SwapED

Your Gateway to the Metaverse

Navigating the Future of Digital Realms

Intermediate Level – Short Course

AGENDA

- Metaverse Definition(s)
- Metaverse Origins & Evolution
- Metaverse Types
- Metaverse Characteristics
- The Importance of Metaverse
- Metaverse: Benefits & Advancements vs. Challenges & Considerations
- Metaverse Layers & Architecture
- Metaverse Applications
- Conclusion
- References

LEARNING OUTCOMES

- You will be able to define the concept with precision and understand its multifaceted interpretations within the digital landscape.
- You will gain insights into the historical progression from early virtual communities to current complex ecosystems.
- You will identify the common essential features across different platforms and environments within this domain.
- You will assess its significance and potential for transforming interactions within digital spaces.

LEARNING OUTCOMES

- You will understand the technical underpinnings, including infrastructure and design principles that enable its functionality.
- You will explore its practical uses in various fields, recognising the breadth of its influence on industry and society.

Metaverse Definition(s)

METAVERSE DEFINITION(S)

A Next-Generation Social Space

- Recognized as an evolution in social connectivity.
- Represents a constructed world with its own rules.

Virtual & Augmented Realities

- Can be fully virtual, like in VR systems.
- Or partially virtual, integrating AR in real-world scenarios.

Diverse Social & Professional Activities

- Enables socialising, collaboration, gaming, and learning.
- Interactions with real people or virtual characters.

(Avila, 2017; Bourlakis et al., 2009; Díaz et al., 2020; Farjami et al., 2011; Jovanović & Milosavljević, 2022; Kye et al., 2021; Park & Kim, 2022)

METAVERSE DEFINITION(S) CONT.

Mimicking Real-World Dynamics

- Hosts a variety of activities, including economic, political, and even natural events.

Bound by Imagination

- The only limit is the user's creativity.
- Lifelogging capabilities for recording life within the Metaverse.

Beyond VR and AR

- More than just virtual or augmented reality technologies.

(Davis et al., 2009; Díaz et al., 2020; Park & Kim, 2022; Thawonmas & Fukumoto, 2011)

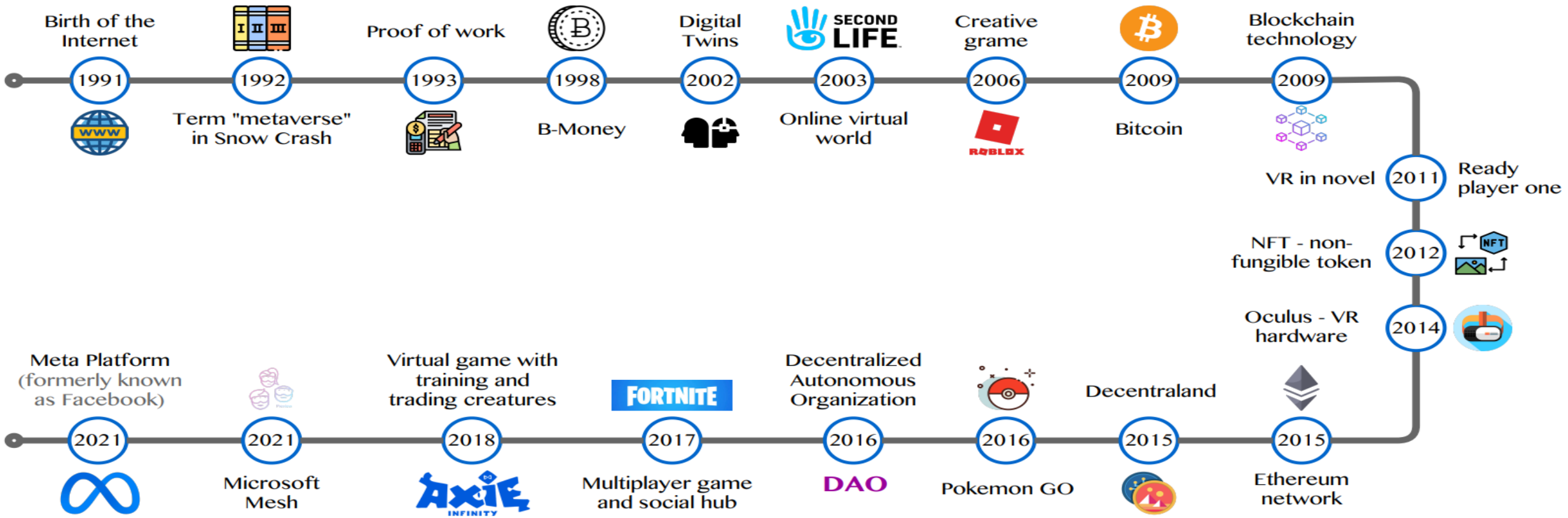
Metaverse Origins & Evolution

METAVERSE ORIGINS & EVOLUTION

Cyberspace Concept (1969)

- Coined by Susanne Using & Carsten Hoff (Atelier Cyberspace).
- Focused on managing physical spaces rather than virtual spaces.

METAVERSE ORIGINS & EVOLUTION



(Huynh-The et al., 2023)

METAVERSE ORIGINS & EVOLUTION CONT.

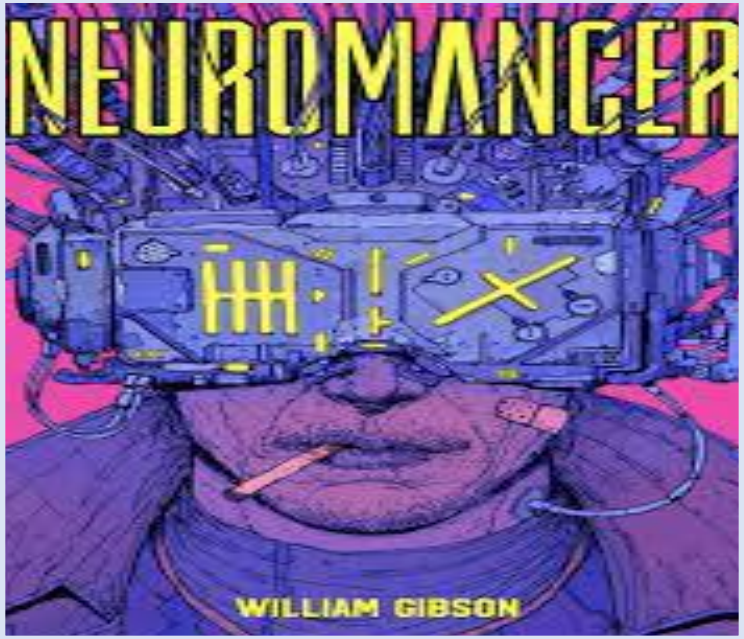
"Tron" Movie (1982)

- Showcased elements like avatars, virtual worlds, and the concept of a digital universe.

METAVERSE ORIGINS & EVOLUTION CONT.

William Gibson's "Neuromancer" (1984)

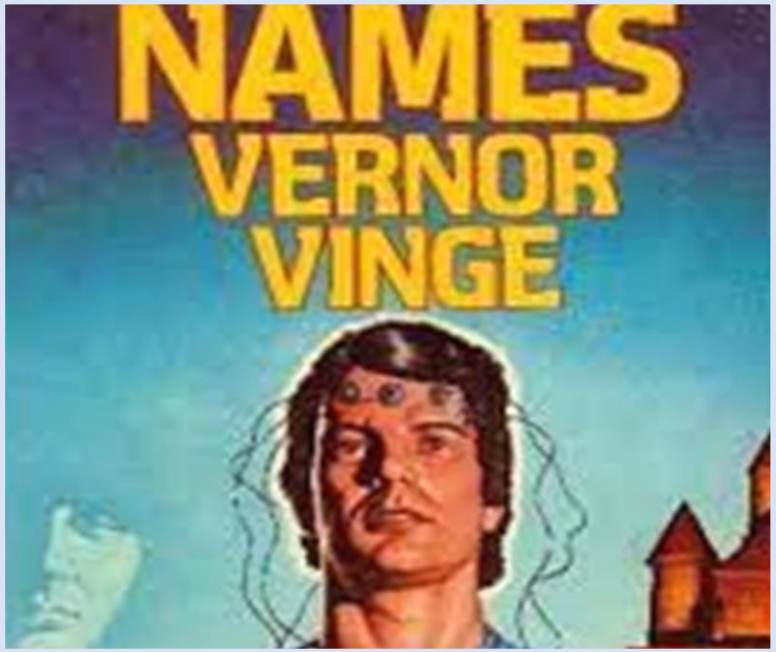
- Presented an early version of virtual reality called "Matrix."
- A precursor to the Metaverse concept.



METAVERSE ORIGINS & EVOLUTION CONT.

"True Names" (1981) by Vernor Vinge

- Early representation of cyberspace in literature.
- Explored themes of virtual reality, hacking, and AI.



METAVERSE ORIGINS & EVOLUTION CONT.

Neal Stephenson's "Snow Crash" (1992)

- Introduced the term "Metaverse."
- Described as a parallel virtual reality accessible globally.
- Users enter via goggles and earphones.
- Features a protocol named "the Street" connecting virtual spaces.
- Users appear as configurable avatars.

METAVERSE ORIGINS & EVOLUTION CONT.

Second life by
Linden Lab – 2003

1.Virtual World Platform: It is an online virtual world where users, through their avatars, can explore, interact, and participate in various activities.

2.User-Created Content: It emphasises user-generated content, allowing users to create and trade virtual items and services. This has fostered a robust virtual economy within the platform.

3.Social Interaction & Community: The platform is renowned for its social aspects, enabling users to meet, socialize, and collaborate with others from around the world.

METAVERSE ORIGINS & EVOLUTION CONT.

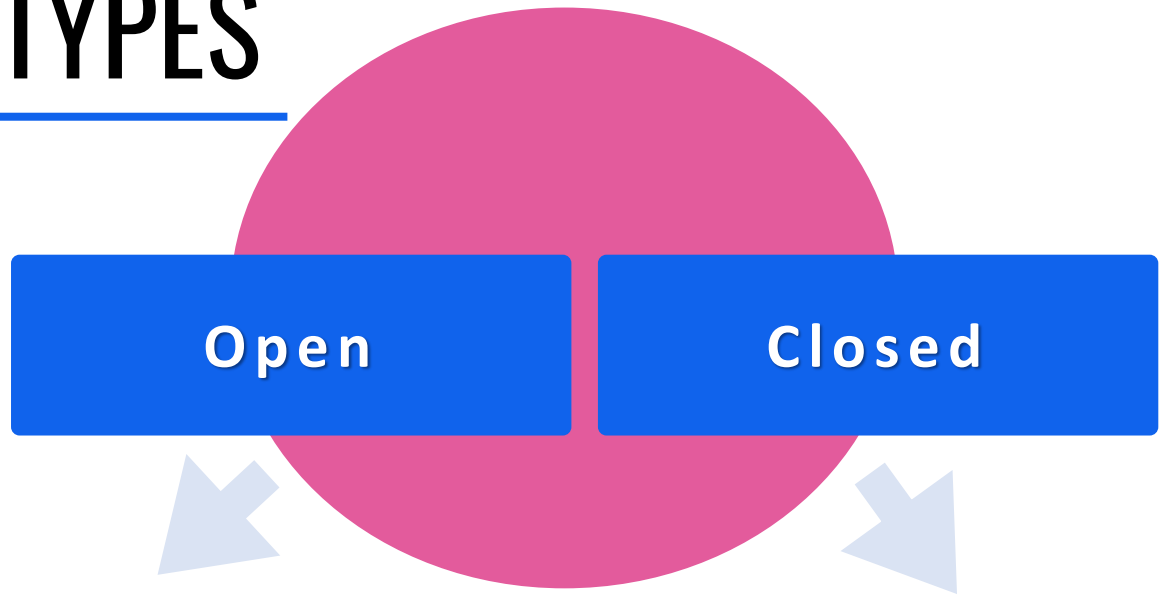
Second life by
Linden Lab – 2003

4. Economic System: It has its own currency, the Linden Dollar, which can be exchanged for real-world currency, providing a model for the economic potential of virtual worlds.

4. Diverse Range of Activities: Users engage in a wide array of activities, including but not limited to social gatherings, educational classes, business meetings, and artistic performances.

Metaverse Types

METAVERSE TYPES



An open metaverse is a community-driven, decentralized virtual environment with free-flowing interoperability among users and spaces.

A closed metaverse is a singularly controlled digital realm with centralized governance over its operations and content.

(Park & Kim, 2022)

METAVERSE TYPES CONT.

Open System	Closed System
Decentralisation	Centralised Control
User Ownership	Proprietary Infrastructure
Interoperability	Limited Asset Ownership
User-Generated Content	Restricted Interoperability
Open Access	Platform-Specific Rules
Transparent Governance	Monetisation Model
Economic Incentives	Content Limitations
Security and Privacy	Data Control

(Park & Kim, 2022)

OPEN METAVERSE EXAMPLES

(Decentraland, 2024; Sandbox, 2024)

CLOSED METAVERSE EXAMPLES

(Meta, 2024; Roblox, 2024)

DECENTRALAND VS. ROBLOX.

Aspect	Decentraland (Open Metaverse)	Roblox (Closed Metaverse)
Governance	Decentralised, governed by the Decentraland DAO	It is centralised and managed by Roblox Corporation, with top-down decision-making and policy enforcement.
Digital Asset Ownership	True ownership of digital assets such as LAND and MANA, recorded on the Ethereum blockchain.	More controlled ownership. Assets created and used within the platform, with limited external transferability.
Interoperability	Higher interoperability due to blockchain technology; assets can be integrated across different platforms.	A traditional virtual economy centred around in-platform transactions and microtransactions.
User Autonomy	A higher degree of user autonomy. Users can directly influence platform development and content.	Limited user autonomy in terms of platform-wide decisions. More structured and guided user experience.
Economic Model	Blockchain-based economy. Decentralised with opportunities for direct monetisation of creations	A traditional virtual economy centred around in-platform transactions and micro-transactions

SwapED

(Decentraland, 2024; Roblox, 2024)

Metaverse Characteristics

METAVERSE CHARACTERISTICS

- **Presence:** Sense of being "there" in the virtual environment.
- **Digital Economy:** Virtual economic systems for transactions.
- **Scalability:** Expandable, Efficient Growth, Broad Reach, Adaptable.
- **Social Interactions:** Dynamic ways users engage within the Metaverse.

(Park & Kim, 2022)

METAVERSE CHARACTERISTICS CONT.

Persistence: Continuous existence of the virtual world and user actions.

Co-presence: Sharing virtual space with others.

Creativity: Users can express creativity through content creation.

Limitless: Boundless, Infinite Possibilities, Unrestricted, Endless.

(Park & Kim, 2022)

METAVERSE CHARACTERISTICS CONT.

- **Synchronous, 3D Virtual Worlds with Continuity of Data:** Real-Time Interaction, Persistent Environments, Data Integrity, Continuous Existence.
- **Reactivity:** Virtual environment reacts and adapts to user actions.
- **Interoperability:** Seamless interaction between different virtual platforms.
- **Decentralized:** Distributed Control, Autonomous, Peer-to-Peer, Non-Centralized.
- **Platform Agnostic Digital Space:** Universal, Cross-Platform, Accessible, Non-specific.

(Park & Kim, 2022)

THE 3Ps OF METAVERSE

Presence

Includes individual user presence, mutual presence in shared spaces, and social engagement among users.

Encompasses the enduring nature of virtual realms and economies, fostering creativity.

Persistence

Portability

Focuses on seamlessly moving user-generated content, economic assets, avatars, and data across various platforms.

The Importance of Metaverse

THE IMPORTANCE OF METAVERSE

- Evolving from a science fiction concept to a critical component of everyday digital life.
- Acts as a digital counterpart to the physical world and an extension of real-world identities.
- Offers a user-defined environment, persistent in nature and expansive in scope.

Transition from Fiction to Reality

- Predicted to be a multitrillion-dollar market with substantial contributions to the global economy.
- Forecasted to have a compound annual growth rate (CAGR) of 44.5%, reaching $13 trillion by 2030.
- Presents a plethora of new business opportunities, models, and services, reshaping the way work and collaboration are conducted.
- Anticipated to influence personal lives and job markets significantly.

Economic Impact and Potential

(Aljumaie et al., 2023; Sahay et al., 2022; Stary, 2023)

THE IMPORTANCE OF METAVERSE CONT.

Job Market Transformation

- Creation of new roles such as virtual world designers, game developers, 3D artists, VR/AR/XR specialists, and UI/UX designers.
- Expansion in digital marketing, community management, virtual event planning, and financial expertise within virtual economies.
- Necessitates professionals in education, healthcare, data privacy, security, ethics, content creation, storytelling, and customer support.

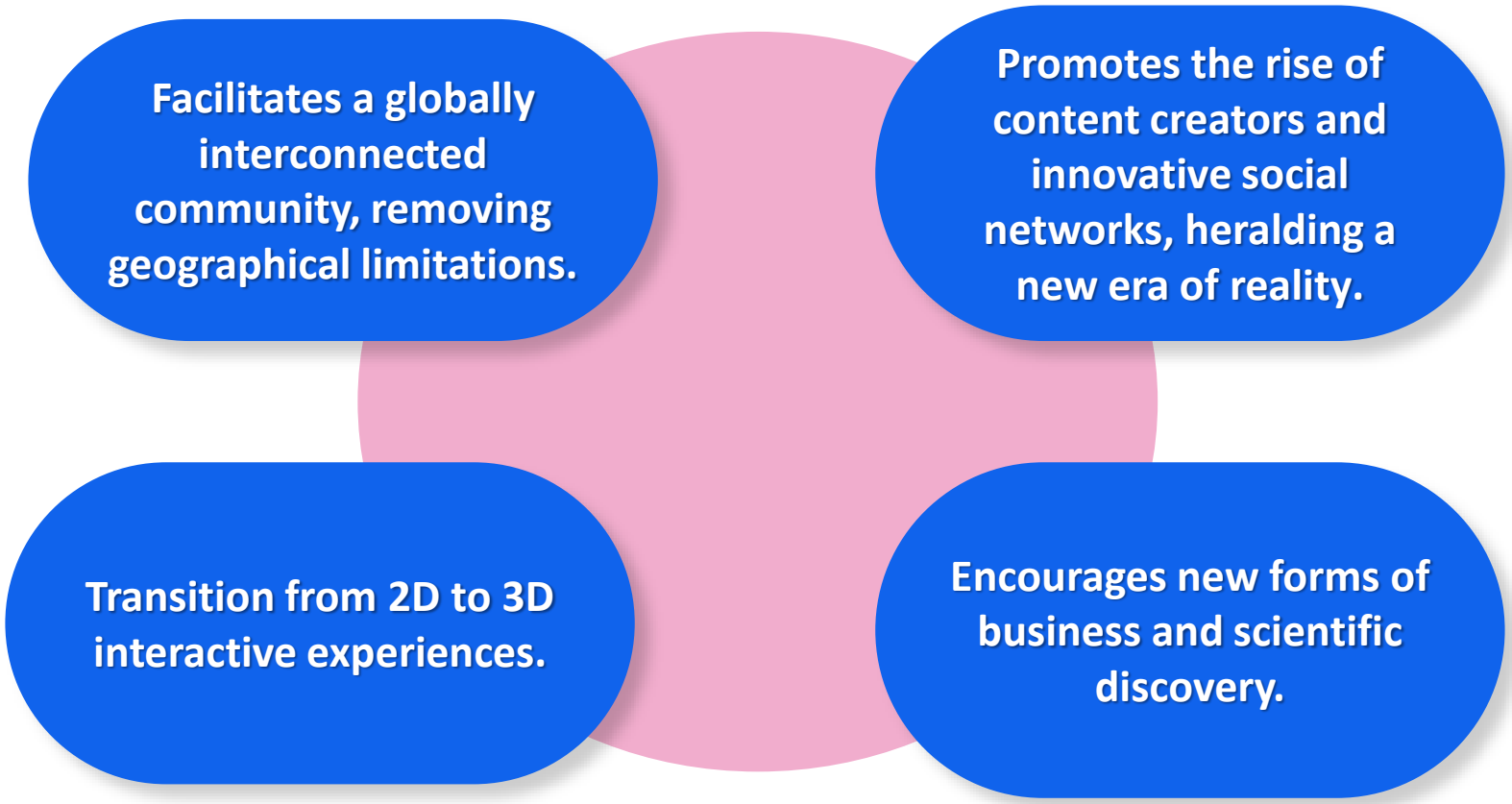
Fundamental Shift in Digital Interaction

- Characterized by its continuous and seamless nature, the Metaverse is creating alternate digital realities.
- Goes beyond transforming social interactions to offering immersive experiences that can reshape industries.
- Holds the potential to significantly alter the landscape of technology, society, and human experience.
- Emphasizes the importance of a mindful approach to integrating the Metaverse into our lives.

(Aljumaie et al., 2023; Sahay et al., 2022; Stary, 2023)

Benefits & Advancements vs. Challenges & Considerations In Metaverse

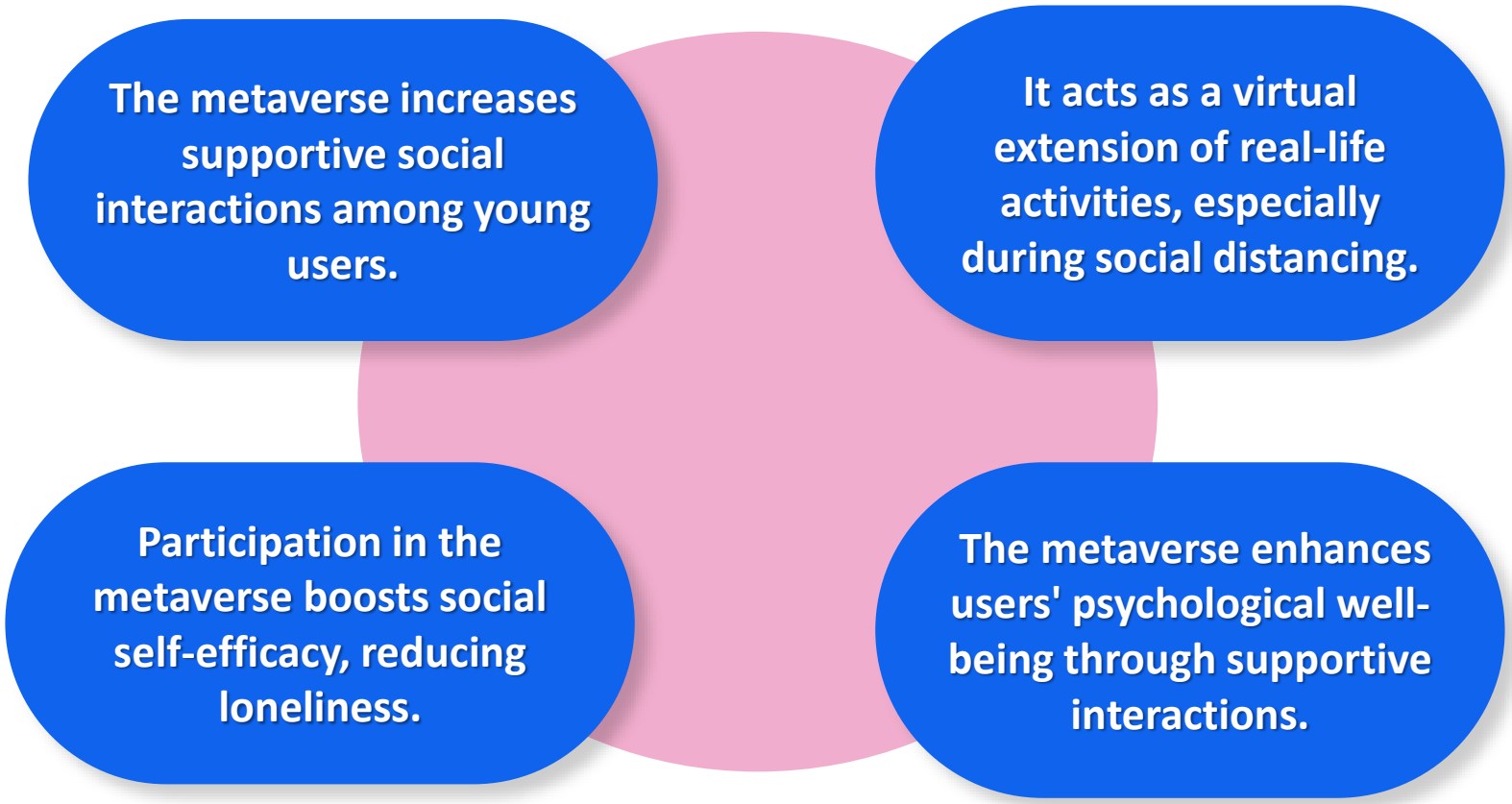
METAVERSE: BENEFITS & ADVANCEMENTS



SwapED

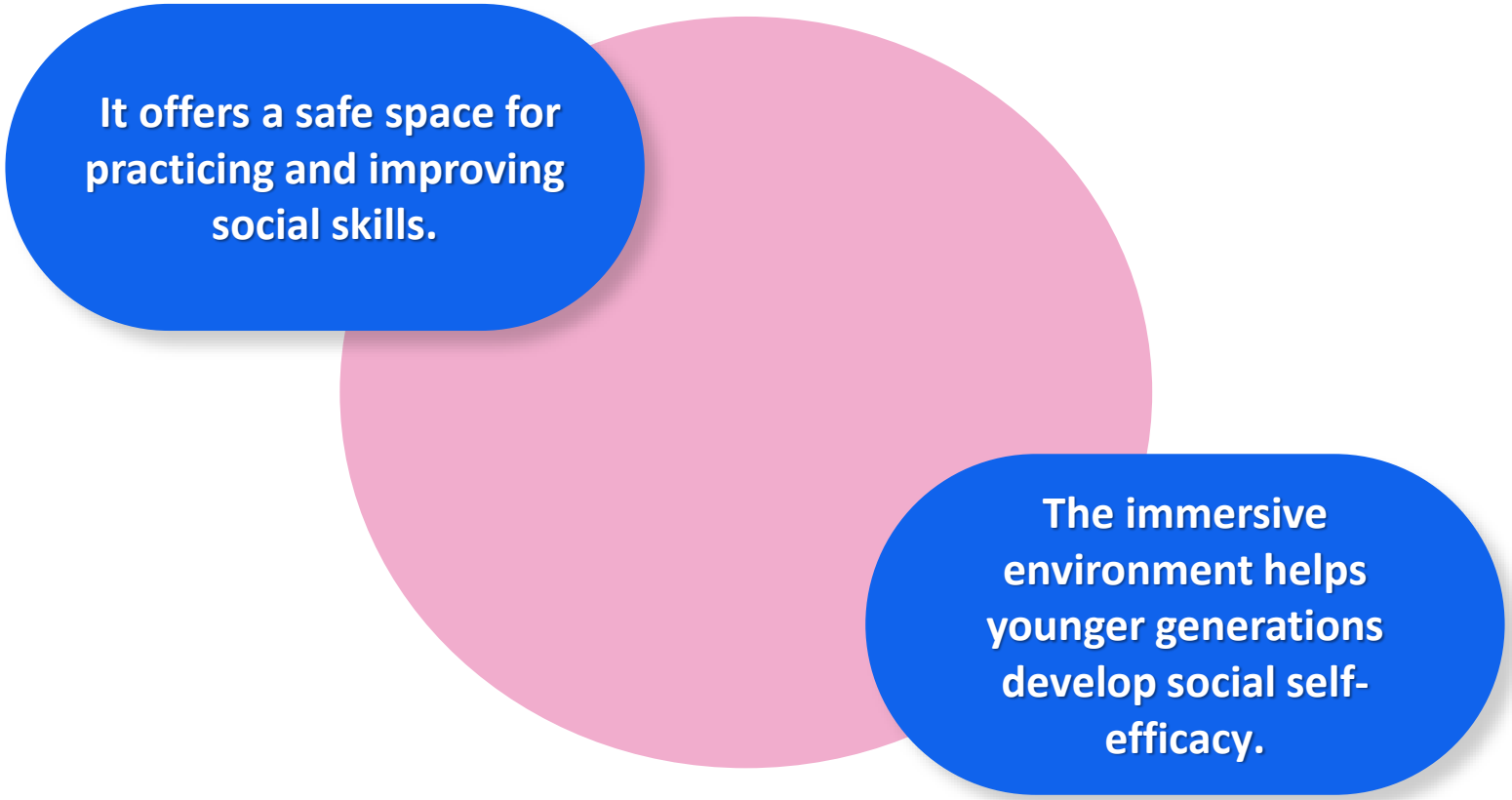
(Aljumaie et al., 2023; Oh et al., 2023)

METAVERSE: BENEFITS & ADVANCEMENTS CONT.



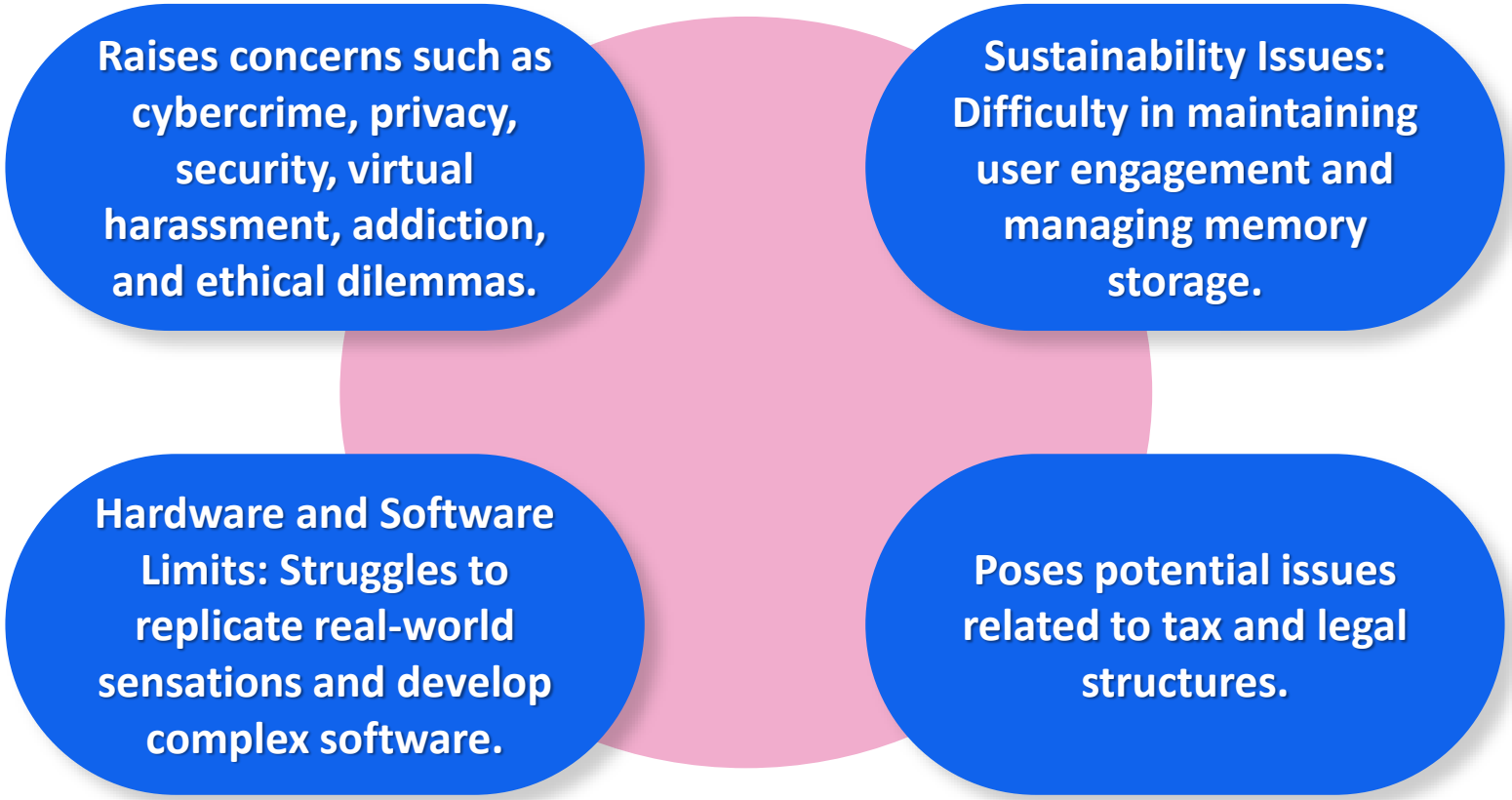
(Aljumaie et al., 2023; Oh et al., 2023)

METAVERSE: BENEFITS & ADVANCEMENTS CONT.



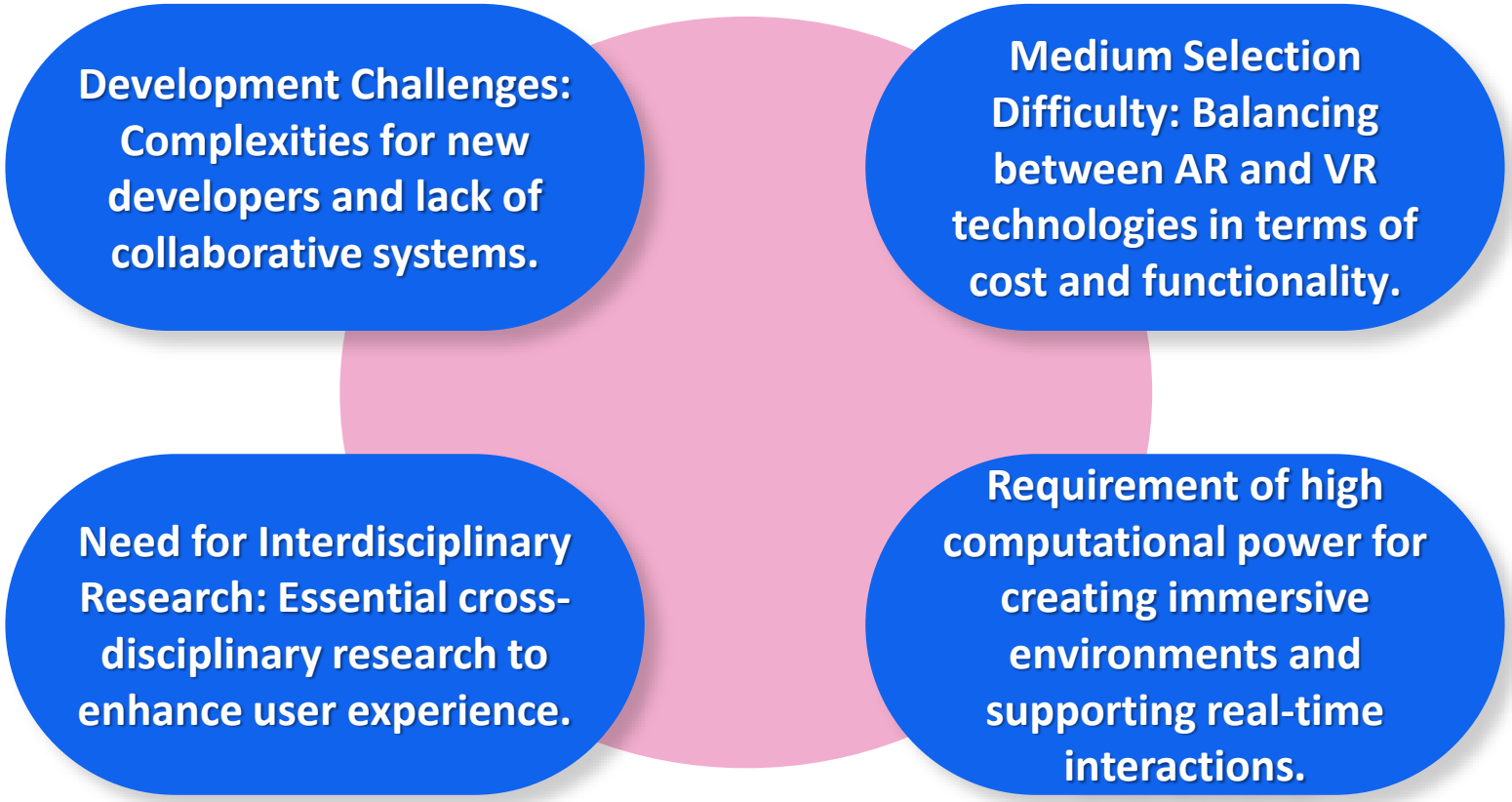
(Aljumaie et al., 2023; Oh et al., 2023)

METAVERSE: CHALLENGES & CONSIDERATIONS



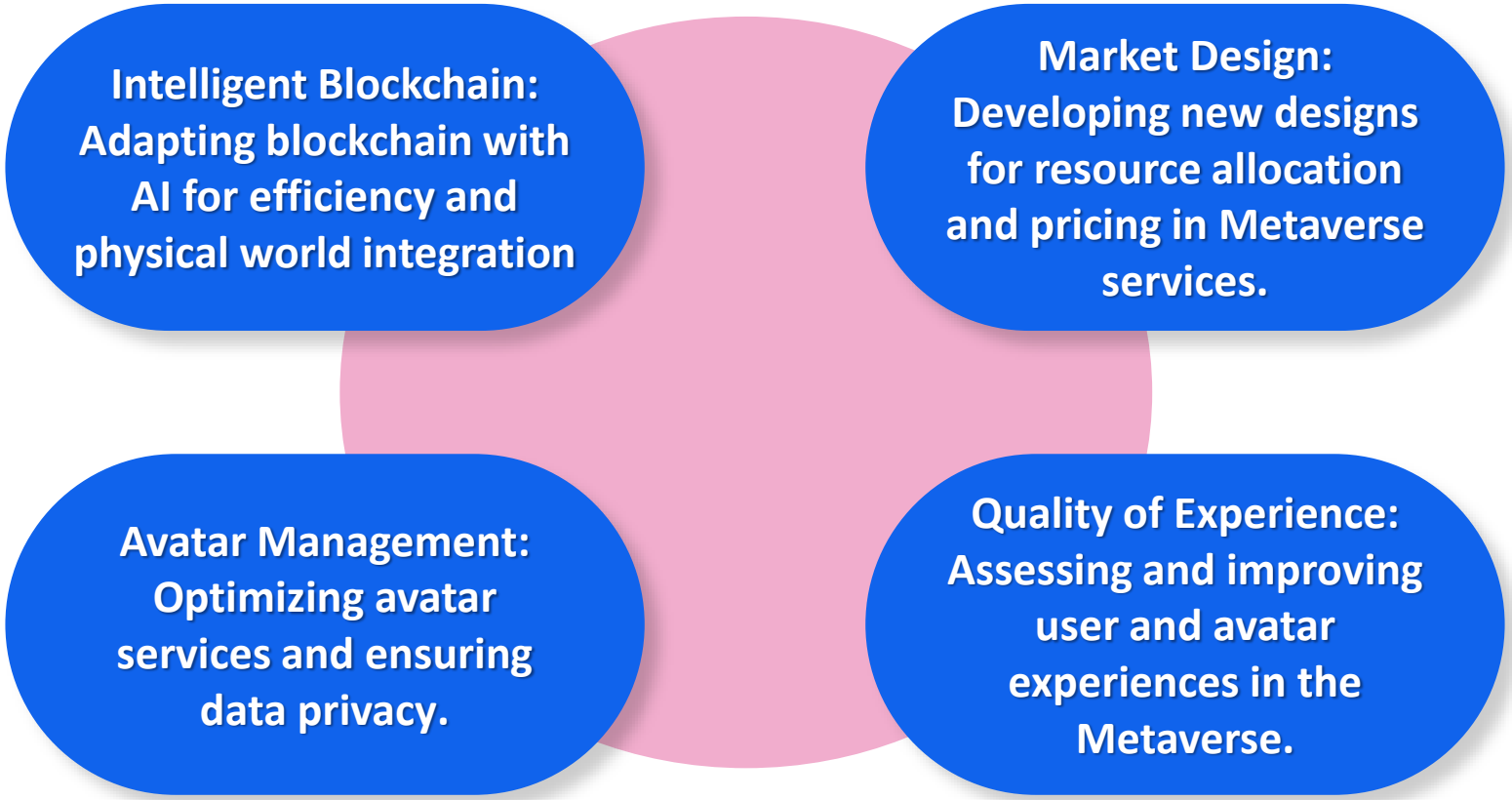
(Ning et al., 2023; Xu et al., 2022)

METAVERSE: CHALLENGES & CONSIDERATIONS



(Ning et al., 2023; Xu et al., 2022)

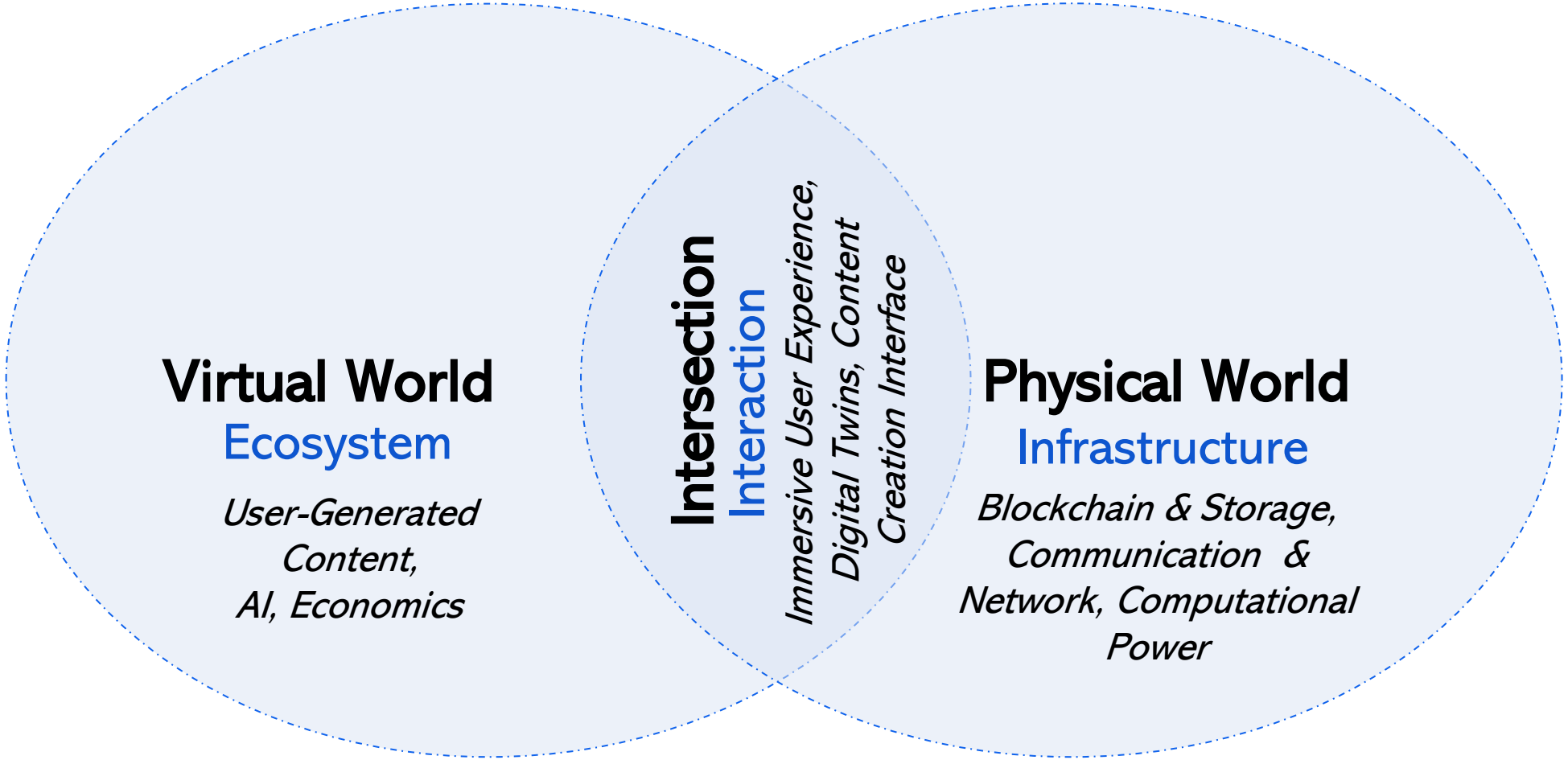
METAVERSE: CHALLENGES & CONSIDERATIONS



(Ning et al., 2023; Xu et al., 2022)

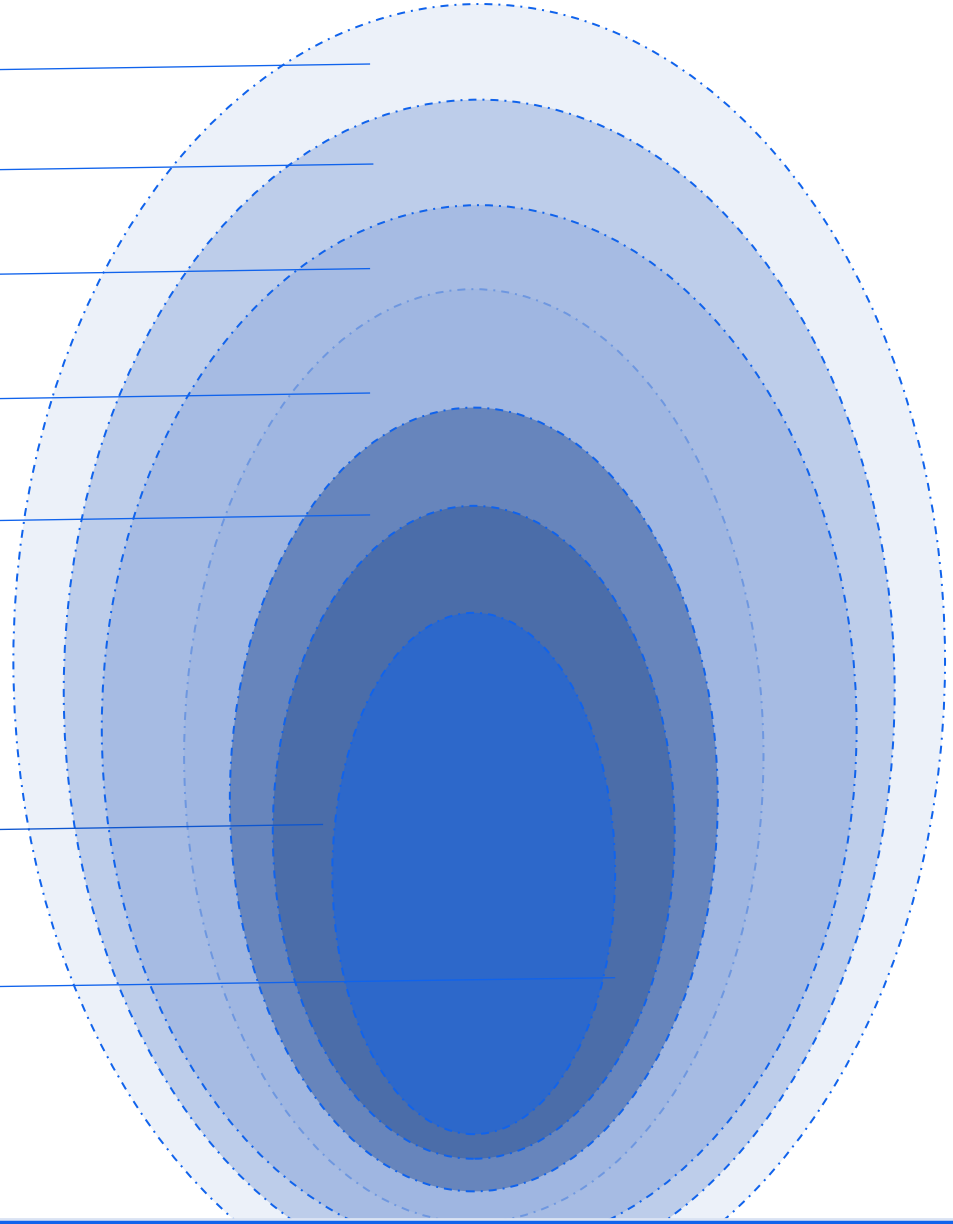
Metaverse Layers & Architecture

3-LAYERS METAVERSE ARCHITECTURE



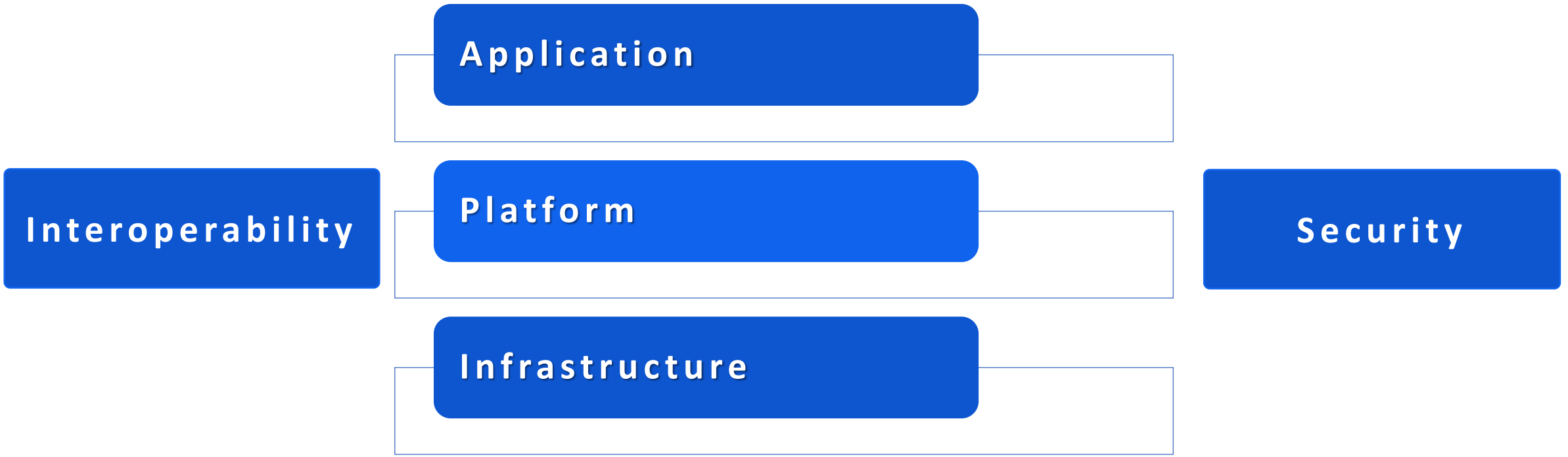
(Duan et al., 2021)

7-LAYERS METAVERSE ARCHITECTURE



(Radoff , 2021)

5-LAYERS METAVERSE ARCHITECTURE



(Themistocleous, 2023)

Metaverse Applications

METAVERSE APPLICATIONS

Professional & Technical Fields	→	Finance, Banking, Healthcare, etc.
Creative & Entertainment Industries	→	Fitness, Fashion, Gaming, etc.
Social & Commercial Aspects	→	Marketing, Social Media, etc.
Education & Training	→	Educational & Training Applications
Real Estate & Travel	→	Real Estate, Time Travel, Tourism, etc.
Virtual Environments & Workforce	→	Virtual Possession, Venues, Workforce etc.

(Par &Kim, 2022)

Virtual Travel Experiences

Enables exploration of digital versions of real-world destinations and historical sites.

VR Tourism Promotion

Utilizes virtual tours and marketing campaigns for destination promotion.

Virtual Travel Agencies

Offers planning and booking experiences within the Metaverse for seamless travel planning.

TRAVEL & TOURISM

(Monaco & Sacchi, 2023)

TIME TRAVEL EXPERIENCES

Historical Reenactment

Allows users to virtually experience historical events.

Time-Travel Adventure Games

Integrates time travel as a core element of gameplay.

Virtual Historical Tours

Provides guided virtual tours through significant historical moments and locations.

SwapED

(Ganguli, 2020)

Metaverse Classrooms

Creates virtual environments for immersive learning in various subjects.

Metaverse Laboratories

Simulated labs for scientific research and experiments.

Metaverse Tutoring

Offers personalized education and tutoring in virtual space.

EDUCATION

SwapED

(Cai et al., 2022; Kye et al., 2021)

Virtual Offices & Buildings

Facilitates remote work through digital workspaces and infrastructure.

Team Building/Global Collaboration

Enhances teamwork and allows for worldwide cooperation in the Metaverse.

Improved Work-Life Balance

Promotes a balanced lifestyle with virtual conferences, meetings, and reduced commuting.

CORPORATE COLLABORATION AND REMOTE WORK

SwapED

(Bennett, 2022)

CONCLUSION

- ✓ The Metaverse is more than a concept; it's a transformative digital evolution, blending virtual and augmented realities to create immersive environments that expand social, economic, and professional boundaries.
- ✓ From its science fiction origins to today's applications, the Metaverse is a powerful platform for reimagining how we interact, work, and experience digital spaces.
- ✓ While offering opportunities—from virtual economies and social interactions to innovative education and business models—it also presents challenges like privacy concerns, ethical dilemmas, and the need for scalable, interoperable systems.
- ✓ The Metaverse's future is limited only by creativity and technological advances, with applications spanning real estate, healthcare, education, and entertainment.
- ✓ As it develops, addressing legal, economic, and social implications will be crucial to ensuring a safe, inclusive digital realm for all users.

REFRENCES

Aljumaie, M., Chi Nguyen, H., Chu, N.H., Nguyen, C.T., Nguyen, D.N., Thai Hoang, D. and Dutkiewicz, E., (2023). Potential Applications and Benefits of Metaverse. *Metaverse Communication and Computing Networks: Applications, Technologies, and Approaches*, pp.17-37.

Avila, S., (2017). Implementing augmented reality in academic libraries. Public Services Quarterly, 13(3), 190–199.

Bennett, D., (2022). Remote workforce, virtual team tasks, and employee engagement tools in a real-time interoperable decentralized metaverse. *Psychosociological issues in human resource management*, *10*(1), pp.78-91.

Bourlakis, M., Papagiannidis, S., & Li, F., (2009). Retail spatial evolution: Paving the way from traditional to metaverse retailing. Electronic Commerce Research, 9(1), 135–148.

Cai, S., Jiao, X. and Song, B., (2022). Open another door to education—Applications, challenges and perspectives of the education metaverse. *Metaverse*, *3*(1), p.12.

Davis, A., Murphy, J., & Owens, D., (2009). Avatars, people, and virtual worlds: Foundations for research in metaverses. Journal of the Association for Information Systems, 10(2), 91–117.

REFRENCES

Decentraland, (2024). Welcome to Decentraland (no date a) Welcome to. Available at: https://decentraland.org/ (Accessed: 04 January 2024).

Díaz, J., Saldana, ˜ C., & Avila, C., (2020). Virtual world as a resource for hybrid education. Int. J. Emerg. Technol. Learn.(iJET)., 15(15), 94–109.

Dionisio, J.D.N., Iii, W.G.B. and Gilbert, R., (2013). 3D virtual worlds and the metaverse: Current status and future possibilities. ACM Computing Surveys (CSUR), 45(3), pp.1-38.

Duan, H., Li, J., Fan, S., Lin, Z., Wu, X. and Cai, W., (2021, October). Metaverse for social good: A university campus prototype. In *Proceedings of the 29th ACM international conference on multimedia* (pp. 153-161).

Farjami, S., Taguchi, R., Nakahira, K. T., Nunez Rattia, R., Fukumura, Y., & Kanematsu, H., (2011 September). Multilingual problem based learning in metaverse. In International conference on knowledge-based and intelligent information and engineering systems (pp. 499–509). Berlin, Heidelberg: Springer.

REFRENCES

Ganguli, S., (2020). Junction Model of Multiverse: A Possible way of Time travel, Inter-dimensional Travel and travel to another Universe.

Huynh-The, T., Pham, Q.V., Pham, X.Q., Nguyen, T.T., Han, Z. and Kim, D.S., 2023. Artificial intelligence for the metaverse: A survey. Engineering Applications of Artificial Intelligence, 117, p.105581.

Hwang, G.J. and Chien, S.Y., (2022). Definition, roles, and potential research issues of the metaverse in education: An artificial intelligence perspective. *Computers and Education: Artificial Intelligence*, *3*, p.100082.

Jovanovi´c, A., & Milosavljevi´c, A. (2022). VoRtex metaverse platform for gamified collaborative learning. Electronics, 11(3), 317. https://doi.org/10.3390/ electronics11030317

Kye, B., Han, N., Kim, E., Park, Y., & Jo, S. (2021). Educational applications of metaverse: Possibilities and limitations. J. Educat. Eval. Health Prof., 18:32. https://doi.org/ 10.3352/jeehp.2021.18.32

Meta, (2024). Horizon Worlds on meta quest, Meta. Available at: https://www.meta.com/experiences/2532025600194082/ (Accessed: 04 January 2024)

REFRENCES

Mystakidis, S., Fragkaki, M. and Filippousis, G., (2021). Ready Teacher One: Virtual and augmented reality online professional development for K-12 school teachers. *Computers*, *10*(10), p.134.

Ning, H., Wang, H., Lin, Y., Wang, W., Dhelim, S., Farha, F., Ding, J. and Daneshmand, M., (2023). A Survey on the Metaverse: The State-of-the-Art, Technologies, Applications, and Challenges. *IEEE Internet of Things Journal*.

Oh, H.J., Kim, J., Chang, J.J., Park, N. and Lee, S., (2023). Social benefits of living in the metaverse: The relationships among social presence, supportive interaction, social self-efficacy, and feelings of loneliness. *Computers in Human Behavior*, *139*, p.107498.

Park, S. M., & Kim, Y. G., (2022). A metaverse: Taxonomy, components, applications, and open challenges. IEEE Access, 10, 4209–4251.

Roblox, (2024). Metaverse champions hub. Available at: https://www.roblox.com/games/6674394294/Metaverse-Champions-Hub (Accessed: 04 January 2024).

REFRENCES

Sahay, S., Mahajan, N., Malik, S. and Kaur, J., (2022, August). Metaverse: Research based analysis and impact on economy and business. In *2022 2nd Asian Conference on Innovation in Technology (ASIANCON)* (pp. 1-8). IEEE.

Sandbox, (2024). The Sandbox game - own the future. play, create, earn (no date) The Sandbox. Available at: https://www.sandbox.game/en/ (Accessed: 04 January 2024).

Stary, C., (2023, May). Can a 'Metaverse by Design' Benefit from Digital Process Twins?. In *International Conference on Subject-Oriented Business Process Management* (pp. 91-110). Cham: Springer Nature Switzerland.

Stephenson, N., (2003). Snow crash: A novel. Spectra.

Thawonmas, R., & Fukumoto, A., (2011). Frame extraction based on displacement amount for automatic comic generation from metaverse museum visit log. In Intelligent interactive multimedia systems and services (pp. 153–162). Berlin, Heidelberg: Springer.

REFRENCES

Xu, M., Ng, W.C., Lim, W.Y.B., Kang, J., Xiong, Z., Niyato, D., Yang, Q., Shen, X.S. and Miao, C., (2022). A full dive into realizing the edge-enabled metaverse: Visions, enabling technologies, and challenges. *IEEE Communications Surveys & Tutorials*.

SwapED

ANY QUESTIONS?

Please Contact Us: hello@swapeducation.com

Discover More Courses: https://swapeducation.com/

Continue your learning journey with us! Visit our website to explore more courses on technology, digital innovation, and beyond.

Thank You