enforce quality standards in the manufacturing, supply, and distribution of medical products are lacking, patients are exposed to substandard goods.

Conversely, areas with insufficient regulation and governance, along with unethical practices by wholesalers, distributors, retailers, and healthcare professionals, are more prone to the circulation of falsified products. The information presented clearly indicates the urgent necessity for the integration of a technological solution to address these behaviours. Therefore, this study suggests a strategy for the incorporation of blockchain technology within the healthcare supply chain as a preventative measure against these occurrences.

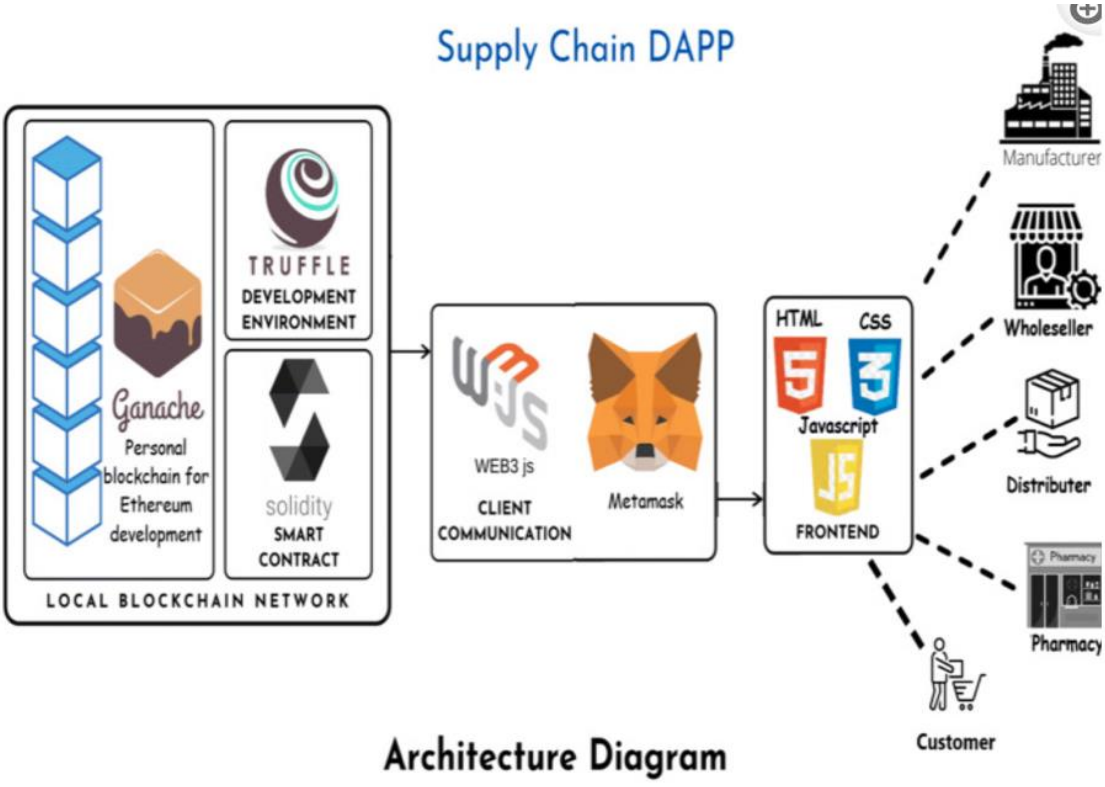


Fig. 3.2.2 Supply chain DAPP proposed architecture

Source: PMC PubMed Central

The figure displays the high-level architecture diagram of the proposed system. The diagram illustrates three stages: the local blockchain network, client communication, and the front end. Additionally, it portrays the stakeholders and their interactions with the system. The stakeholders are expected to utilize decentralised software devices, specifically a Decentralised Application (DAPP), to access the smart

contract. Further details regarding the components depicted in the diagram will be elaborated upon in the subsequent sections.

Within the local blockchain network, we have three key components: ganache, truffle, and smart contracts. Ganache serves as an in-memory Ethereum blockchain, offering a secure and predictable environment for the development, deployment, and testing of your DAPP. It also provides us with 10 external accounts, each loaded with 100 fake ether and linked to addresses on our local Ethereum blockchain. Moving on, we have the truffle framework, which empowers us to construct decentralized applications on the Ethereum blockchain. This framework includes a comprehensive set of tools for writing smart contracts in the solidity programming language. Furthermore, truffle allows us to conduct thorough testing and seamless deployment of smart contracts on our local blockchain. Lastly, we come to the most significant component of our local blockchain network: smart contracts. In essence, smart contracts are programs stored on the blockchain that are triggered when specific conditions are met. They serve to automate the execution of agreements, eliminating the need for intermediaries and ensuring immediate certainty for all stakeholders involved. Once the predetermined conditions are verified, the system swiftly executes the designated actions, such as registering a medicine or facilitating digital transactions using ether. Once the transaction is finalized, the blockchain undergoes an update that is immutable. Developers have the ability to create smart contracts using the solidity programming language. Additionally, the involvement of stakeholders is documented in the form of functions within the smart contracts (Kaleido, n.d.; Nguyen, 2014).

At this stage of the architecture diagram, the link between the local blockchain network and the front end is established. This enables stakeholders to utilize the front end to initiate functions within smart contracts and subsequently record transactions on the blockchain. This process enhances transparency and traceability. The initial sub-component of this stage is web3.js, a JavaScript library utilized for developing clients or websites that can interact with the blockchain. Through JavaScript Object Notation Remote Procedure Call (JSON RPC), web3.js connects to the Ethereum Blockchain. It also permits the sending of requests to an individual Ethereum node via JSON RPC in order to read and write data onto the network. Lastly, MetaMask, a cryptocurrency

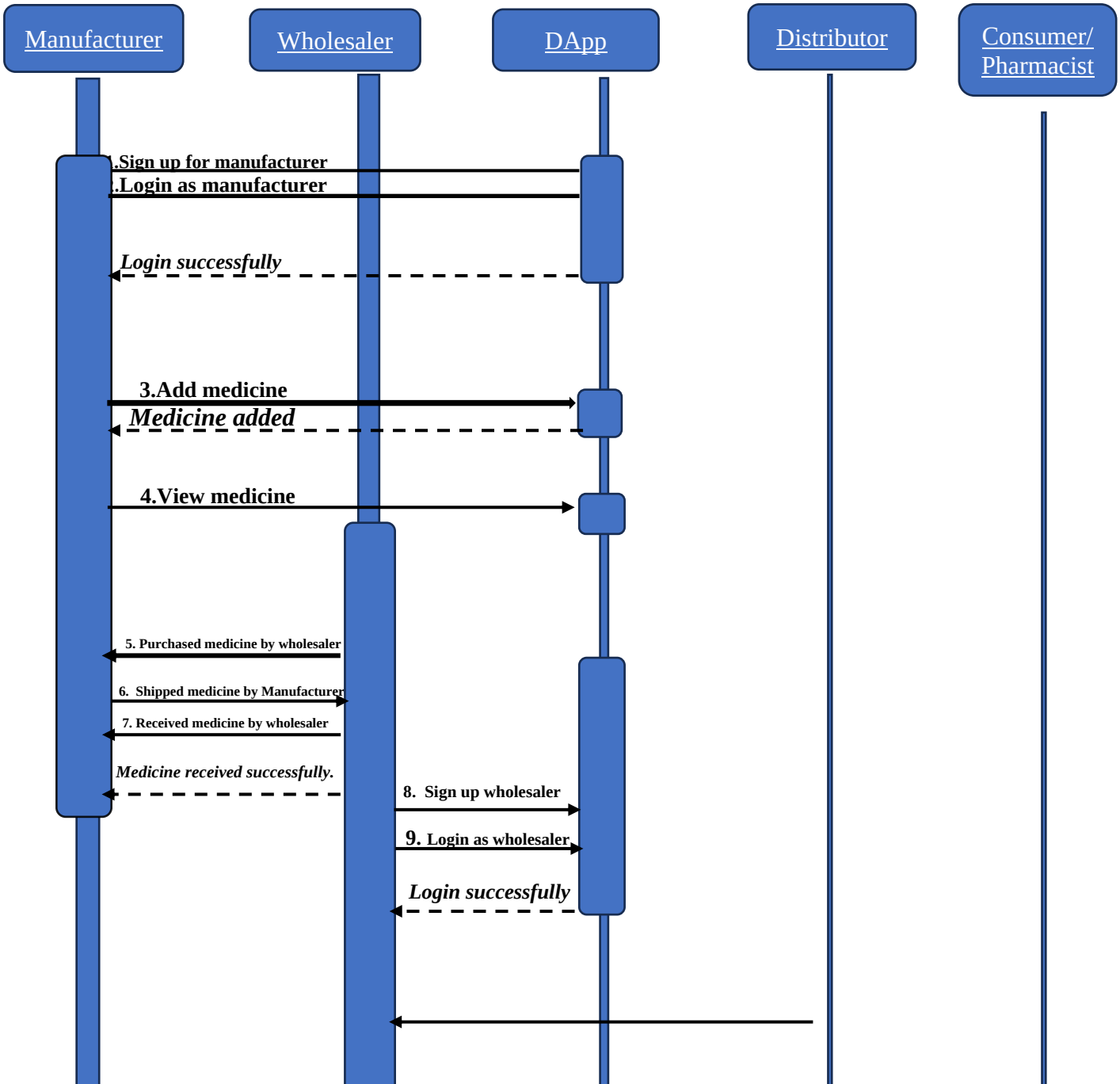
wallet, assists in connecting to the Ethereum blockchain. It functions as a browser extension, providing access to Ethereum-enabled distributed applications within the browser. MetaMask injects the Ethereum web3 Application Programming Interface (API) into the JavaScript context of every website, allowing DAPPs to retrieve data from the blockchain (Lee, 2019; Chen & Kim, 2016).

To develop the proposed solution, the Ethereum blockchain platform is utilized. Ethereum is an open and accessible public blockchain, allowing anyone to utilize it. The smart contract, written in Solidity, is compiled and tested using the truffle framework. This framework offers a range of tools for creating smart contracts using the Solidity programming language. Additionally, it enables the testing and deployment of smart contracts onto the blockchain. In conjunction with truffle, ganache is employed to provide a local Ethereum blockchain for development and testing purposes. Ganache supplies 10 default accounts, each with 100 ethers. Finally, metamask is employed to facilitate transactions through decentralized applications on the local blockchain network.

To begin, stakeholders within the supply chain must go through the registration process on the decentralized application, providing all necessary information. Once a stakeholder is successfully added, an event will be triggered and announced to all participants involved in the supply chain. The responsibility then falls on the manufacturer to add a pre-approved medicine to the system. This action will trigger an event indicating that the medicine has been added and is now available for sale. Interested wholesalers can proceed with the purchase process, transferring the required funds to the manufacturer's account. This transaction will trigger an event notifying all participants of the purchase and transfer of ownership, resulting in a change of the medicine's state to "PurchasedByWholesalerAndForSale." Moving forward, distributors, along with other wholesalers within the system, can purchase medicine from the wholesaler, transferring funds accordingly. This action will trigger a purchase event and update the state of the medicine, either to "PurchasedByWholesalerAndForSale" or "PurchasedByDistributorAndForSale." The state of the medicine will also be recorded in the history as "SoldByWholesaler," thus completing the purchase process for the distributor. As previously mentioned,

stakeholders at the pharmacy level have the ability to purchase medicine from the distributor, resulting in a change in the medicine's status to either "PurchasedByPharmacyAndForSale" or "PurchasedByPharmacyAndForSale" after recording the transaction in the history log. This also updates the status to "SoldByDistributor," effectively transferring ownership. To conclude the supply chain process, either the pharmacy or the customer can then purchase the medicine from the pharmacy. Additionally, customers have the option to track and trace the medicine using the medicine ID or barcode.

The flow of medicine throughout the entire supply chain life cycle can be visually represented in Figure 3.2.3.



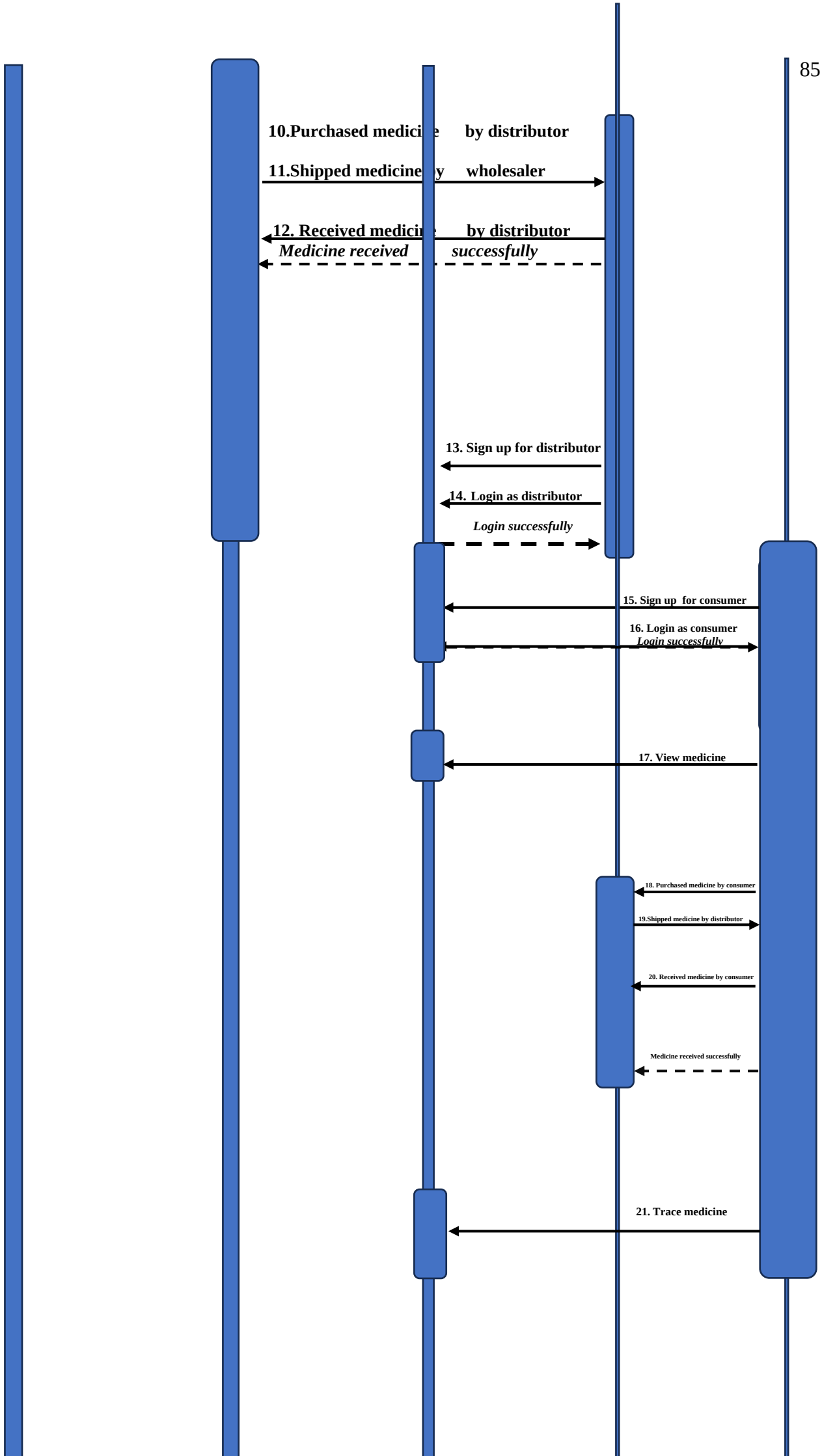

10.Purchased medicine by distributor
11.Shipped medicine by wholesaler
12. Received medicine by distributor
Medicine received successfully
13. Sign up for distributor
14. Login as distributor
Login successfully
15. Sign up for consumer
16. Login as consumer
Login successfully
17. View medicine
18. Purchased medicine by consumer
19.Shipped medicine by distributor
20. Received medicine by consumer
Medicine received successfully
21. Trace medicine

Fig. 3.2.3 Sequence diagram of the proposed system
Source: compiled by the author based on NCBI data

Blockchain technology is revolutionizing the healthcare industry, as evidenced by the notable advancements it has made in this field. Trials conducted in Swiss hospitals have demonstrated the effectiveness of using blockchain to process orders for medical devices. By storing patient data on blockchain networks, the information remains highly secure, private, and accessible solely to authorized individuals, thereby minimizing the potential for data breaches. The improvement of interoperability among healthcare providers results in a seamless exchange of medical records, ultimately leading to enhanced patient outcomes. The immeasurable value of blockchain lies in its ability to safeguard clinical trials, preventing any manipulation of data and guaranteeing the authenticity of trial outcomes. Moreover, blockchain enables streamlined tracking of drugs throughout the entire supply chain, effectively combating the issue of counterfeit medications and prioritizing patient well-being.(SWISSlinx, 2023)

Taking a pioneering stance in Switzerland, Atupri Health Insurance has become the first insurance provider in the country to embrace cryptocurrencies. Individuals who possess Bitcoin or Ethereum now have the opportunity to utilize these digital currencies when making payments. By collaborating with Bitcoin Suisse, a trailblazing Swiss cryptocurrency company, Atupri Health Insurance further solidifies its position as an innovative healthcare provider, committed to offering cutting-edge digital solutions. Caroline Meli, the Head of Marketing and Sales at Atupri, emphasizes the company's commitment to embracing new technologies and leveraging the advantages of digitalization. This strategic approach aims to enhance customer experience by expediting processes. Atupri, a prominent health insurance provider, is further solidifying its position as a pioneer in the healthcare industry by introducing an innovative payment solution. Customers now have the option to use Bitcoin and Ethereum, two popular cryptocurrencies, for their regular payments to Atupri Health Insurance.(Ian Simpson, 2020)

Caroline Meli emphasizes the extensive level of personalization offered by our services. Our valued customers have the freedom to select their preferred payment

method. As trailblazers in the digital healthcare industry, we stay ahead of social trends and offer insurance solutions that have a long-term vision. The significance of blockchain technology and the growing prominence of cryptocurrencies cannot be ignored. With this in mind, we aim to establish the essential frameworks that will benefit our policyholders.

In collaboration with Bitcoin Suisse, a Swiss specialist in cryptocurrencies, Atupri Health Insurance now offers the convenient option of paying with Bitcoin and Ethereum. Bitcoin Suisse, known for its advanced crypto-financial services, has a proven track record in supporting official institutions in adopting cryptocurrencies as a form of payment. With their secure and user-friendly technology, they provide one of the most sophisticated global solutions for cryptocurrency payments. Armin Schmid, Head of Crypto Payments at Bitcoin Suisse, expresses enthusiasm about the partnership with Atupri and assures customers of secure and hassle-free payment options with cryptocurrencies. It is important to note that Bitcoin Suisse, as a regulated Swiss financial intermediary, adheres to all legal requirements for payment transactions. According to Caroline Meli "Our health insurance company does not possess any Bitcoins. Once the payment is initiated, our policyholders receive the prevailing exchange rate, which is always secured by Bitcoin Suisse in Swiss francs and subsequently transferred to us. Consequently, we are never exposed to any potential risks associated with currency fluctuations." (CryptoStale, 2023)

The finance industry has seen how blockchain technology can revolutionize fraud prevention. Through a secure ledger system, it fosters transparency and effective risk management while keeping the confidentiality of financial services activity. In such secrecy, they can produce unchangeable records after creation, thus making transactions more visible and efficient. With blockchain technology adoption in banks, cross-border transactions are much faster: their transaction time is cut from days to minutes with high-cost implications through reduced fees since no intermediaries take part in those peer-to-peer transfers. Also, using cryptocurrencies (which use blockchain) as an alternative to fiat currencies for international payments is both secure and fast due to reliance on this innovative technology (Nakamoto, 2008). Smart contracts are the most revolutionary application of blockchain technology in the field

of finance. It is a self-executing contract whereby the terms of an agreement are directly written into code, and when predetermined conditions are met, these contracts automatically execute to implement the agreement terms without needing any further human intervention. This level of automation brings about high levels of efficiency which would not be realized through manual interventions for such financial operations as disbursement of loans or trade settlement or insurance claims. Take supply chain financing for example: funds can be automatically released through smart contracts upon delivery and confirmation of goods which greatly reduces delays and fosters trust between involved parties in an agreement (Buterin, 2013).

Moreover, the feature of blockchain to present a ledger that is both transparent and cannot be tampered with is extremely useful in meeting compliance requirements. The need for financial institutions to keep extensive records leads to audit trails, they must be updated continuously as well as checked by the regulators periodically. In this regard, Blockchain offers an immutable ledger that ensures data security and can be accessed by regulators at any time in real-time (Tapscott & Tapscott, 2016). In the case of keeping every detail regarding those insured on a blockchain, insurance companies tend to offer better service, by way of advanced fraud prevention measures. Every record that is ever created from any source can be found in the blockchain, making it easy to identify any duplicate or fake claims. On top of this, information sharing through blockchain also lessens redundant tasks among all parties involved as everyone is privy to identical sets of data. This results in fewer duplicate efforts down the line (Casey & Vigna, 2018).

The emergence of insurance is one more milestone made by blockchain technology. A parametric insurance policy is a policy that is based on certain parameters or triggers that automatically lead to a payout if they happen, such as a natural disaster or specific weather conditions. There is no need to wait for long claims adjustment procedures: when the trigger event occurs, the payout will be made automatically. An example could be an insurance policy for farmers that pays out if rainfall drops below a certain level without needing detailed assessment—thus providing timely financial assistance. Such a practice not only quickens the pace of claim settlement but also raises customer satisfaction due to early payouts. This

pragmatic approach not only cuts time off paperwork but is also far less bureaucratic and ensures delivery into the right hands at the right time (Swartz, 2021).

The influence of blockchain on finance is wide-reaching indeed, encompassing more than just banking and insurance but also sectors such as real estate and asset management. Among others, government service provision can benefit from this innovative technology. For instance, in real estate, ownership and title information can be stored on a public ledger through blockchain, eliminating the need for a title search or efforts to minimize fraud risk. Asset management through tokenized assets using blockchain paves the way for fractional ownership with liquidity enhancement; consider governments that implement blockchain-based systems for tamper-proof voting and transparent public records, which in turn facilitate tax collection easily (Tapscott & Tapscott, 2016).

3.3 The economic potential of technology and innovation as substitutes for the military sector and promotion of world peace.

In contemporary economic discourse, militarism emerges as a dominant element of global economics, reflecting its influence on national budgets worldwide. The enormity of funds channelled to the military is a stark indicator of its significance. This allocation not only underscores the role of the military in national security strategies but also demonstrates its impact on economic development and international relations. Globally, there has been a surge in military expenditure. Nations worldwide have collectively poured over $2 trillion into their defence forces for the first time in 2021 (a figure revealed by SIPRI). The USA alone accounts for 38%. The exorbitant expenditure on militarism is often justified by the need to ensure national security and assert global dominance. But it raises valid questions: what do we sacrifice by this allocation? The money funnelled into the military is siphoned from areas such as education, healthcare, and infrastructure. These sectors have great potential value that they could contribute towards sustaining economic stability and fostering growth in the future. Nations are currently navigating through an era rife with a multitude of complex issues including but not limited to technological evolution, disparity in wealth, climate metamorphosis, and global epidemics. Such situations breed hot conversations on the

best use of national resources, an aspect that places the continuous prioritisation of military spending under the magnifying glass. Its impact is not only on the economy but also on world peace and prospects for growth.

A 3.6 percent boost in global military expenditure was recorded in 2019. It reached a colossal $1.9 trillion, as reported by the Stockholm International Peace Research Institute (SIPRI). This marks the most money spent since 1988, after adjusting for inflation— a whopping 7.2 percent leap from figures ten years prior. U.S. military spending took a turn this year; it grew for the second year in a row after seven years of successive declines. In 2019, their total spending hit $732 billion— nearly matching what the next top ten spenders combined put forth. It is interesting to note that China has been increasing its defence budget for the 25th consecutive year. However, they were still second in military spending last year, significantly lagging behind the top spender. The $261 billion estimated expenditure by China in 2019 was a massive 85% higher than what it was in 2010. India followed closely with $71.1 billion and Russia with $65.1 billion while Saudi Arabia actually decreased its military spending by 16%, placing them fifth on the list. But looking at military budgets as a percentage of GDP, the rankings tell a different story.

The military contribution to Saudi Arabia's GDP remained substantial in 2019 despite a decrease in spending. Among the top 15 spenders as identified by SIPRI, Saudi Arabia had the highest proportion where the military made up 8% of the country's GDP. For comparison, the United States spent $732 billion which amounted to "only" 3.4% of its GDP. There were actually fewer people involved in buying these things than you might have thought and there was some real haggling— this was important information that readers should know before committing themselves financially or otherwise to such purchases. (Statista)

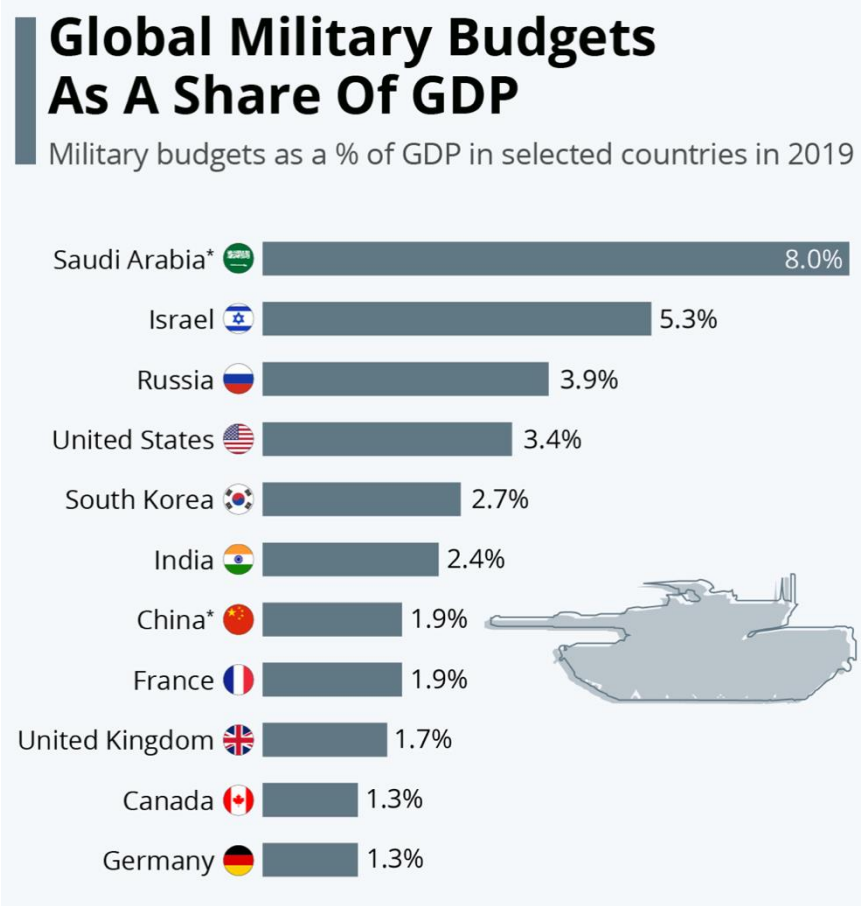


Fig. 3.3.1 Global military budgets as a share of GDP

Source: Statista

The fields of IT, renewable energy, biotech, and high-tech manufacturing are places where an injection of funds is likely to result in an economic boom, they are leaders in any technologically advanced society as they grow rapidly and create many high-value outputs. The before mentioned field of information technology, which includes software engineering, cybersecurity, and cloud computing, has played a significant role in fostering job opportunities and fuelling economic growth in the 21st century, amounting to trillions for the American economy and providing work for millions of people. For instance, the software sector alone added nearly $1.8 trillion to the U.S. gross domestic product in 2021. (based on a Software.org report).

Advanced manufacturing is the inclusion of automation plus artificial intelligence (AI) and high precision systems which define it as part of the state-of-the-art technologies. This is significantly important in preserving and strengthening a country's industrial base - an essential element of its economy. According to a

comprehensive study by Deloitte, countries leading in advanced manufacturing have a competitive position not only in global markets but also in maintaining economic leadership. On the other hand, military spending usually yields less than what is spent, yielding back less than a dollar per each dollar spent. This substantial disparity shows that investment in technology does not only promote economic growth but also helps to foster sustainable economic development, unlike defence spending.

Germany's “Industrie 4.0” initiative is a standout example showcasing the nation's pledge to fortify its standing as a global industrial giant through smart investments in advanced manufacturing. The core of “Industrie 4.0” lies in the digitalization of manufacturing processes achieved by setting up smart factories that use IoT, AI, and machine learning. This has helped to improve not only the efficiency but also the customization capabilities, leading to high levels of productivity which trigger economic growth waves along the value chain. Besides, it helps SMEs take up new technology so that all these benefits do not end up only within one program but reach others in broader business circles throughout the economy.

In addition, South Korea's “Digital New Deal” is an all-encompassing program that places priority on the digital infrastructure and innovation. The end goal is establishing itself as a major technology hub, which is being achieved through this strategic plan that involves heavy investments in areas like 5G, AI, data centres, and digital health. By doing so, South Korea has shown leadership globally; particularly notable are the electronics and automotive industries that have seen increased exports and new job opportunities because of such emphasis. In efforts to promote innovation, the government, partnering universities with research institutions and industry leaders, has created an environment where growth thrives hand in hand with development.

The concept of using technology and innovation to address global conflicts is rooted in the idea that when a country achieves economic independence, it reduces its vulnerabilities, which in their turn, often lead to geopolitical tensions. An entity does not have control over a decentralised ledger, and this is the essence of what blockchain presents. The corruption in the misappropriation of humanitarian aid could be curbed by implementing blockchain usage appropriately, as the system guarantees full transparency and tamper-proof traceability: usually when trust in government is low

because corruption is not only revealed but also addressed through mismanagement (and its direct impact on society via unrest and conflict) by use of blockchain. As mentioned previously, blockchain has potential to revolutionise supply chain management into a transparent and secure process where efficiency is ensured not compromised; to ensure the origin and journey of resources take place through valid channels, not tampered along with delivery. In conflict areas or locations highly susceptible to exploitation (such as illegal trade in arms) that use blockchain for upholding international agreements, sanctions via proper resource allocation, leading towards peace promotion.

Blockchain technology within the Metaverse has the potential to replace some military needs and play a part in global peace-based frameworks by fostering transparency (which reduces corruption), reducing opportunities for corruption, and ensuring equitable resource sharing. As countries and companies continue with their exploration and adoption of blockchain technology, the contribution towards building economic opportunities and decreasing conflicts can only grow more significant, showcasing that massive technological economy effect is still untapped by far.

CONCLUSIONS AND PROPOSALS

Conclusions:

The primary aim of this bachelor's qualification work was to explore the impact of the Metaverse on international economic relations, with a specific focus on understanding how emerging technologies like blockchain, decentralized finance (DeFi), and non-fungible tokens (NFTs) can reshape traditional economic, legal, and trade frameworks. The work sought to analyse the integration of these technologies within the Metaverse and evaluate their potential to influence global economic dynamics, promote peace, and enhance business development strategies. Additionally, this study aimed to investigate the role of a specific entity, GmbH "Block Consult", within this evolving digital landscape, assessing its organizational structure, strategic management, and its broader economic impact within the Metaverse paradigm.

The first section described the theoretical and methodological framework of the metaverse. By providing the necessary theoretical framework for understanding the concept of the Metaverse, blockchain, DeFi (decentralized Finance), and NFTs (non-fungible tokens). Theories of critical concepts pertaining to the Metaverse, blockchain technology, decentralized finance (DeFi), and non-fungible tokens (NFTs) are also discussed in this section.

The study on Metaverse as an emergent factor in global economic relations has shown that it goes much further than just redefining the traditional trade systems, thus illuminating its various and complex roles. The theoretical frameworks presented with blockchain, DeFi, and NFTs reveal the potential of these technologies to revolutionize virtual economies, where innovation finds a place to offer transparency plus efficiency in digital dealings. The Metaverse not only opens the doors of new international trade but also brings forth an aspect that many overlook: intricate tax and legal systems. These need to be complemented by robust cybersecurity efforts aimed at safeguarding digital assets and user identity, introduced within those domains.

The study unveiled that firms could take advantage of Metaverse for growth by adopting creative virtual reality tactics. Such approaches do not follow conventional

digital marketing but rather intrude further into other strata entailing operationalization and management metamorphosing client interplays with operational dynamics. Potential like the ripple effect, which is far-reaching and transformative.

The business world will never be the same with Metaverse as it provides a dynamic platform that allows companies not to be limited by physical or temporal boundaries, making market entries easier. It also facilitates easy market expansion and offers unique competitive positioning through customer experience plus supply chain operation streamlining using blockchain technologies. In the financial and economic analysis of "Block Consult," the company has demonstrated its ability to take full advantage of expertise in blockchain at the right place within the Metaverse. Its focus on specialized consulting services has allowed adaptation swiftly towards digital trends, thereby enhancing international management capabilities as well as competitiveness at a global scale for the firm.

Insights from the public opinion survey underscored a growing acceptance and enthusiasm for the Metaverse, highlighting significant opportunities for businesses willing to invest in this innovative technology. The survey results suggest a positive outlook for the integration of the Metaverse in enhancing business processes and consumer engagement.

Proposals:

Let companies not just think of virtual reality as a tool for marketing but let it be part of their business in all aspects. These covers setting up virtual offices, showcasing products in the Metaverse and even offering customer support services through this platform to ensure easy accessibility and high client involvement.

Considering recent developments due to the Metaverse capabilities, every business has to come up with its own special strategy adapted for its own needs. This is about understanding details of digital consumer behavior and tailoring your offers based on those findings.

To be able to take full advantage of the Metaverse's competitive benefits, firms have to come up with unique virtual experiences that set them apart from real-world and purely digital competitors.

The Metaverse is not constrained by borders; it is limitless. Organizations can use this to their advantage without having to worry about physical infrastructure constraints which means easy international market entry and reaching out for untapped new demographic segments.

Use blockchain to ensure the safety of operations: one way that could help is through incorporating blockchain technology into the Metaverse transactions, which would improve security and efficiency, essential components when dealing with international digital tasks, let alone others. They include a description and animation of services or production processes that result from introducing virtual reality technologies.

Stay relevant by keeping up to date: because Metaverse is dynamic due to advancements in technology which has led to evolving consumer expectations (and also new business models and strategies developed by competitors) in such an environment like the Metaverse we need continuous learning plus adaptation.

In order to contribute to the wider development of international commercial connections in the digital age, businesses should play an active role in policy formation within the Metaverse. This involves deliberating ethical considerations surrounding privacy, data security, and societal repercussions of virtual landscapes.

It is essential for organizations to abide by these recommendations if they aim at not only integrating themselves with other international partners through the digital platforms but also enhancing their operational performance within the Metaverse. Businesses can contribute to the wider development of international commercial connections in the digital age and improve their operational performance inside the Metaverse by following these tips.

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ANNEXES

Annex A

SWOT Matrix

SWOT Matrix	Opportunities (O): 1. O1: Expansion into other European markets. 2. O2: Diversifying services to cater to emerging blockchain applications. 3. O3: Collaboration with tech firms for innovative solutions. 4. O4: Growing demand for DeFi and NFT.	Threats (T): 1. T1: Regulatory changes affecting blockchain and cryptocurrency operations. 2. T2: Rising competition in the consulting domain. 3. T3: Technological advancements making current solutions obsolete.
Strengths (S): 1. S1: Expertise in blockchain technology and cryptocurrency. 2. S2: Strong set of competencies. 3. S3: Strong reputation in the Swiss market. 4. S4: Experienced team with diverse skill sets.	Strengths and Opportunities: 1. The company's strong technological background can help gain a competitive edge in new European markets. (S1, S2, S3, O1) 2. An urge to utilize specialized skills to cater to the expanding market needs in these innovative sectors. (S4, O2, O3, O4)	Strengths and Threats: 1. The crucial necessity is to utilize an established reputation to differentiate and maintain a competitive edge in the crowded market. (T1, T2, S1) 2. Continuous application of innovative solutions to maintain leadership in technological advancements is mandatory. (S4, T3)
Weaknesses (W): 1. W1: Dependency on a rapidly changing tech environment. 2. W2: Potential scalability issues as demand grows.	Weaknesses and Opportunities: 1. High level of dependency on the volatile crypto market and partnership with fintech business entities: differentiating risks by forming strategic partnerships, thus potentially stabilizing revenue streams. (W1, O3, O4). 2. Scalability challenges as the company grows: strategically plan expansion to manage growth and address rising concerns. (W2, O1).	Weaknesses and Threats: 1. Developing strategies to adapt quickly to regulatory changes and stabilize the impact of market volatility. (W1, T1) 2. Enhancing operational efficiencies and technological capabilities to better compete and scale in a competitive market. (W2, T2)

Source: compiled by the author.

Annex B

PESTLE analysis

P	E	S	T	L	E
Political	**Economical**	**Social**	**Technological**	**Legal**	**Environmental**
-Regulatory environment **-Government support for technology** **-Navigating global trade policies**	**-Economic stability** **-Inflation rate** **-Exchange rate**	**-Technological adoption** **-Education and expertise** **-Cultural openness to innovation**	**-Advancements in blockchain technology** **- Cybersecurity concerns** **- Integration with existing systems**	**-Data protection laws** **-Intellectual property rights** **-Compliance requirements**	**-Sustainability in IT** **-Corporate responsibility** **-Public recaption of blockchain's impact**

Political Factors:

•Regulatory Environment: in the blockchain space, the regulatory landscape is critical. Swiss policy favouring digital currency innovation could be a major advantage.

•Government Support for Technology: Switzerland's proactive stance on blockchain and fintech may provide numerous government-backed initiatives that can benefit Block Consult.

•Global Trade Policies: as a Swiss firm, Block Consult must navigate the complexities of international trade policies, especially if they are dealing with clients outside of Switzerland.

Economic Factors:

•Economic Stability: Switzerland's strong economic stability supports business operations and the growth of new technologies like blockchain.

•Exchange Rates: the strength of the Swiss Franc can impact international business, affecting how competitive Block Consult's pricing is on the global market.

•Inflation: low inflation rates in Switzerland provide a stable financial environment for investments and long-term business planning.

Social Factors:

•Technological Adoption: there is a high rate of technology adoption among Swiss businesses and consumers, which could facilitate quicker uptake of blockchain solutions.

•Education and Expertise: Switzerland's high educational standards and focus on technology could provide a steady stream of talent for Block Consult.

•Cultural Openness to Innovation: Swiss culture's openness to innovation and new technologies can enhance Block Consult's market acceptance.

Technological Factors:

•Advancements in Blockchain Technology: rapid advancements in blockchain and related technologies could provide Block Consult with new tools and methodologies to offer their clients.

•Cybersecurity Concerns: as cybersecurity is paramount in blockchain applications, technological developments in security measures are crucial.

•Integration with Existing Systems: The ability to integrate blockchain with existing corporate systems and technologies is vital for client adoption.

Legal Factors:

•Data Protection Laws: Switzerland's strict data protection laws will affect how Block Consult manages data, particularly with international clients.

•Intellectual Property Rights: protecting innovations in blockchain through patents or other intellectual property rights is essential, especially in a competitive industry.

•Compliance Requirements: as DeFi and NFT markets evolve, staying compliant with both Swiss and international financial regulations is challenging but necessary.

Environmental Factors:

•Sustainability in IT: there is growing concern about the environmental impact of digital technologies, including energy consumption by blockchain networks.

•Corporate Responsibility: swiss companies are often expected to lead in corporate social responsibility, including environmental sustainability.

•Public Perception of Blockchain's Impact: Public sensitivity to the environmental costs of technologies like blockchain (e.g., energy usage of crypto mining) could influence market acceptance.

This PESTLE analysis provides an overview of the external factors that Block Consult Ltd should consider as it strategizes its business planning and development. Understanding these factors will help the company leverage opportunities and mitigate potential threats in the dynamic landscape of blockchain technology and consulting.

Source: compiled by the author.