

METaverse

RESHAPING THE FINANCIAL SERVICES SECTOR



1.0 INTRODUCTION

- 1.1 The rapid advancement of technology has transformed the world in numerous ways, transcending the boundaries of what was once deemed not possible. In recent years, the term "metaverse" has gained significant attention, sparking curiosity and debate amongst the financial market players and regulatory community.
- 1.2 Metaverse describes what many expect to be the next significant paradigm for how citizens will use digital technologies and networks to interact, collaborate and have various kinds of virtual experiences. The metaverse, often referred to as a virtual realm of infinite possibilities, represents a convergence of virtual reality, augmented reality, and the internet respectively.
- 1.3 The Financial Services Commission, Mauritius ("FSC Mauritius") is, as a result of the fast emergence of metaverse, acting proactively to ensure that the regulatory and business environments in Mauritius are appropriately ready and re-engineered, wherever appropriate, for the stakeholders of the financial service sector to engage in such new digital experiences and benefit, accordingly.
- 1.4 The FSC Mauritius is, in that respect, issuing this consultation paper and inviting its industry stakeholders and the general public, to express their comments/feedback on the strategic developments and repercussions of the metaverse within the financial services industry in Mauritius.
- 1.5 For ease of this consultation process, the FSC Mauritius has drawn up a list of questions, as set out in **Appendix 1**. Comments/feedback must be submitted to: fintechconsultation@fscmauritius.org, **not later than 30 November 2023**.
- 1.6 The FSC Mauritius will, following the outcomes of this public consultation, consider the establishment of a multidisciplinary Working Group, in collaboration with the financial services industry, to further address the future policy and regulatory orientations of the Mauritius international financial centre in relation to metaverse.

2.0 BUILDING BLOCKS

- 2.1 Metaverse has been defined, in a report published recently by McKinsey¹ as the emerging 3D-enabled digital space that uses virtual reality, augmented reality and other advanced internet and semiconductor technologies to allow people to have lifelike personal and business experiences online.
- 2.2 Unlike conventional virtual reality experiences that are isolated and disconnected, the metaverse is envisioned as a seamless and persistent universe that allows users to move fluidly between different digital realms. The metaverse is effectively a shared space where people can create, consume, and collaborate on a massive scale.
- 2.3 Metaverse, as such, relies on a combination of some key technologies to create its immersive and interconnected digital environment, including:
- (a) *Virtual Reality (VR)*, which provides users with a fully immersive experience, transporting them to digital spaces that simulate the real-world.
 - (b) *Augmented Reality (AR)*, which overlays virtual elements onto the real world, enhancing users' perception and interaction with the physical environment.
- 2.4 These technologies, along with advancements in computer graphics, haptic feedback, artificial intelligence, and networking infrastructure, will continuously contribute to the development of the metaverse.
- 2.5 As the concept of metaverse is hence gaining traction and moving closer to reality, the “metaverse economy” is rising, globally. Alike the internet which has transformed the global economy by enabling new business models and disrupting traditional industries, the metaverse has also the potentials to revolutionise economic systems by creating unprecedented virtual economies and digital marketplaces. It is predicted that the global market revenue from the metaverse will rise exponentially from \$ 65.51 billion to \$ 936.57 billion over the period 2022-2030².

3.0 WEB 3.0 TRANSFORMATION

- 3.1 Metaverse has accelerated the transition from Web 2.0 to Web 3.0. Web 2.0 had initially brought a paradigm shift to the internet by introducing centralised platforms such as social networking³, user-generated content, and interactive web applications⁴. Web 3.0 nowadays characterises the next stage of internet revolution, focusing on data interoperability, machine understanding and decentralisation respectively.
- 3.2 Web 3.0 is commonly referred to as the "Semantic Web" or "Decentralised Web". It provides the underlying infrastructures that empower the metaverse. Web 3.0 effectively represents the next generation of the internet, characterised by decentralised and distributed technologies that will correspondingly prioritise user privacy, security, and control over personal data.
- 3.3 Unlike Web 2.0, Web 3.0 effectively embraces the principles of blockchain, cryptocurrency and peer-to-peer networks, whereby data is not only accessible but also semantically linked, allowing machines to understand and interpret such data or information better. This, as a result, enables more personalised user experiences, intelligent search and recommendations.
- 3.4 Web 3.0 has, moreover, the potential to admit new business models, establish marketplaces for digital assets and client advisory services, amongst others. Metaverse has become a virtual shared space where users can interact, create and transact in real-time.
- 3.5 Web 3.0 therefore plays a crucial role in facilitating the creation, storage, and exchange of digital assets. It is the vital platform used by the metaverse, to cultivate this emerging digital economy.

4.0 ROLES OF ARTIFICIAL INTELLIGENCE (“AI”)

4.1 AI serves as one of the backbone technologies of the metaverse, by supporting immersive experiences that transcend the limitations of traditional digital spaces. Consequently, virtual environments have nowadays become alive through:

- (a) AI-powered avatars which are capable of natural interactions,
- (b) Voice recognition that fosters fluid communication, and
- (c) Procedural generation that creates dynamic landscapes,

all contributing to a sense of presence and engagement that were previously unattainable.

4.2 When AI takes the form of deep learning, it furthermore plays a transformative role in shaping the metaverse by revolutionising how users can interact, create and experience virtual environments. Deep learning, in fact, understands context and intent, thereby enabling AI-powered avatars and Non-Player Character (NPCs⁵) to respond intelligently and realistically to users' actions and conversations. This heightened level of interactivity fosters a sense of presence and realism, bridging the gap between the physical and virtual worlds.

4.3 AI also enhances realism, responsiveness, and personalisation through real-time data analysis and predictive algorithms.

4.4 Metaverse thrives on creativity, and AI ultimately acts as a catalyst for content creation and customisation, in this broader context. Generative AI tools, in particular, enable users to effortlessly produce intricate virtual objects, artworks, and architecture. AI algorithms can also effectively empower users to tailor their experiences, from personalised avatars to AI-curated content recommendations that resonate with individual preferences.

5.0 DISTINCTIVENESS OF NON-FUNGIBLE TOKENS (“NFTs”)

- 5.1 NFTs are defined as a type of virtual asset⁶ representing various items (ranging from digital art to in-game possessions) and can be traded like other traditional assets⁷. NFTs are generally and securely stored on a blockchain, which is a decentralised ledger recording transactions. However, NFTs cannot be replicated or destroyed which makes them uniquely valuable.
- 5.2 From customisable avatars that reflect individuality, to virtual real estate parcels bearing imprints of personal creativity, NFTs offer a bridge between the tangible and the digital worlds, fostering a sense of ownership and authenticity previously unattainable⁸.
- 5.3 Metaverse therefore offers an interconnected digital universe and enables the capabilities of blockchain technology to create NFTs to benefit several industries, including the financial services industry. For instance, through the implementation of smart contracts, programmable functionalities are integrated into digital assets, facilitating seamless transfer and collateralisation, while also empowering the emergence of innovative financial services⁹.

6.0 BENEFITS FOR THE FINANCIAL SERVICES INDUSTRY

- 6.1 The financial services sector is highly relevant in the context of the metaverse. Metaverse plays an important role in the trading of virtual assets within a decentralised environment, and creates mutual relationships with the financial services sector, impacting various aspects of investment, insurance, pensions and beyond.

This emerging virtual realm certainly introduces new opportunities and challenges that will intersect with finance and economic activities.

- 6.2 Indeed, there are many potential economic benefits¹⁰ associated with the metaverse, such as:

- (a) Financial promoters/businessmen can establish virtual storefronts in the metaverse, whereby customers may seamlessly browse and purchase their products or services; or
- (b) Users could create and sell digital goods or services, whereby avatars can effectively be personalised and customised in relation thereto. Users are, in fact, willing to invest in items that differentiate their avatars, enabling them to express their individuality and creativity. This drive for personalisation fuels demand for digital goods or services, therefore boosting the virtual economy.

6.3 Metaverse also creates immersive and interactive virtual experiences (e.g virtual meetings) for the benefits of financial customers. Virtual meetings in the metaverse, in fact, transcend the limitations of traditional video conferencing.

Instead of flat screens, customers would therefore be able interact with their financial service providers (such as investment advisers or managers, insurance brokers, pension scheme administrators or managers, etc.) in immersive environments, making discussions more engaging and productive.

6.4 Moreover, metaverse opens the doors for ground breaking financial innovation and simulation, that is:

- (a) New and innovative ways of simulating financial scenarios, stress tests, and trading/investment strategies. Complex financial models can accordingly be visualised in 3D, enabling better understanding and decision-making.
- (b) Investment dealers, advisers and portfolio managers can effectively immerse themselves in realistic simulations, helping them to anticipate market movements and make informed choices.

7.0 SALIENT CHALLENGES OF METAVERSE

7.1 Beneath the surface of an enticing metaverse may lie several challenges that have the potential to disrupt and reshape the financial services industry in unexpected ways, including:

- (a) Virtual Asset Vulnerabilities: One of the primary challenges facing the metaverse in the financial services industry pertains to the security and integrity of virtual assets. As virtual spaces or economies flourish within these digital domains, individuals and businesses increasingly rely on virtual assets or currencies, NFTs, etc. Yet, the decentralised nature of many metaverse platforms exposes these assets to potential breaches, theft, and fraud. Without robust encryption and secure storage mechanisms, these digital valuables become susceptible to exploitation by cybercriminals, undermining the trust required for financial transactions within the metaverse.
- (b) Cybersecurity Risks: The interconnected nature of the metaverse introduces a complex web of digital interactions, opening doors for possible cyberattacks. From Distributed Denial of Service (DDoS)¹¹ attacks targeting virtual marketplaces to identity theft within virtual worlds, the spectrum of cybersecurity challenges is broad. As financial transactions and sensitive information become intertwined with the metaverse, financial institutions must adapt their cybersecurity measures to guard against data breaches, hacking attempts, and privacy infringements.
- (c) Server Outages and Uncertainties: The metaverse's seamless integration relies heavily on the stability and reliability of underlying server infrastructures. However, as witnessed in traditional online platforms, server outages can result in significant disruptions, rendering virtual financial business activities temporarily or even permanently inaccessible. These outages can lead to financial losses, erode user trust,

and hinder the growth of metaverse-based financial services. Ensuring robust server architectures and disaster recovery plans becomes paramount to mitigating this threat.

- (d) Content Moderation and Safety: In the metaverse, users encounter various content risks that can impact on their online experiences. These risks encompass exposure to inappropriate or offensive content, cyberbullying, identity theft and scams. Applying measures to ensure a safe and inclusive environment would involve, for example, guidelines for content moderation. Another way to tackle these problems is by AI-powered algorithms. These can help to scan and analyse vast amounts of content in real-time, and can identify or filter out content that violates financial community guidelines, ultimately helping to maintain a safer environment for all users within the metaverse.
- (e) False information and manipulation: The metaverse's one-to-one and immersive conditions make it easier for bad actors to persuade, mislead, and manipulate. The deceptive possibilities of bots, "deepfakes," and AR-altered realities are, for instance, daunting, especially for the less financially literate community, who will have trouble discerning what or who is real.

8.0 BENCHMARKING WITH FOREIGN MODELS

8.1 There are several overseas financial regulators, institutions, fintech companies and business alliances that are collaborating to foster metaverse development and drive innovation at the core of the financial services sector.

8.2 Below are some worthy to quote examples of such collaborations or models:

- (a) **European Commission ('EC')** – The EC intends to establish a new initiative to regulate the metaverse. The aim was, through a public

consultation in May 2023, to create an ecosystem in financial services sector whereby an open, interoperable, and innovative virtual world exist, and it can be used safely and with confidence by businesses and the general public. The European Commission considers the Digital Services Act¹² and Digital Markets Act¹³ as critical stepping stones or legislative instruments towards this initiative/goal. The European parliament is also concurrently working to address the opportunities, risks, and policy implications for the metaverse.

- (b) **Financial Conduct Authority (FCA) UK** – To analyse the opportunities and risks that such technologies can present for financial markets and customers, the Emerging Technology (EmTech) Research Hub works with partners in the financial services industry, academia, policymakers, and other regulators. The FCA, UK has, in this regard, partnered with EmTech Research Hub¹⁴ and published an update on its website in March 2023. The EmTech Research Hub recognises vital and emerging technology trends that will have a long-term impact on the financial services industry and converts them into actionable insight to guide regulatory thinking in terms of strategy and policy.
- (c) **Government of Dubai** – It has published in its official portal that Dubai¹⁵ is deemed to be consolidated as the world's Web 3.0 capital due to its progressive regulations and robust infrastructure. In 2022, the Dubai's Metaverse Strategy was unveiled, positioning the city as a leader providing a cutting-edge and connected ecosystem, whereby the metaverse community can flourish in a dynamic and enabling environment.

In addition, the:

- Dubai Financial Services Authority (DFSA) oversees the regulation of virtual or crypto assets and

- Virtual Assets Regulatory Authority (VARA) of Dubai developed a Test-Adapt-Scale model that has turned out to be a good proposal for companies targeting the global future economy (including the metaverse).

(d) **Asia and Pacific countries** – Singapore, Indonesia and South Korea are also researching and investigating the metaverse, and intend to develop their regulatory approaches in collaboration with industry. In this relation:

- The Global System for Mobile Communications Association (GSMA) and the Ministry of Science and ICT of South Korea (MSIT) have effectively signed an MoU in February 2022.
- Indonesia launched its own metaverse to support small businesses to be able to compete with foreign services.

China is equally expected to take a stronger stance on Metaverse. A research note was, in fact, published by the Chinese regulatory authorities in October 2021, highlighting that metaverse might develop into a problematic concept for national security.

(e) **Metaverse Business Alliance ('MBA')** – The MBA is a platform that aims to educate the public, decision-makers, lawmakers, and the business community about the use and potentials of immersive technologies. It allows institutions to collaboratively engage with businesses that share information about the application, potentials, and convergence of Web 3.0 technologies.¹⁶

8.3 As the nations across different continents increasingly continue to take steps forward, a future can be anticipated whereby the metaverse will transform into a space that not only unleashes boundless imagination, but also upholds fundamental values of consumer protection and individual empowerment.

9.0 POLICY AND REGULATORY IMPERATIVES FOR MAURITIUS

9.1 It has become crucial for financial regulators to therefore understand and react swiftly, to address the unique context and challenges posed by the metaverse, as this virtual realm continues to evolve and expand its impact on various industries, including the finance services industry.

9.2 Based on foreign jurisdictional and industry best practices, the FSC Mauritius has identified a list of key issues or imperatives for Mauritius, for further attention/discussion, in relation to the metaverse:

- (a) **Consumer Protection:** Given the novelty and complexity of the metaverse, consumer protection becomes paramount. It must be ensured that users are adequately informed about the risks associated with metaverse-related activities, and the users should also have reasonable recourse mechanisms for dispute resolution. It is expected that transactions should be appropriately monitored and addressed to avoid potential scams, fraudulent schemes and misleading practices within the metaverse.

It is important to highlight that consumer protection extends to virtual assets and services, as well. Clear and transparent terms of service for virtual transactions would be necessary to prevent fraudulent practices. Users should similarly be informed about costs, refund policies, and the ownership rights of virtual assets and services they purchase.

- (b) **Data Protection:** Key principles of data protection laws, such as informed consent, purpose limitation, data minimisation and the right to erasure, must be adapted for the metaverse context. Users should be aware about how their data are being used, have the ability to exercise control over their data, and be assured of its security.

Consent becomes specially crucial in the metaverse, given its potential to blur the lines between reality and virtuality. Users may encounter situations whereby their avatars or digital representations engage in interactions, that they have not explicitly consented to.

The metaverse indeed collects vast amounts of data about users' interactions, preferences, and behaviours. Striking the right balance between immersion and consent therefore requires thoughtful design that will respect users' boundaries and ensure that their digital identities are not exploited without consent.

Adequate consent mechanisms and clear privacy policies should be in place, allowing users to control their data and make informed decisions about its use.

- (c) **Intellectual Property Rights:** One of the primary challenges in the metaverse is defining and enforcing ownership rights. In traditional intellectual property contexts, it is relatively straightforward to attribute ownership to tangible creations.

However, in the metaverse, where the boundaries between user-generated content and pre-existing assets can be blurry, determining rightful ownership becomes complex. Creators often build upon existing materials, and distinguishing between unoriginal works and original creations becomes crucial, as a result.

As the metaverse allows users to create and exchange virtual assets (like NFTs), the relevant rules concerning intellectual property rights have to be well-clarified within such virtual environment. This would often include addressing issues (such as ownership, copyright, and licensing of virtual assets/services) to ensure that creators' rights are protected.

In relation to copyright, NFTs specifically bring a novel perspective to the concept of ownership. While the ownership of the NFTs does not necessarily confer copyright ownership of the underlying digital content,

it may grant the holder a form of ownership and provenance over the specific digital items associated with the NFTs. This has significant implications for creators who can effectively tokenise their digital works, allowing them to monetise their creations in new ways.

The Berne Convention for the Protection of Literary and Artistic Works, which has been ratified by 181 countries, establishes the legal framework concerning the rights of authors over their works, regardless of the medium or form of expression. According to this Convention, contracting parties are obligated to provide authors with exclusive rights to their works. It is therefore important to note that the act of storing a protected work in digital format on an electronic medium is considered reproduction and requires the prior consent of the copyright holder.¹⁷

Recently, the use of trademarks in video games has also become an issue of topical debates amongst legal practitioners. In principle, using the trademark of any company in a digital object, such as an NFT or an item in the metaverse, requires permission from the owner of the mark.

- (d) **Regulatory Compliance and Digital Identification:** In the metaverse, financial transactions on virtual asset exchanges can occur without geographical boundaries. This presents unique challenges for AML and KYC procedures. The application and enforcement of robust AML and KYC regulations must be adequately enforced upon metaverse platforms/service providers, to prevent money laundering, terrorist financing, and other illicit activities.

Implementing identity verification methods can, in fact, help deter anonymity and reduce the likelihood of users' dealing in suspicious transactions within the metaverse. Verified users should be increasingly accountable for their actions, knowing that their real identities are linked to their virtual personas.

Virtual assets will, indeed, continue to play a big role within the metaverse through for instance, enabling users to craft unique avatars, building virtual homes or curating distinctive virtual identities. Virtual assets may actually pose a refuge for illicit financial activities by financial criminals and terrorists, in the absence of appropriate and robust regulations.

It is thus essential to establish appropriate regulatory parameters governing the actions of users within the metaverse, as they are holders of their own digital identity and data. Users must understand how to effectively safeguard and preserve their data whilst also knowing the courses of action available to them, in the unfortunate event of data theft, modification, or cloning, which may even extend to the complete compromise of their digital identity.

Recent technological advancements have indicated that impersonating a user within the metaverse may not be a significant challenge. Users may, in fact, become easy targets of identity theft within the metaverse. For example, in addition to replicating digital identities through avatar appearances, voice replication is also possible. Artificial Intelligence has already produced software capable of cloning brief audio samples, akin to the utilisation of Deepfakes.

Managing digital footprints has therefore become increasingly intricate in today's era and the emergence of the metaverse has further compounded this challenge, as an array of devices are employed to gather copious amounts of data.

Against these backdrops, one of the proposed options/solutions for safeguarding digital identity and mitigating its associated risks, is the concept of sovereign digital identity¹⁸. This innovative approach relies on blockchain technology, enables users to engage in online interactions while maintaining control over the data they share and the recipients of that information. By leveraging on sovereign digital identities, individuals can securely authenticate their identities without the need to disclose

excessive personal information. Hence, sovereign digital identities ensure both privacy and security assurances for users.

- (e) **Taxation:** It will become increasingly common for tax authorities to extend their focus to metaverse projects, in due course.¹⁹ The most important question that has been raised when dealing with tax in the metaverse is: What was sold?

For instance, when engaging in the sale of digital real estate within the metaverse, it becomes essential to determine the classification of the product. Is it considered a digital product or a digital service? Moreover, if the product necessitates ongoing support, does it fall into the category of a digital service? These questions shall extend to other types of assets that may also be digitally exchanged within the metaverse.

Indirect Tax: Companies should recognise the possibility of transitioning from physical wholesale operations to digital retail operations within a metaverse. In this scenario, it becomes crucial to identify the physical location of all virtual customers, as opposed to relying on an international wholesale channel to local physical shops. This is particularly important in countries where only local Value Added Tax (VAT) rates are applicable.

Furthermore, emerging business models (such as virtual marketplaces) in the metaverse, may encounter challenges, in case tax regulations are outdated, i.e. they are not yet adapted to such technological advancements. This may inter-alia lead to unfavourable outcomes, such as potential accumulation or double counting of VAT.

It is, in this regard, to be noted that the deemed reseller rules which have been adopted by some foreign jurisdictions²⁰, continue to be applicable to the resale of digital goods on virtual marketplaces, even if these goods were previously sold to individual consumers or users within the metaverse.

Direct Tax: When a company transitions into a metaverse environment, it must be mindful of the potential tax implications associated with its business activities. If a company, for instance, purchases or leases virtual property in a metaverse using cryptocurrencies, it may trigger a taxable gain on the cryptocurrency, depending on the tax laws of the jurisdiction where the company is subject to taxation.

Similarly, if a company opts to create and sell its own NFTs within the metaverse (such as a fashion brand offering unique branded clothing for avatars) any profit resulting from the appreciation in value of the NFTs, as well as the cryptocurrencies received in exchange, may be subject to taxation. An essential aspect to contemplate is when these profits become subject to taxation. Does it occur at the point of the virtual transaction? Or, does it happen when the cryptocurrency is converted into fiat currency?

It is also possible that a particular increase in value or profit is subject to annual taxation, based on the value or profit at a specific moment within the year, or the average value over the year.

- (f) **Ethical Use of AI and Algorithms:** Within the metaverse, artificial intelligence and algorithms can significantly influence user experiences and financial decision-making. It is essential to establish informative guidelines so as to ensure that AI applications within the metaverse are developed and used ethically, avoiding bias and discriminatory practices.

As the metaverse expands, users should have a clear understanding about how AI and algorithms impact their experiences. Whether it is content curation, recommendation systems or personalised advertisements, users should be informed about how their data is used and the decisions that algorithms make on their behalf.

Moreover, developers should provide mechanisms for users to challenge and correct algorithmic decisions, fostering a sense of agency and control.

10.0 CONCLUDING REMARKS

- 10.1 Collaboration will be vital for reshaping the financial services industry within the Mauritius International Financial Centre, with the advent of metaverse. Government agencies, regulatory bodies and financial services industry stakeholders (including financial innovators and technological specialists) must forge strong partnerships to co-create frameworks that will foster responsible innovation and resilient compliance within the industry.
- 10.2 Regular dialogue and engagement can indeed help to establish standards, guidelines and best practices, ensuring that the metaverse becomes a safe space for the organisation and conduct of financial business activities in Mauritius.
- 10.3 Another critical or focal point is related to the education of users. As the metaverse introduces novel types of financial services, users must be empowered to make informed decisions. Financial literacy campaigns may, in this respect, educate users about risks and benefits, enabling them to navigate virtual spaces adeptly. Institutions should simultaneously emphasise responsible usage, alert users to potential pitfalls and provide resources for reporting suspicious activities.
- 10.4 The integration of metaverse (as an immersive and inclusive digital frontier) into the financial services industry in Mauritius International Financial Centre can hence offer immense potentials for future financial business innovation and growth in Mauritius.

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Appendix 1

List of questions to industry stakeholders and general public

1. How do you envision the impact of metaverse on the financial services industry, in the next 1 and 3 years respectively?
2. What new or potential business opportunities do you see for financial institutions in the metaverse space?
3. Are there specific financial services you would like to see implemented in the metaverse, that are currently unavailable in the physical world?
4. How can the metaverse foster collaboration between financial institutions and other industries to create a more interconnected digital economy in Mauritius?
5. What do you think are the biggest hurdles that need to be overcome, to achieve widespread adoption of financial services in the metaverse?
6. What steps are being taken to ensure that financial transactions in the metaverse are seamless and user-friendly, and how can financial institutions ensure that users have a positive experience in the metaverse financial ecosystem?
7. Are there any particular aspect(s) which you would like to add/put forward for the consideration of the FSC Mauritius (or other competent authorities, by extension)?

Note: It is not compulsory to answer all the questions set out in this Appendix. Respondents are invited to answer those questions which they consider relevant to their needs/circumstances.



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