

The metaverse applications for the finance industry, its challenges, and an approach for the metaverse finance industry

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Abstract— With the rapid development of digital technology, all areas of society may accelerate their entry into the virtual world, thus blurring the boundary between the physical and digital worlds and promoting a Metaverse. The more financial opportunities in metaverse offers its members, the more choices they have. Whether you're a visitor or a company that has invested in the metaverse to sell your goods, there are many ways to generate money. The potential of the metaverse to build virtual spaces for people to connect may have a significant negative impact on the financial and banking sector, among other useful applications it offers. For the reason of metaverse, people can interact with cutting-edge technology using extended technology (VR, AR, MR) etc. With these developing ideas rise to the metaverse, a virtual economy where things may be produced and purchased. Metaverse increased the financial trust-ability of the people for its reliable and safe technologies. Metaverse uses digital virtual identifications, extended reality, blockchain decentralization techniques, AI applications, IoT systems, and digital twins for metaverse finances. In this paper, we are going to discuss metaverse applications, their challenges, and a state of art approach for the finance industry.

Keywords— Metaverse, finance, banking, artificial intelligence, blockchain, digital twins.

I. INTRODUCTION

The metaverse considered the next generation of the internet is impacting almost all domains. From healthcare to manufacturing, from education to smart cities, from finance to the military, many stakeholders and big techs are integrating the metaverse in their application area. Most of the stakeholders and big techs have not just considered the metaverse as their favorite technology but also a new favorite of the investment industry. In a report by Wahid Pessarlay [1,2] the metaverse market is predicted to generate about \$50B with the finance sector adoption by 2026. This statement is supported by the rapid growth of metaverse technology. The US and Canada are standing as the key market followed by Europe. This significant growth and acceptance are observed mostly because of the digital assets / NFT (Non-fungible tokens) and blockchain technologies that have so far shown proof of reliable finance management in the IT world. Cryptocurrencies supported by blockchain technology have served as the base of all financial transactions in the metaverse. The proper operation of finances and business-related

operations in the virtual world is one of the key reasons which attracted and motivated the bank sector. Today, fintech find themselves banking on the metaverse. Marianne Curphey [3] identified two major areas that FinTech's are focusing on in the metaverse: first, allowing banking customers to virtually meet and communicate with bank staff, as well as transact, invest, and purchase banking products. The second is experimenting with the gamification of financial services to enhance customer engagement. Banking and finance sectors are getting attracted by the metaverse and this can be explained by the adoption of Virtual Reality (VR), Augmented Reality (AR), and blockchain technologies, leading to a high focus on improving customer experience, and growing adoption of metaverse platforms to align financial services and businesses aiming to drive global market revenue growth. The purpose of this study is to explore contextual marketing in banking on the metaverse path and to give conceptual knowledge about the subject of metaverse banking. Additionally, examples of banks' forays into the metaverse in terms of the banking industry's contextual marketing are provided, and distinct customer expectations and the solutions that banks offer to meet these expectations are understood [4]. Nowadays many financial have engaged in the metaverse financial market and below is a list of the top 8 world's prominent companies [5,6].

SN	Company	Revenue	Country
1	PMorgan Chase & Co.	US\$130 Billion	USA
2	Bank of America	US\$89.11 Billion	USA
3	HSBC	US\$49 Billion	UK
4	BNP Paribas	US\$49 Billion	FRANCE
5	Shinhan Bank Co. Ltd	US\$10 Billion	South Korea
6	NH Investment & Securities Co. Ltd	US\$2 Billion	South Korea
7	Kookmin Bank	US\$1.85 Billion	South Korea
8	Mogo Inc.	US\$17 Million	British Columbia
9	National Bank of Kuwait S.A.K. P	US\$15 Million	Kuwait
10	IBK Group	US\$10 Million	South Korea

TABLE 1. LEADING COMPANIES IN FINANCE MARKET WHO ARE USING METAVERSE.

Evolution of Metaverse Finance

For the improvement technologies, financial sector turned traditional to digital finance. After the concepts of blockchain decentralization and digital currency's the decentralized finance system started. Metaverse is combinations of pervious all technological trends with many of its own technologies making finance easier and more and more trustable. In figure 1 we can see the evolution of finance in recent years.

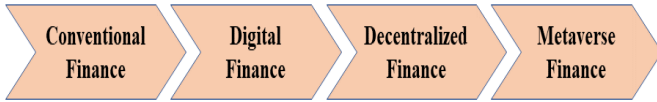


Figure 1. Metaverse Finance Evolution.

II. METAVERSE APPLICATIONS FOR THE FINANCE INDUSTRY

The metaverse is quickly gaining ground in the financial sector. Banks are embracing virtual reality because it has the potential to transform clients and bank can interact with money [7]. In this section, we are going to explain finance applications with the metaverse. Figure 1 summarizes the applications of the metaverse in the financial industry.

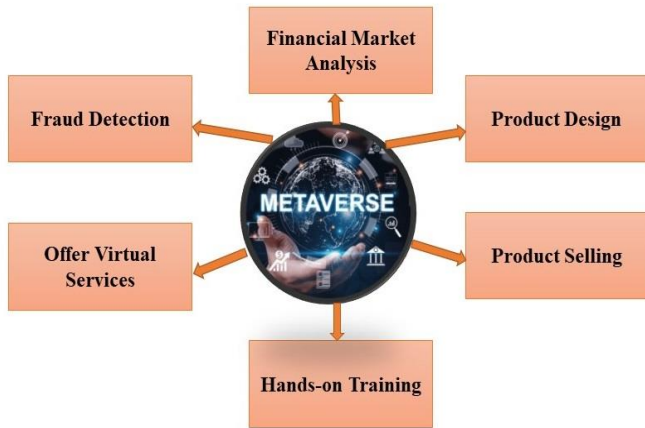


Figure 2. Metaverse Applications in the Financial Industry

A. Financial market analysis and new market

AI is a core part of the metaverse, last few years technology giants are using all AI techniques for market analysis to increase their business. Nowadays, they are using metaverse AI for their financial market analysis. Metaverse AI is the collaboration of AI and metaverse. Improvements in Integration with VR and AR platforms is undeniably driving the metaverse market growth in finance, despite limitations like privacy and security issues regarding the metaverse that may limit industry progress.

B. Product design

Manufacturing companies use augmented reality to accelerate the design of their new products. Augmented reality engineering allows engineers to visualize their own 3D product design. Engineers can visualize data in an AR space,

and people come together to interact with that model. They use it for training, design evaluations, and assembly checks. Big companies, using metaverse AR technology to make their products 3D mode demos, manufacture more attractive products and are increasing the financial transactions of companies. As an example, BMW uses AR technology for its pre-product modelling.

C. Product Selling

Metaverse comes very closer to reality, there are many ways to sell finance products on the metaverse. Metaverse displays products by using VR on its own platform and customers buy things from metaverse by using secure blockchain methods. The metaverse working for product selling, brands selling, virtual products using NFTS to make money, virtual entertainment systems for display products, and digital advertisements

D. Hands-on training

One of the clearest and most widely applicable uses for metaverse technologies is training. Virtual reality (VR) can unite people by making their avatars and virtual workstation without the cost and downtime of going to a central training venue. To make virtual training station on metaverse, these technologies are using- VR, AR, Hollo lens, 5G networks, and many more. While training via video conference can be quite one-way, VR makes learning a much more practical, hands-on experience. In this way the finance industry getting benefits from the metaverse.

E. Offer virtual services for increasing business

Metaverse can arrange a virtual launch program by informing potential buyers, generating interest in a new product, increasing company awareness, building audience loyalty, and making quick initial sales. Introduction of new service in the metaverse into something more than just a dull and protracted report, we refer sticking to the following tips: to make the service immersive, and help visitors experience the products by metaverse technologies. The demand for metaverse events has increased because of the coronavirus outbreak, mostly because of travel limitations and the expanding capacity of technologies to guarantee a higher degree of online interaction. Just before the COVID-19 crisis, several new metaverse start-up joined the market, spurring quick adoption and expansion

F. Fraud Detection

In manual or traditional financial systems, fraudulent transactions with fraud identification were a big issue for the finance industry. Metaverse can identify fraudulent financial transactions and users easily through its unique identification and decentralization(multi-accounting) blockchain system [8]. On the other hand, using these metaverse tools financial industry can reduce fraud transactions and fraud users, metaverse tools are- minimizing silos, multi-layered, browser and device fingerprinting, digital footprint analysis, IP scanning, and multi-factor authentication. Metaverse uses non-fungible tokens (NFT) and other cryptocurrencies for

financial transactions. Users are able to buy with NFTs within these metaverse virtual trade across several platforms, like-digital art, licensing, ticketing, fashion, experiences, supply chains, identification, real estate, gaming, and trading [9]. In figure 2 shown, benefits of fraud detection in the metaverse system.

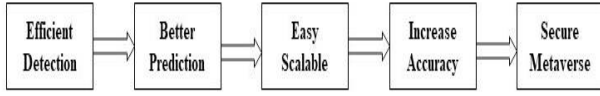


Figure 3. Benefits of Fraud Detection

III. POSSIBLE CHALLENGES IN THE FINANCE METAVERSE

One of the main challenges facing the global finance and banking sector as it moves toward digital transformation and the integration of the real world of finance and the metaverse [10-15]. Figure 3 summarizes possible metaverse challenges in the finance industry.

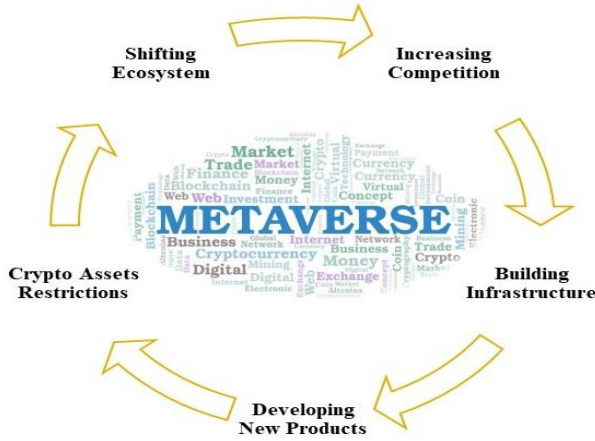


Figure 4. Possible Challenges in the Financial Metaverse.

A. Increasing Competition

It is a bit difficult or matter of time to create to transactions of assets with a virtual presence, for financial companies have to create several successful competitions on the metaverse. Financial services firms must first concentrate on developing a smooth, cutting-edge customer experience and identifying the most effective ways to communicate with customers in the metaverse if they are to outperform the competition. Creating a content strategy that favors seamless cross-channel experiences is necessary to accomplish that goal.

B. Building the payment infrastructure for the metaverse

Finance is a kind of asset transactional industry. To build the virtual financial sector, the first challenge for the metaverse is payment methods. Mostly metaverse is working for the development of financial issues, selling of things globally. Many countries are not allowing digital or blockchain payment systems for their internal trustable issue.

C. Developing new protection products for the metaverse

1 in 15 Americans, or 14.4 million consumers, were victims of identity fraud in 2019. The concept of identity theft in the virtual world follows naturally as a result. In virtual reality, identity theft has two aspects: Firstly - Identity theft (A person shows themselves as another avatar and uses their credits to buy goods) and secondly- the misappropriation of a virtual identity. Although it is yet unknown how to handle the identified theft concerns, this gives a chance to develop fresh approaches.

D. Crypto assets restrictions

Understanding how to integrate transactional features that entail the purchase of NFTs and the exchange of virtual currency into the metaverse is crucial for the banking and financial sectors. Recently there is no regulation or central authority that oversees this type of business and protects the consumer user, which is precisely why the metaverse was created: to monetize the experience in a decentralized system based on the blockchain, like the real world. It is critical that space usage be controlled, safety distances between avatars be mandated, accounts and personal data be safeguarded, and trustworthy cyber security measures be implemented.

E. Shifting Ecosystem

Since the introduction of the metaverse has made it possible for customers to have a genuinely immersive experience, it has been challenging to develop a digital banking experience that is comparable to visiting a branch in person. In the future, customers may interact with their bank using an avatar in the metaverse rather than calling a call centre. In addition to enabling clients to access their accounts from any physical location, this innovation also gives financial advisors the potential to better engage clients through data visualization through augmented reality (AR) and virtual reality (VR) technology.

IV. AN APPROACH FOR THE METAVERSE FINANCE INDUSTRY

In figure 4 we showed an approach, how the metaverse can do safe financial transactions in the financial industry. In our approach, Artificial Intelligence algorithms, decentralized blockchain technologies, and metaverse tools combinedly contributing to make fraud-fewer safe transactions for finance sector. We can see in the figure, the blockchain decentralization ledger system checks transactions by type of token with each block structure and at the end with some authentications (proof of transactions). Tokens are digital assets on blockchain technology, decentralization ledger system making secure this digital token transactions. On the other hand, Artificial Intelligence algorithms detect fraud identities, also fraud transactions, identify authentic nodes, and analyze transactions. To secure the financial issues present artificial intelligence exploring new explainable artificial intelligence (XAI) methods for finance industry.

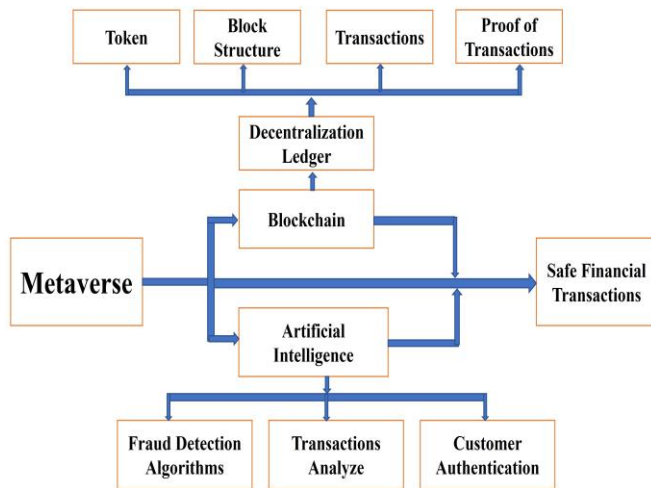


Figure 5. Metaverse Approach for the Financial Transactions.

In the XAI we can get explanations of methods how AI increase sustainability of the finance industry with metaverse technology.

V. CONCLUSIONS

Globally the finance industry the most important part of personal financial issues and for central or global business. Each financial organization wants to make its transactions secure. The new global technological big innovation, metaverse can secure every financial transaction for all financial institutions. In this paper, we discuss its applications and possible challenges based on the finance industry. Finally, we showed an approach for metaverse finance and how can it make secure all the transactions.

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