

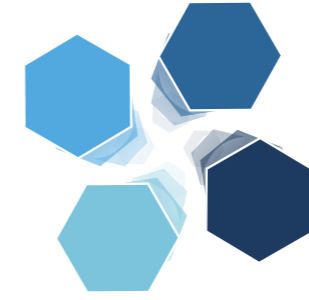


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Riyadh Valley Co



Metaverse – Changing Business Dynamics

May, 2024



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Introduction



The metaverse, while still in a nascent stage, is likely to lead the next wave of digital disruption with applications in both the public and private sectors. The metaverse envisions a virtual realm where individuals can connect, interact, and explore in a digital universe. From a public sector standpoint, the metaverse shows tremendous potential to reimagine tourism and government services. Metaverse applications have increased with growing innovations in the sectors of education, healthcare, virtual commerce, real estate, gaming and entertainment, social media as well as virtual worlds for virtual offices. Some examples of use cases include virtual car dealerships and immersive online shopping, training and onboarding, sales and marketing, virtual meetings, virtual sporting events and theatre screenings as well as virtual banks where clients can also learn about products.

In 2022, the highest spends were by China and the US with China's metaverse spend at about USD 76 billion while the US's estimated spend was about USD 35 billion. The two countries are expected to lead the global spend on the metaverse with an expected spend of USD 457 billion by China and USD 375 billion by the US by 2030. In the GCC, Saudi Arabia and UAE lead the region's metaverse spends in 2022 estimated at USD 1.1 billion and USD 2.8 billion respectively.¹ By the end of 2030, metaverse is expected to contribute around USD 15 billion to the GCC economies.²

Abundant business opportunities exist in the metaverse landscape with companies being able to host virtual events, create virtual stores and tours of products and services as well as enhance customer experience through various virtual touchpoints. The novelty of the technology is expected to further drive traffic and therefore increase sales to business that utilise the metaverse to create engaging and interactive marketing campaigns such as virtual concerts and virtual product experiences.³ Corporations, Venture Capital (VC), and Private Equity (PE) firms had already invested, globally, about USD 120 billion from January to May of 2022, more than double the USD 57 billion invested in 2021.⁴

Government initiatives are also driving public interest in the metaverse. One example of a major initiative is Saudi Arabia's USD 500 billion city of NEOM. The goal is to allow people to experience the city of NEOM before it is built through a virtual twin built in the metaverse. The metaverse platform is to be implemented incorporating mixed-reality twins, simultaneous physical-digital presence with immersive reality and creating a market for integrated cryptocurrency and NFTs transaction platforms.¹ Another example that highlights the value added by the metaverse in the GCC, is the UAE launched Sharjaverse. This is a government-backed metaverse city featuring a "Virtual Transaction Center" for official document processing and aims to boost the country's digital economy and local tourism.

¹ Strategic Gears

² Strategy&

³ FortySeven

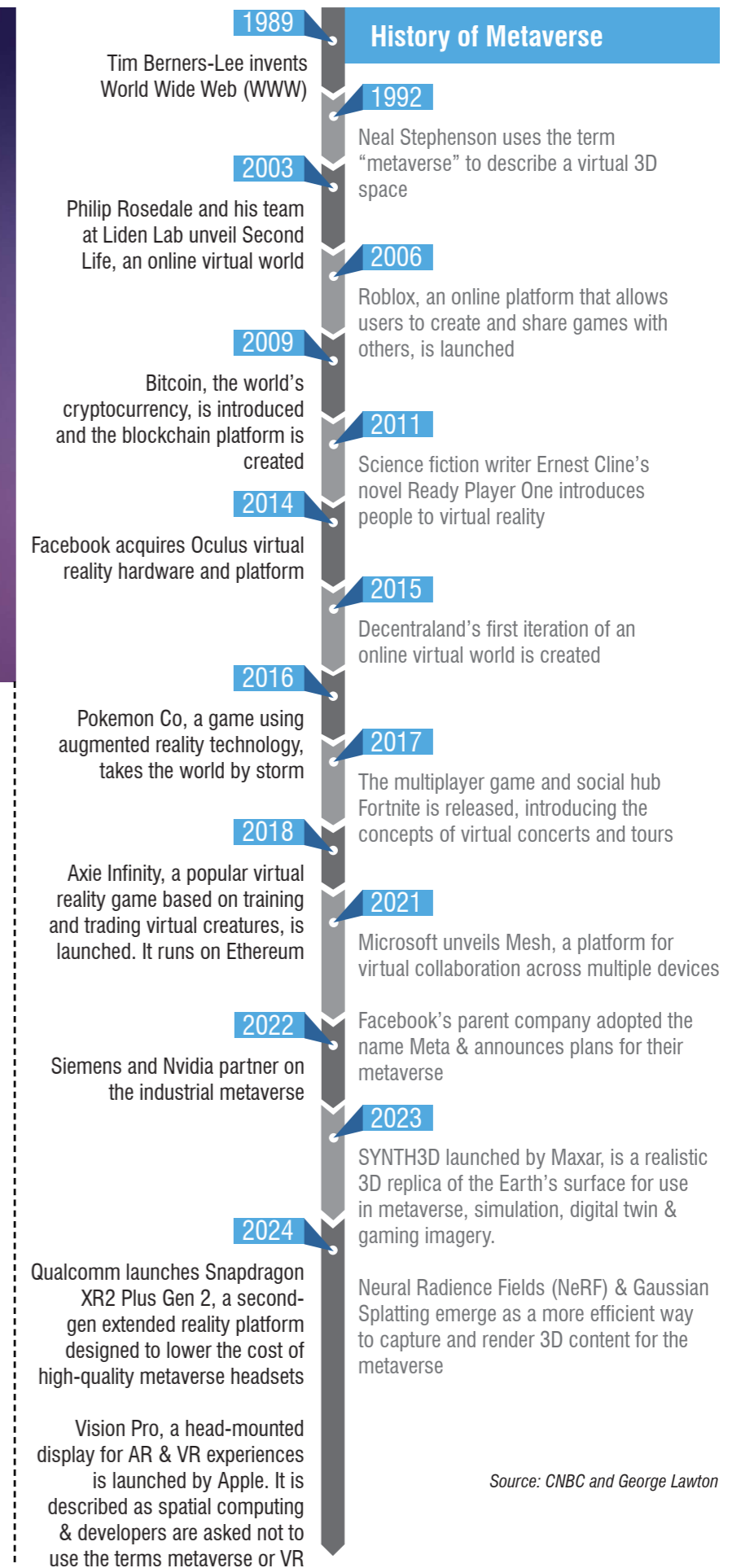
⁴ McKinsey



Overview of Metaverse

The word metaverse comes from the prefix "meta", meaning beyond, and the stem "verse", a derivative of "universe". It is an evolving concept that envisions a virtual realm where individuals can connect, interact, and explore in a digital universe. Metaverse essentially sees a convergence of digital technologies to combine and extend the reach and use of cryptocurrency, artificial intelligence (AI), augmented reality (AR), virtual reality (VR), spatial computing, and more. Accessible through browsers, mobile apps, and headsets, it facilitates real-time interactions and experiences across vast distances.

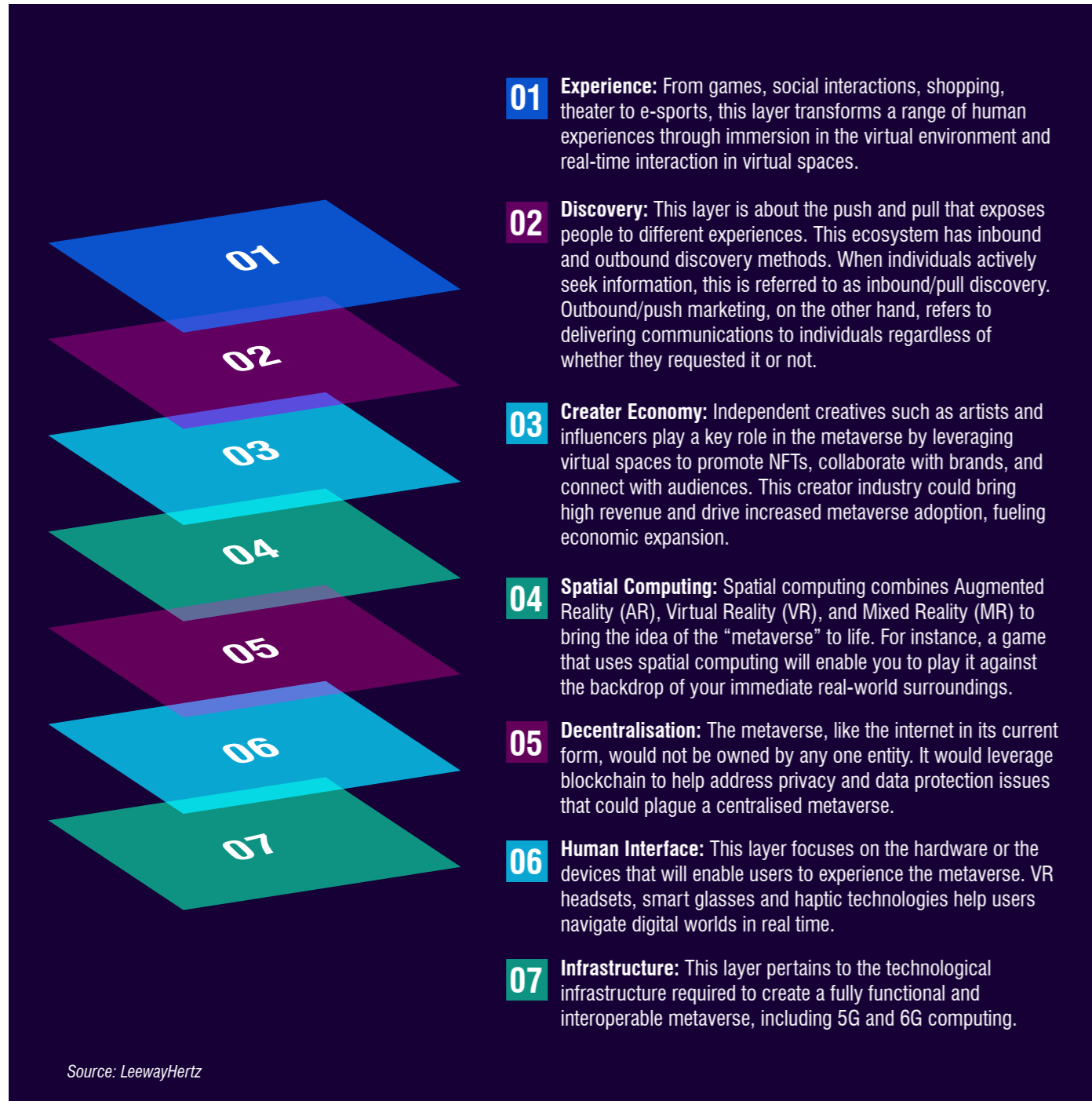
The word metaverse was coined by author Neal Stephenson in his science-fiction novel Snow Crash in 1992, and Decentraland's first iteration of its virtual world was created in 2015.



Source: CNBC and George Lawton

Jon Radoff, a popular Web3 author and entrepreneur envisions the metaverse as seven core layers. These seven layers represent different phases of the value chain of the metaverse market.

Seven Layers of Metaverse



Technology serves as the bridge between the conceptualisation of these elements and their implementation. Technology also provides the necessary infrastructure to bring these elements to life. Today, Metaverse has become a reality due to 7 key technologies that are powering it.

Technologies powering the Metaverse



Blockchain

Blockchain technology forms the bedrock of the metaverse. It provides decentralization and essential for various functions within the metaverse such as digital ownership verification, value transfer, governance, digital collectability, accessibility and interoperability.



Cryptocurrency

Cryptocurrency enables transactions within the metaverse, facilitating purchases and in-game transactions. Users have to exchange their real-world currencies to crypto before they can use it to carry out any transaction.



AR & VR

Augmented Reality and Virtual Reality engines play an important role in enabling metaverse. While VR enables users to see 3D simulations, AR helps users to actually feel things by creating physical simulations. As a result, users can hear, feel and interact with the virtual metaverse as if they are physically present in it.



Artificial Intelligence

AI plays a major role in making every process that happens in the metaverse an immersive one. It can help process data at lightning speed with the aid of machine learning techniques.



3D Reconstruction

Using special 3D cameras and other reconstruction technologies to render realistic 3D images and models of buildings, objects and characteristics, 3D reconstruction helps create realistic and life-like models for the users. The data collected using 3D cameras and 4K photography are then passed through computers which create life-like stimulations that are to be used in the metaverse.



Internet of Things (IoT)

Internet of Things (IoT) basically refers to a system that takes every element of the physical world and connects them to the internet through sensors and devices. In the case of metaverse, IoT and its applications will be able to collect data and feed it to the metaverse to adjust more precisely to the real-world conditions.



Edge Computing & 5G

Edge computing facilitates faster data transfer with fewer delays and helps enable smoother experiences. Another important feature that is often combined with edge computing is the availability of 5G networks. With the advent of 5G being rolled out and made available at affordable rates, more users can experience the metaverse from their desktops and other devices without facing any issues as regards to lag in network speed.

While the ideal Metaverse is still a work in progress, we are currently witnessing the early stages of its applications being implemented across various fields. Metaverse applications are emerging in key areas such as education, gaming, and healthcare.

Real-world use cases of Metaverse

Gaming

Fortnite is a video game that offers a virtual world with live events and collaborations. It allows for players to interact, compete and explore through different platforms such as PC, consoles and mobile phones

Virtual Office and Employee Onboarding

Virbela is a virtual world platform that provides a metaverse solution for remote work. It offers customizable virtual offices and interactive spaces where employees can meet and engage in virtual activities.

Entertainment and Social Media

VRChat is an online virtual world platform where users can meet and communicate with people from around the world and attend virtual events

Real Estate

Somnium Space is a blockchain-based virtual reality platform that emphasizes virtual real estate. Users can buy, sell, and own virtual land

Education

Engage is a virtual reality platform which offers a wide range of immersive learning experiences, including virtual classrooms and virtual field trips.

Virtual Commerce

Within Decentraland, users can create and monetize their virtual creations, such as art, virtual fashion, and digital goods using cryptocurrency

Healthcare & Therapy

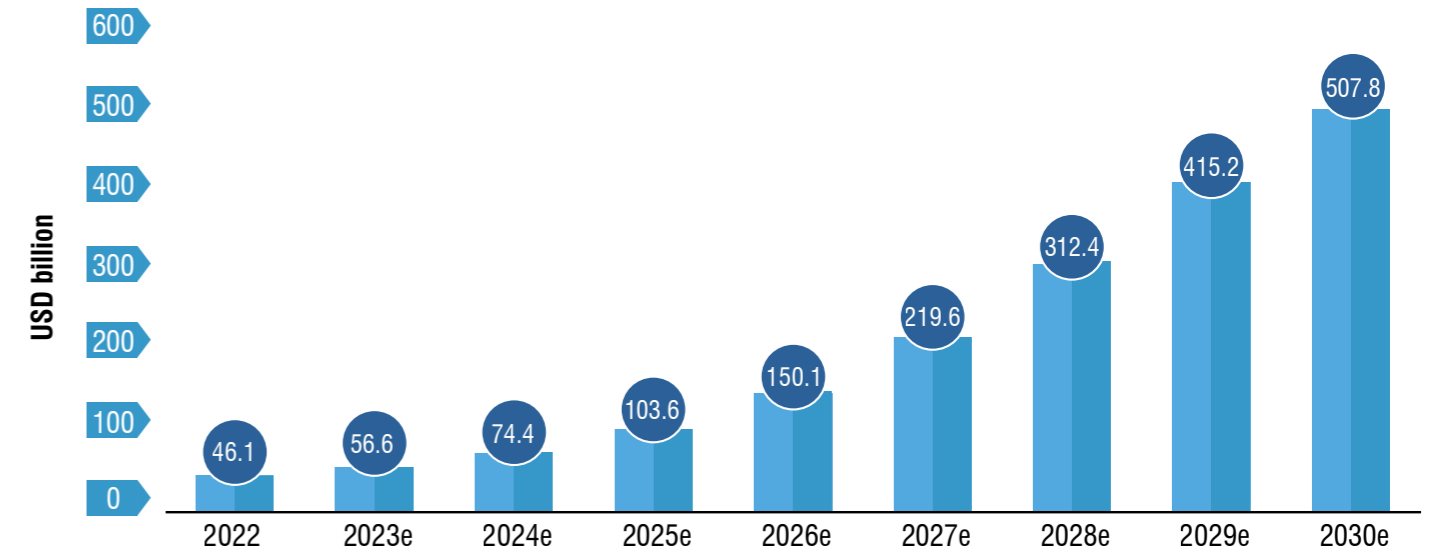
The Apollo Hospital Group, a healthcare multinational headquartered in Chennai, India, has revealed a partnership with “8chili Inc.”, a virtual platform where patients can engage in activities to learn how to manage emotions

Source: Antier Solutions

Global Metaverse industry

According to Statista Market Insights, the metaverse market size is projected to reach USD 507.8 billion USD by 2030, up from USD 46.1 billion USD in 2022, with an expected annual growth rate (CAGR 2022-2030) of 34.97%.

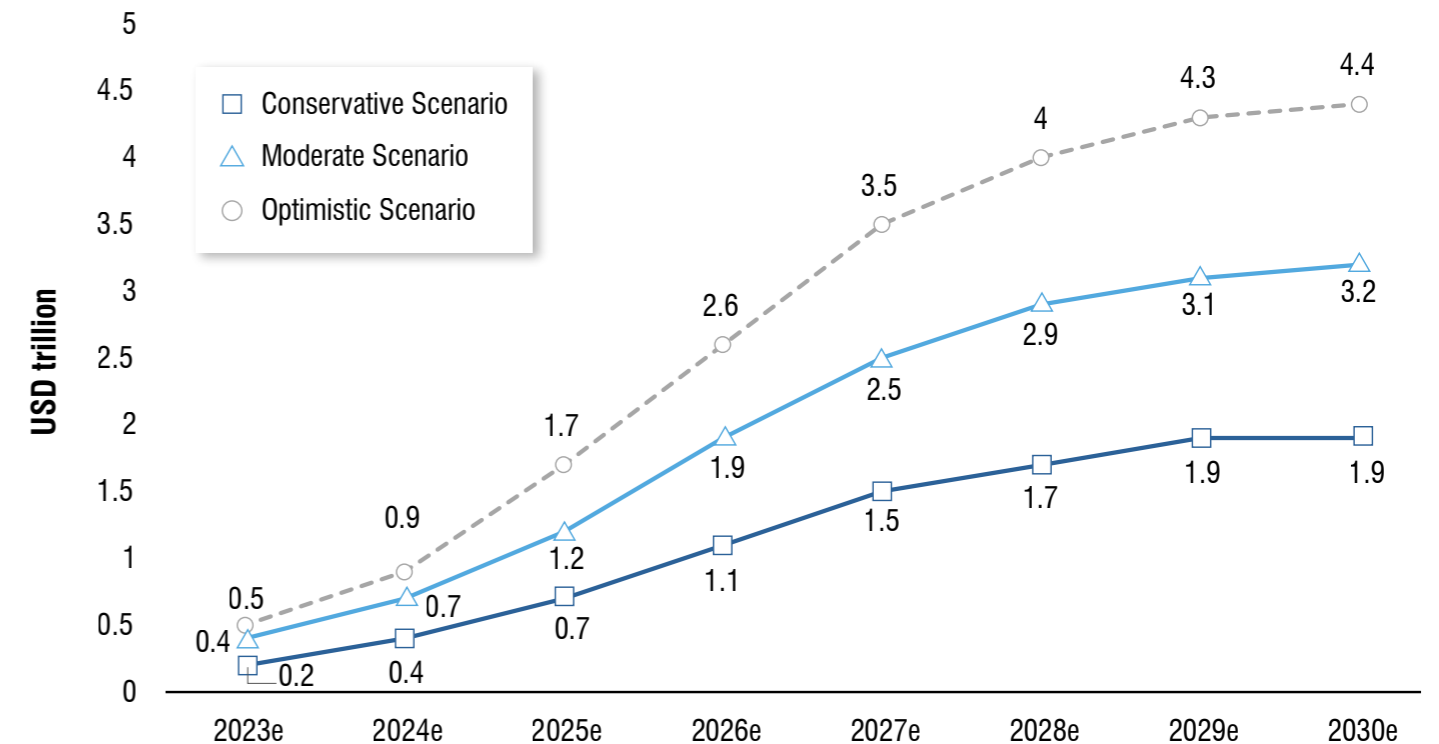
Global Metaverse Market (in USD billion)



Source: Statista

Additionally, the global total addressable market, representing the market size potential for metaverse products and services, is forecasted to reach at least USD 1.9 trillion by 2030, up from USD 0.2 trillion in 2023. This is under the conservative expectation where only 15% of the digital economy shifts to the metaverse.

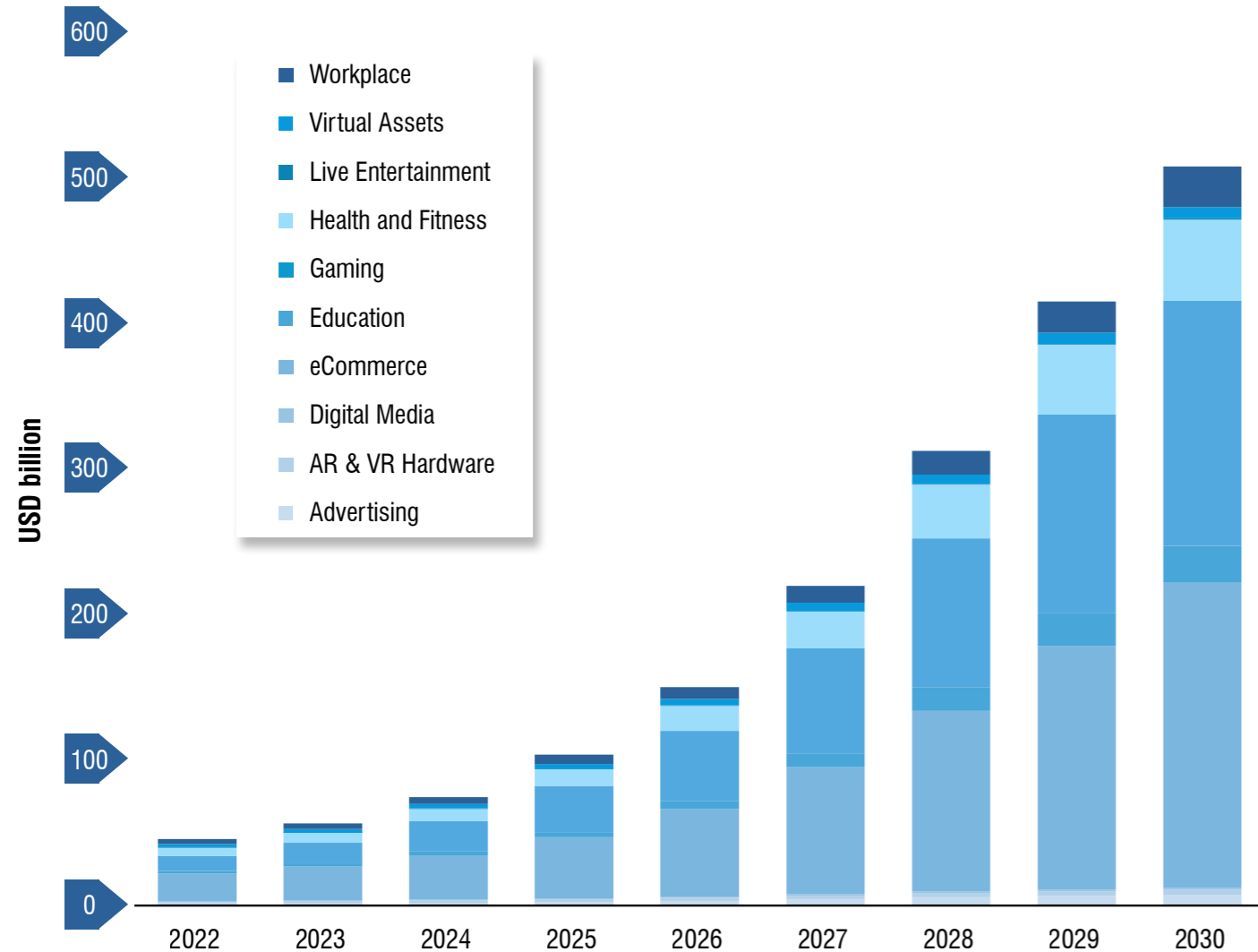
Total Addressable Metaverse Market (in USD trillion)



Source: Statista

Metaverse Gaming and Metaverse eCommerce are anticipated to lead in terms of market share within this ecosystem, with both industries projected to grow 16 times and 11 times respectively, from 2022-30.

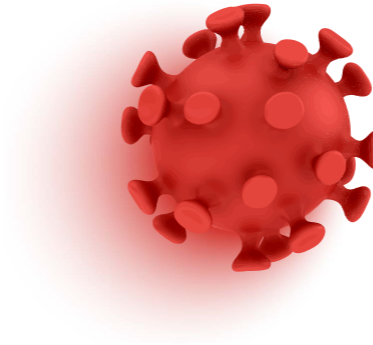
Market Structure of the Metaverse Ecosystem (in USD billion)



Source: Statista

Gaming and e-commerce are poised to tap into a broader audience through the Metaverse. However, understanding the underlying factors fuelling this demand is crucial.

Demand Drivers of Metaverse



Covid-19 pandemic and work from home culture

- The Covid-19 pandemic accelerated the adoption of remote work and virtual collaboration tools, propelling the demand for metaverse solutions.
- As organizations worldwide adapted to remote work setups, the metaverse emerged as a vital platform for creating immersive digital environments conducive to remote collaboration and industrial processes.



Growing popularity of cryptocurrencies and non-fungible tokens (NFTs)

- The rising popularity of cryptocurrencies and non-fungible tokens (NFTs) has significantly contributed to the expansion of the metaverse market.
- With increasing acceptance of digital currencies as a means of exchange, users are leveraging the metaverse to purchase digital assets using cryptocurrency.
- This trend presents immense opportunities for innovation and economic growth within the metaverse ecosystem.

Expanded opportunities for Business-to-Consumer (B2C) and Business-to-Business (B2B) enterprises



- The metaverse offers opportunities for both Business-to-Consumer (B2C) and Business-to-Business (B2B) enterprises, revolutionizing the way businesses interact with consumers and clients.
- B2C companies can now access a global marketplace, reaching consumers from any corner of the world and facilitating seamless transactions through immersive virtual experiences.
- Meanwhile, for B2B enterprises, the metaverse presents customised trade exhibitions, product demonstrations, client meetings, and customer service.

Source: Business Wire and GrandView Research

While these demand drivers present exciting opportunities for innovation and economic growth, given that the metaverse is still in its early stages of development, there are several issues that still need to be tackled.

Challenges faced by Metaverse



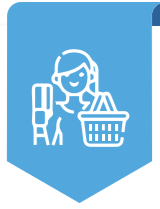
Privacy and Security

- Platforms will likely collect user data, including location, biometric data, and financial transactions. Companies will likely also be able to monitor physical reactions due to the link to wearable and haptic devices that measure emotions and physical reactions.
- Additionally, there exists the added risk for security breaches and cybersecurity concerns.
- To build customer trust in the platform, reliability and security for the customers must be prioritized.



Platform Interoperability

- One of the biggest challenges is the lack of interoperability between the various metaverse platforms as well as the absence of uniformity.
- If a platform does not leverage interoperability, it may become difficult for users to move seamlessly between other worlds and for businesses to build services ready for multiple Metaverse platforms.
- The difficulty in implementing interoperability is due to the need for standardisation and normalisation to be done across multiple companies.



Usefulness for consumers

- Consumers are likely to assess usefulness by determining if it is worth spending time and money in the metaverse in the form of interacting with content, playing, buying, and collaborating with others.
- The expensive requirements coupled with the difficulty in setting up of VR/AR tools will likely limit the metaverse to a smaller consumer segment.



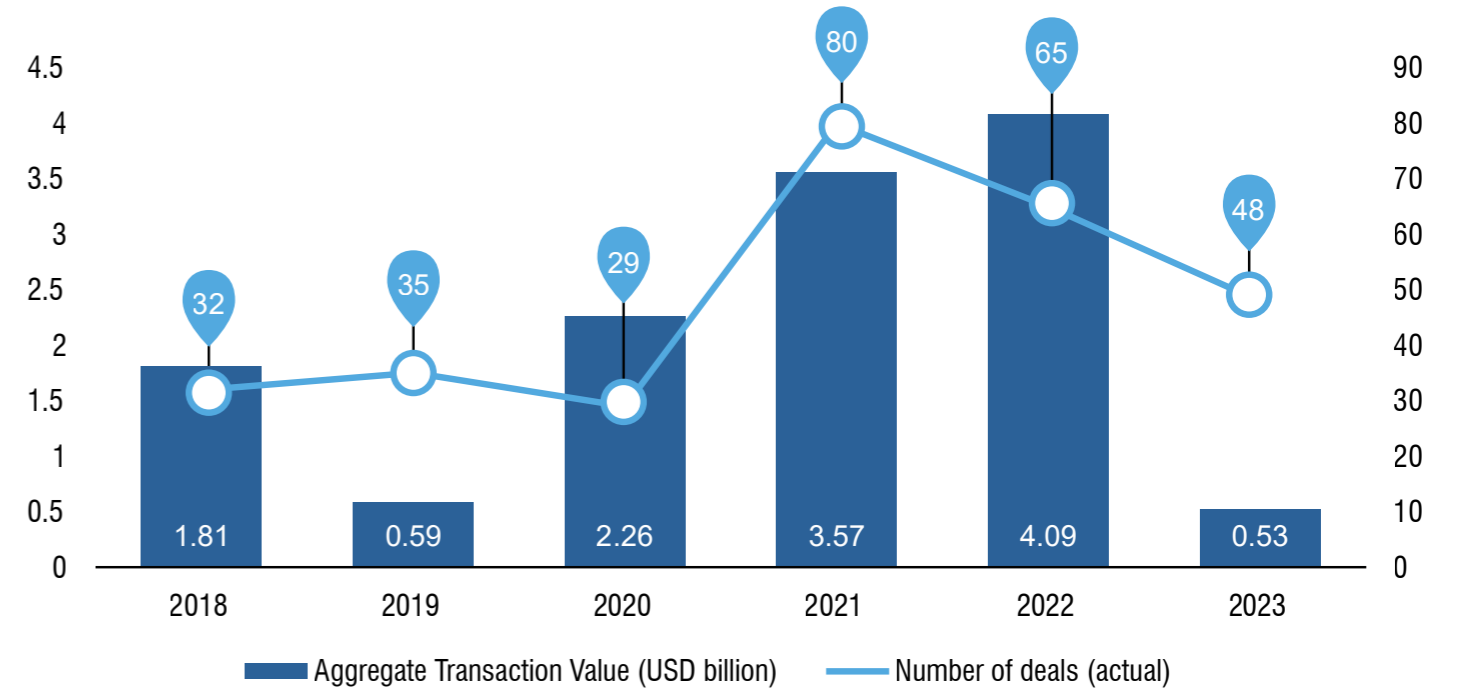
Cost and technical barriers

- Adopting the metaverse requires companies to build immersive virtual experiences which require specialised technical knowledge and high cost challenges to be overcome.
- The high costs are likely to include investments in hardware, software, as well as in the infrastructure needed to create virtual environments capable of supporting a large numbers of users and interactivity.
- The technical expertise required can be especially challenging for smaller organizations with limited resources.

Source: Forbes, Wired and Coforge

The metaverse continues to attract attention from global venture capitalists, despite a slowdown in 2023. The count of deals in global private equity and venture capital funding rounds, in metaverse companies, closed at 48 in 2023, dropping from 65 in 2022. This slowdown was attributable to technological bottlenecks, hardware limitations, concerns about privacy and security as well as macroeconomic conditions such as inflation, and high interest rates.

PE/VC backed funding rounds in metaverse companies, 2018-2023

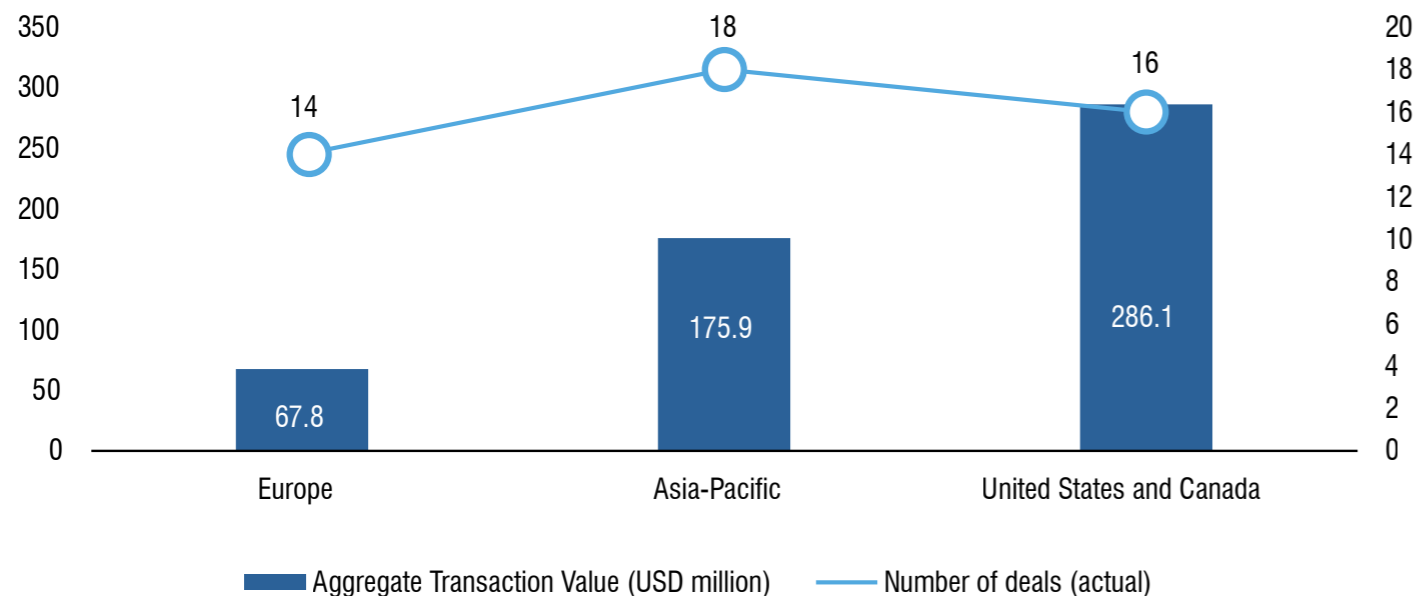


Source: S&P Global

The US and Canada accounted for about 54% of the aggregate transaction value PE/VC backed funding rounds and roughly 33% of the total deal volume in metaverse companies in 2023.





PE/VC backed funding rounds in metaverse companies, 2023








Source: S&P Global

Despite the drop in funding in 2023, the metaverse market is expected to bring in further funding as active daily users increase driven by more accessible and cheaper tech as the ecosystem matures. Apart from large companies like Meta and Apple, there are several startups which are making a huge impact in this space.

Startups in the metaverse industry

Startup	Country	Latest funding	Details
RLTY	 France	June 2022 seed round of USD 4.24 million	RLTY provides a no-code startup platform to build 3D immersive experiences for the metaverse. It combines various technologies like virtual reality (VR), cloud computing, blockchain, and a game engine towards organizing concerts, festivals, art exhibitions, and more.
Bit.Country	 Singapore	Secondary private transaction preceded by seed round in May 2021	Bit.Country provides metaverse as a service. Metaverse.Network is the startup's metaverse network and it allows non-technical users to launch their own metaverse projects. Bit.Country's application programming interface (API) enables game development as well as development of smart contract decentralized apps (dApps).

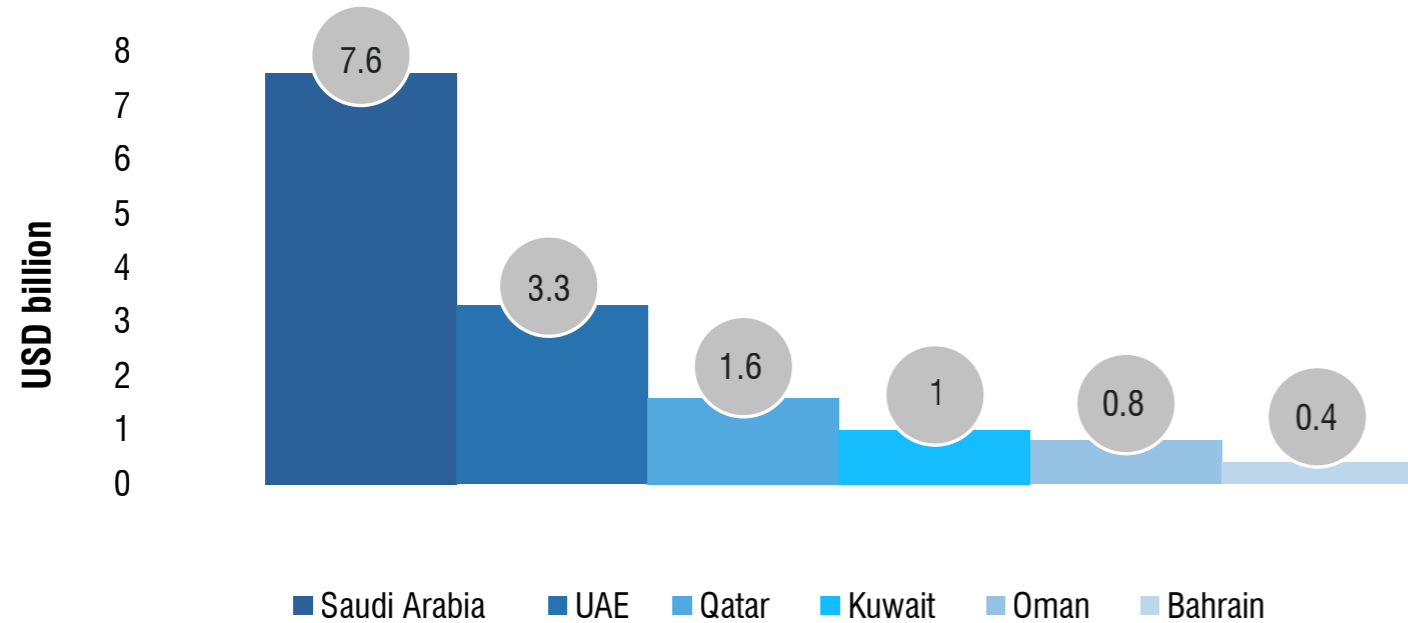
Edverse	 India	May 2022 seed round of USD 700 thousand	Edverse utilizes Polygon and Elysium blockchains to create a public decentralized network and deliver education history as NFT records. It also offers a metaverse space to host virtual classrooms and alumni meetups as well as conduct joint classes.
Veyond Metaverse	 USA	Early-stage VC round in January 2024 of USD 30 million preceded by seed round in February 2022	Veyond Metaverse maintains a healthcare metaverse ecosystem. The healthcare ecosystem enables the creation of, manipulation of and interaction with patient digital twins. This enables remote surgical training, remote supervision of surgeries, as well as real-time collaboration between surgeons. The startup also makes use of its proprietary cloud communication platform, to leverage extended reality (XR), AR, and VR, to improve collaboration and engagement.
Metaboutiq	 Estonia	-	Metaboutiq creates wear-to-earn NFTs. The startup's marketplace provides limited collections of curated 3D outfits for use in virtual work and leisure spaces. Metaboutiq promotes NFTs through partnerships with social media influencers. The NFTs by the startup are interoperable across AR and VR ecosystems.
Next Earth	 Hungary	-	Next Earth allows users to own locations on earth as NFT lands and connect them to their web2 business websites or platforms. The startup's landownership platform also allows developers to use smart contracts and mint dynamic NFTs to build map-based applications.
KEYS Metaverse	 UAE	Early-Stage VC round in September 2022	KEYS Metaverse makes an open metaverse focusing on accessibility as well as immersive user experiences. The real estate-centric metaverse also engages global real estate buyers and sellers by offering a 3D marketplace.

Source: StartUs Insights

Metaverse in the GCC region

The metaverse has the potential to transform key sectors in the Middle East, particularly the GCC (Gulf Cooperation Council). According to a report by Strategy&, the metaverse is expected to contribute about USD 15 billion to GCC economies by 2030.

Projected Metaverse Contribution to the GCC countries, 2030




Source: Strategy&

There are several notable developments made by the governments, companies, and startups in the GCC region to boost the ecosystem.


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UAE


 - Dubai’s metaverse strategy, formally introduced in July 2022, aims to add USD 4 billion to the economy and create 40,000 new jobs over the next five years.
 - The UAE established the Middle East’s first metaverse incubator to develop early-stage metaverse and Web3 applications.
 - The Ministry of Economy opened its third office in the metaverse to facilitate connection and collaboration among the public. It features a multi-story building where each floor serving a different purpose.
 - In collaboration with Multiverse Labs and the Sharjah Commerce & Tourism Development Authority, the UAE launched Sharjaverse in October 2022. This government-backed metaverse city features a “Virtual Transaction Center” for official document processing, and aims to boost the country’s digital economy and local tourism.

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Saudi Arabia

 - Saudi Arabia’s USD 500 billion city of NEOM includes a digital metaverse component, and is being used to customize aspects of the projects for real estate clients with inputs on construction while allowing collaboration between architects, engineers and designers. Metaverse gaming is also expected to be a major component of the NEOM megacity project.
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Qatar

 - Qatar Airways introduced the Qverse platform. The platform enhances the travel experience by allowing customers to virtually explore the airline’s premium check-in area and even tour the interior of their aircraft cabins.
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Kuwait

 - Virgin Mobile Kuwait announced a Metaverse program to collaborate with Kuwaiti content creators on platforms including a blockchain based virtual game environment called The Sandbox, as part of its ambition to be GCC’s telecommunication leader and disruptive innovator.
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Bahrain

 - Bahrain Institute of Banking and Finance launched its metaverse campus, which is intended to provide students and professionals in business and finance with an immersive learning experience supported by the latest technology.
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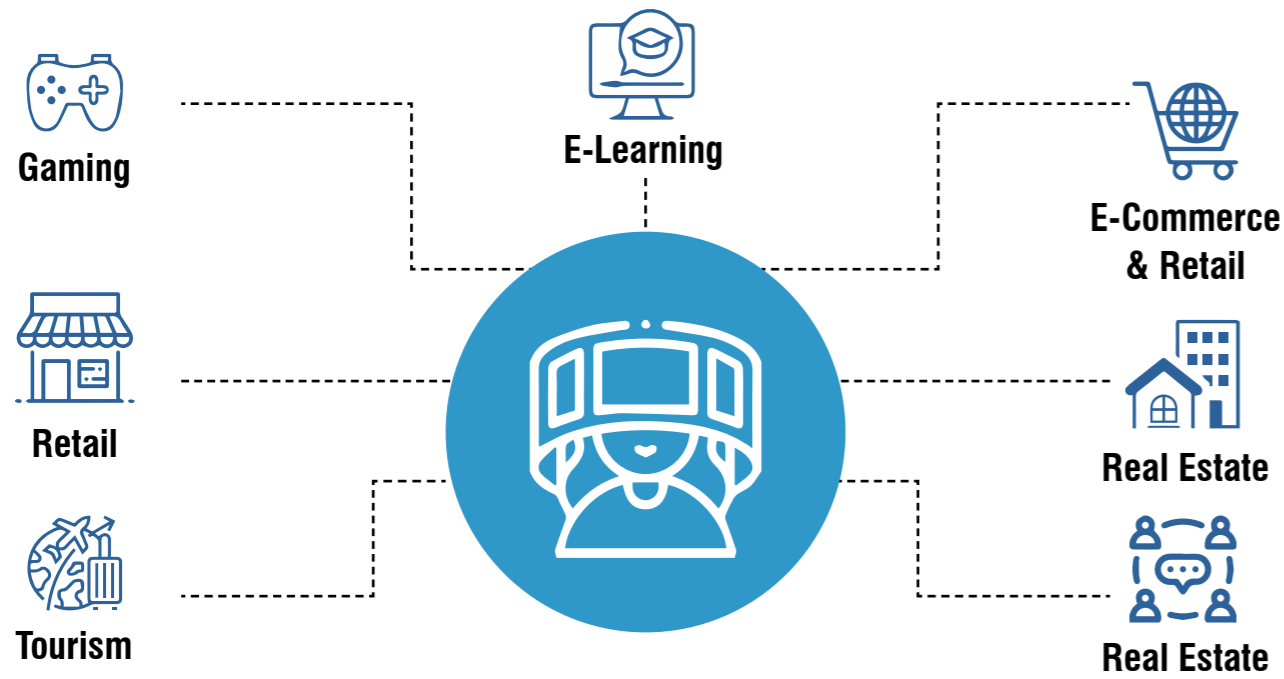
Oman

 - Oman’s Military Technological College opened a Research Management System and Metaverse Learning Center to reduce risks students potentially face during direct practical training.

Source: Strategy&, Fair Observer, National News, Analytics Drift and Arabian Stories

In terms of industries, Tourism and Gaming industries are projected to reap maximum gains from the metaverse, as of 2030.

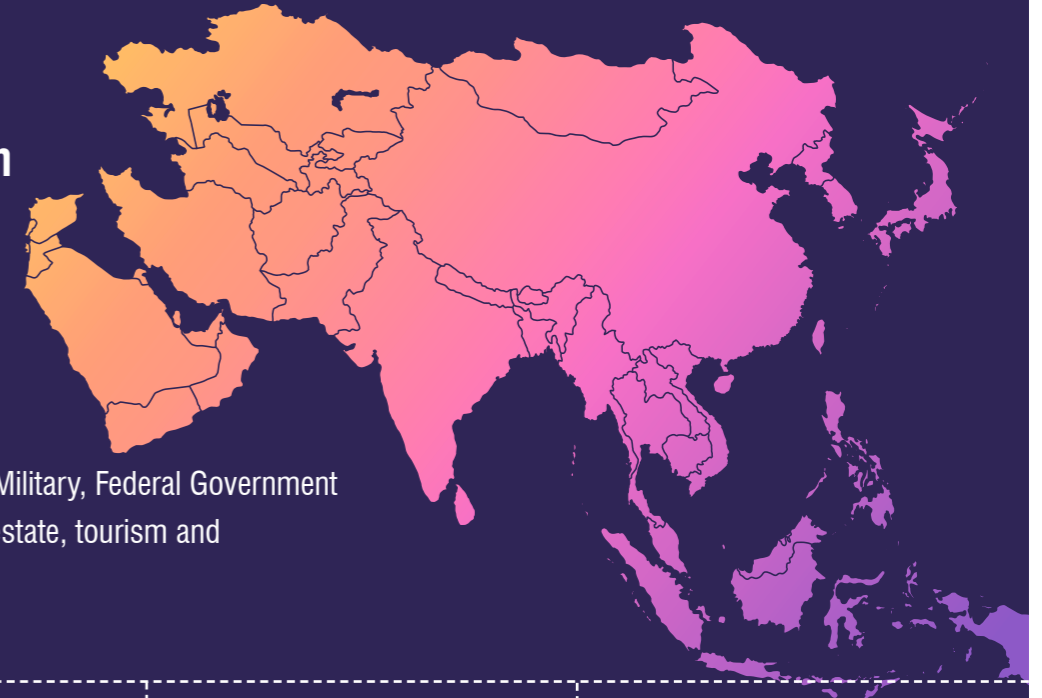
Sectors seizing Metaverse opportunity



Source: Purple Quarter



Metaverse adoption – Comparison with global peers



USA

- Adoption in the US Military, Federal Government Entities, retail, real estate, tourism and entertainment



Spain

- Adoption in gaming, tourism, real estate and “CatVers” to promote the Catalan culture and language



Saudi Arabia

- Adoption in infrastructure projects, virtual tourism experiences, and virtual events



UAE

- Adoption in healthcare, Dubai Space Centre life on Mars simulation, UAE Ministry of Economy office in the metaverse, arts, real estate, and fashion retail



China

- Adoption in marketing, e-commerce, Metaverse cities, blockchain-based service platforms, public services, entertainment, and manufacturing



Japan

- Adoption in, Japan Metaverse Economic Zone, Education and training, retail, financial services and real estate



South Korea

- Adoption in virtual public services, tourism, and education

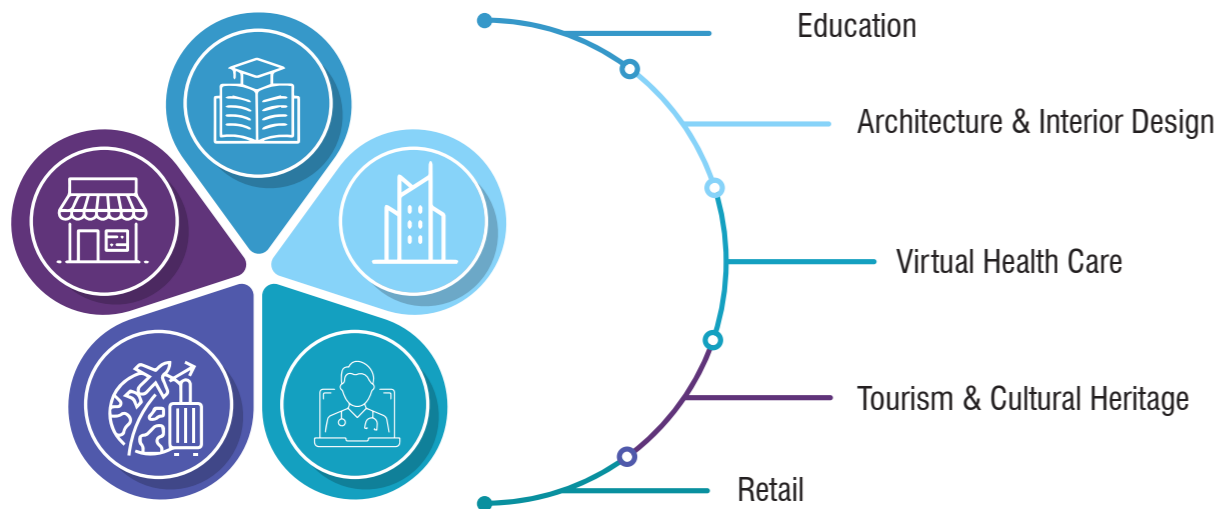
Source: Strategic Gears

Metaverse in Saudi Arabia

Saudi Arabia is expected to emerge as a key player in the global metaverse sector, due to innovative projects launched in the region and millions pledged towards the development of metaverse infrastructure. The metaverse is expected to increase civic engagement, global collaboration and quality of life and the underlying technology is expected to play a key role in advancing towards Saudi Arabia's Vision 2030 agenda.

As part of the diversification from oil in Vision 2030's targets, many non-oil sectors such as education, tourism, and real estate, are expected to be impacted by the developing metaverse industry. The developments are expected to attract further investments, both local and international, which in turn is expected to benefit the economy by capitalizing on emerging market opportunities.

Sectors expected to grow due to the Metaverse in Saudi Arabia



Source: Strategic Gears

Key Trends in Saudi Metaverse Industry

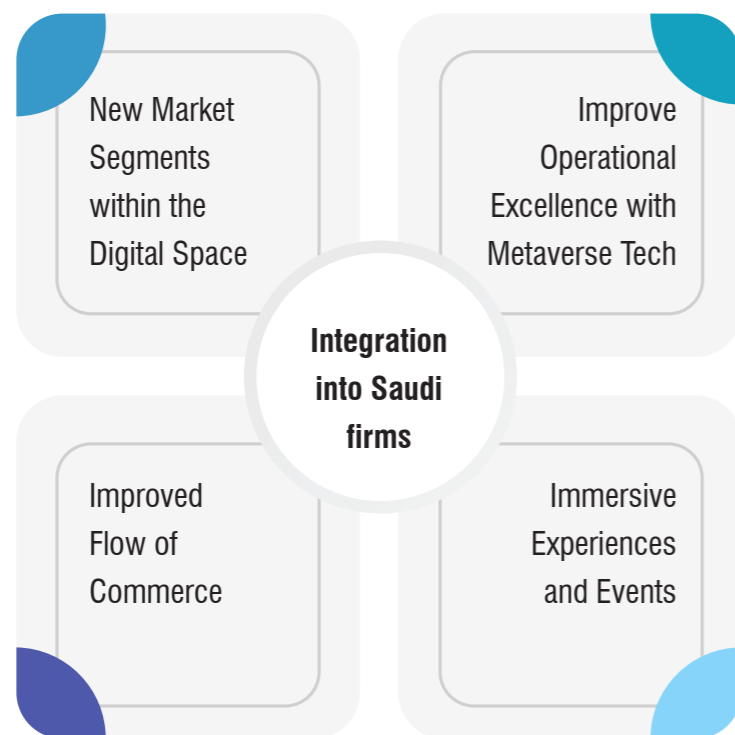
- 1 Giga Projects**
 - Creation of new ecosystems heavily supported by technology as part of Vision 2030's goal of changing how cities operate.
 - Investments of over USD 1 billion, in creating a digital replica of NEOM incorporating mixed-reality twins, simultaneous physical-digital presence with immersive reality and creating a market for integrated cryptocurrency and NFTs transaction platforms.
- 2 Tourism**
 - An immersive 3D experience completed in November 2022, emphasizing the significance of a renowned AIUla monument by The Royal Commission for AIUla.
 - The Mukaab, a massive cube filled with metaverse technology planned for 2030, to include a variety of retail, cultural, and tourist attractions.
- 3 Training**
 - The first metaverse academy in the Middle East was launched in Riyadh Meta Platforms in May 2023 in partnership with Tuwaiq Technologies Academy.
 - The academy's programs include discovery, up-skilling and training with the aim of aiding the region's technological advancement.
- 4 Investments**
 - Significant investments in digital economy focusing on digital infrastructure and communication technology in the metaverse realm.
- 5 Events**
 - On March 7, 2023, an event was organised by the International Telecommunication Union (ITU) and the National Cybersecurity Authority (NCA) in Riyadh, Saudi Arabia, on embracing the metaverse.
 - The 92nd Saudi National Day was hosted on the "Decentraland" metaverse platform.
 - On June 8, 2023, Riyadh hosted its first Metaverse Discovery Day in the world.
- 6 Partnerships**
 - In February 2023, Saudi Arabia's Digital Government Authority (DGA) signed an MoU with the Sandbox Company and reserved virtual space on its metaverse platform. The DGA aims to streamline governmental functions and create jobs in the metaverse.

Source: NEOM, Royal Commission for AI-Ula, International Telecommunication Union, Strategic Gears

The metaverse is a developing technology and therefore has many challenges and risks that need to be handled with effective solutions. This is amplified in the case of early adopters like Saudi Arabia because the metaverse is essentially a new digital world unbound by geography and is currently devoid of clear rules and regulations.

The metaverse and Web3 serves as a new channel for the delivery of services to customers and several Saudi government agencies and businesses have begun integrating the metaverse as part of their mode of operation.

Metaverse Integration into Saudi firms



Source: Strategic Gears



Spotlight – Palm Network

The Palm Network is one of Riyadh Valley Company’s indirect investments from RRE Venture’s investments. It is an Ethereum-compatible sidechain designed by and for Ethereum developers featuring low gas costs and fast transaction finality. As a sidechain, it runs independent of Ethereum but remains connected to the Ethereum Mainnet by a two-way bridge. The Palm network is built to serve as the foundation of a new scalable and sustainable ecosystem for NFTs and is powered by the PALM token. The Palm Network is one of Riyadh Valley Company’s indirect investments from the RRE Venture.

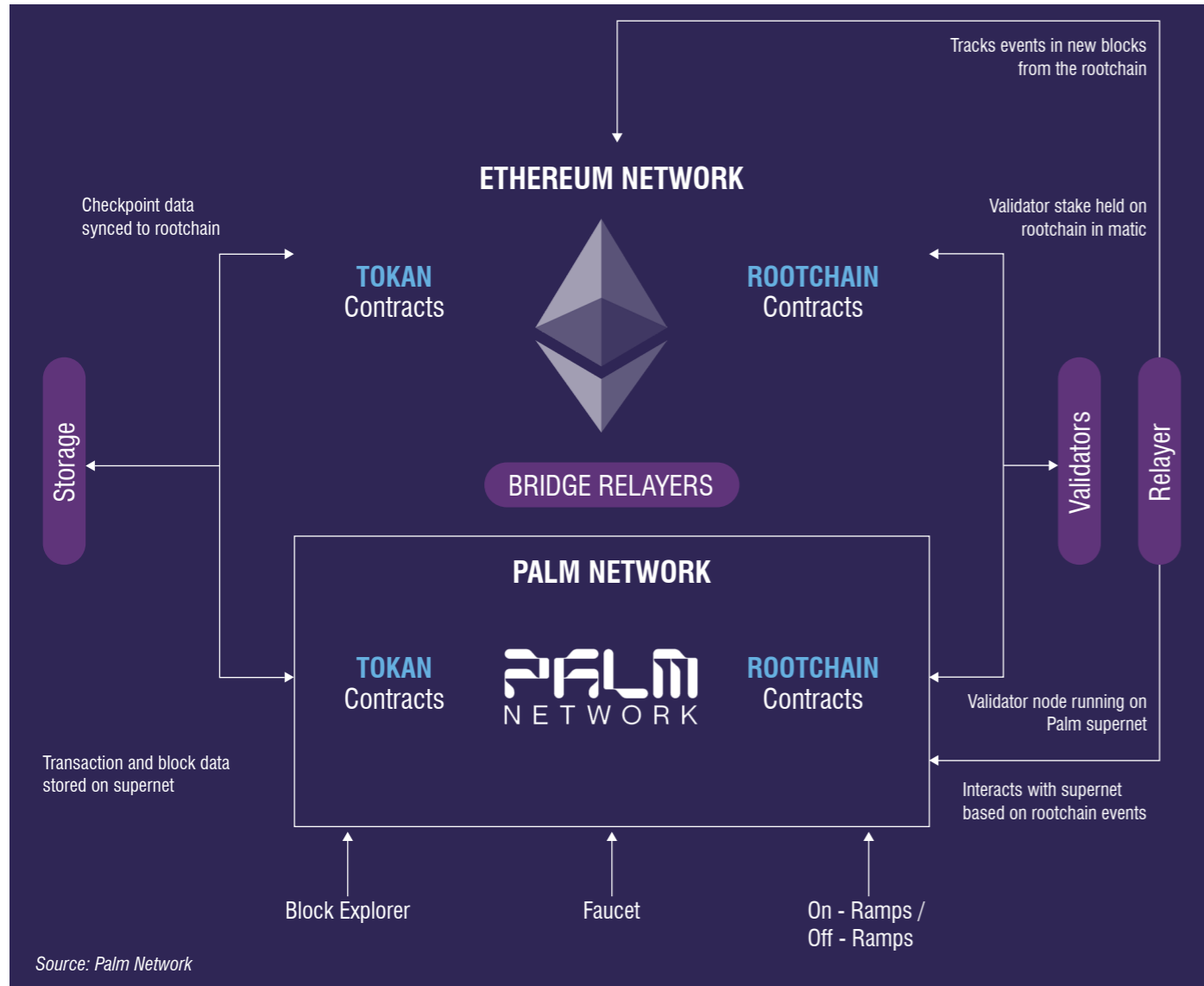
Palm Network Ecosystem



Source: Palm Network



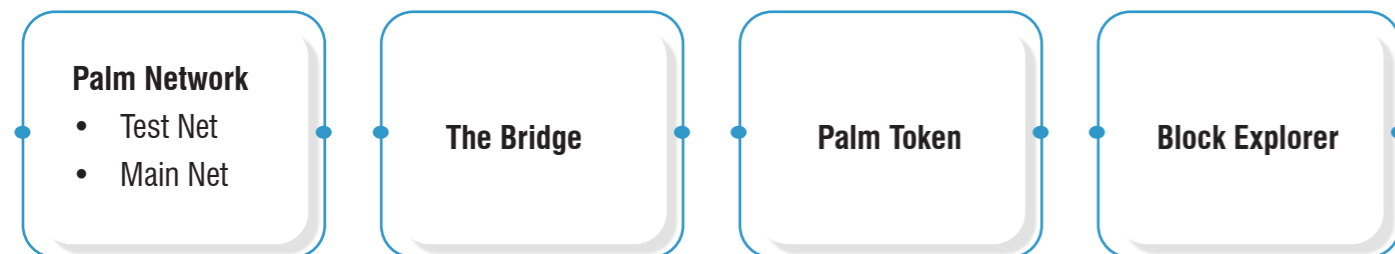
Palm Network Architecture



Source: Palm Network

The Palm network uses PolyBFT consensus (a variation of IBFT) and Poof-of-Stake, The network is over 99% more energy efficient than similar networks.

Palm Network Offerings



Source: Palm Network

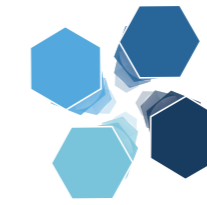
Conclusion

Global adoption of the metaverse is on the rise with consumers, businesses, and governments looking for innovative solutions to deepen connectivity. The potential for the metaverse to generate large economic value by 2030 worldwide indicates its growing relevance. In addition, it is expected that by 2030 over half the live events could be held in the metaverse and about 80 percent of commerce could be impacted with opportunities to visit virtual stores and discover new brands. The conveniences offered by virtualisation would also change how education is disseminated with collaboration on a global scale.⁴

The underlying technologies of the metaverse are still early in development, complex, and intermingled with complicated interactions. This provides stakeholders, in both the public and private sector, with the opportunity to shape the metaverse, keeping in mind the technical challenges of data privacy, data storage and financial services as well as challenges regarding social cohesion and wider access. The metaverse is well-poised to complement the real world by allowing for a greater freedom in movement between physical and virtual worlds to broaden the range of experiences.⁴

Saudi Arabia's nascent metaverse industry has grown with increased interest, investment, and creative ideas by both the government and Saudi businesses, but currently remains a small share of the global metaverse market. GCC's growth in the number of metaverse applications demonstrates the value that the metaverse can already bring and the value created is likely to increase as theoretical and practical issues are resolved over time.⁵

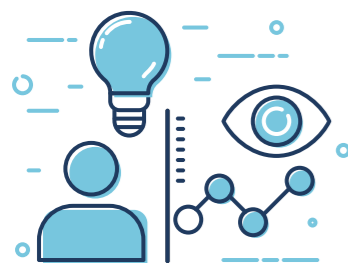
⁴ McKinsey
⁵ Strategy&



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Riyadh Valley Company

Riyadh Valley Company established in 2010 by Royal Decree No.116 dated 13/4/1431 AH to be the investment arm of King Saud University in the fields of Knowledge Economy and the university strategic projects.



Vision

To be the regional leader in knowledge-based investment and technology.



Mission

Riyadh Valley Company is a strategic investor, focused on leveraging the local capabilities, investing locally and globally in growth - stage businesses to create financial and strategic returns that will support the future of economic development in the Kingdom.

Investment Sectors:

Venture Capital Investments



Healthcare Investment



Renewable energy & Sustainable Resources



Information & Communication Technology



FinTech



Education



Logistics and Transportation

Strategic Investments



Innovation and R&D Projects



Educational Projects



Healthcare Projects



Commercial Projects



Residential Projects



Mixed-use Projects

Knowledge Investment Portfolio



Strategic Investment Portfolio



Sudair Pharma Company Project

Research center and offices



ELM Information Security Company Project

Research & Innovation center



Four Directions Company Project

Office project



Majd Real Estate Company Project

Offices project



Derma Clinic Company Project

Residential project



City Lights Real Estate Company Project

Mixed-use project



Al-soroooh Al-Mubarakah Company Project

Offices project



Obeikan Company Project

Commercial project



Derma Clinic Company Project

Healthcare project



Dur Alkuttab Company Project

Educational project



Four Directions Company Project

Commercial project



U WALK Project

Commercial project



Qasr Alaaredh Company Project

Building



Sahat Al-Ardh Company Project

Mixed-use project



The Esplanade Project

Commercial project



Almaarefa University Project

Building project



NMR Real Estate Company Project

Mixed-use project



Takween Altanmia Company Project

Offices project



Arrowad Education Company Project

Educational project



Innovation Tower Project

Office building project

