# The Reference Architecture of Industrial Metaverse

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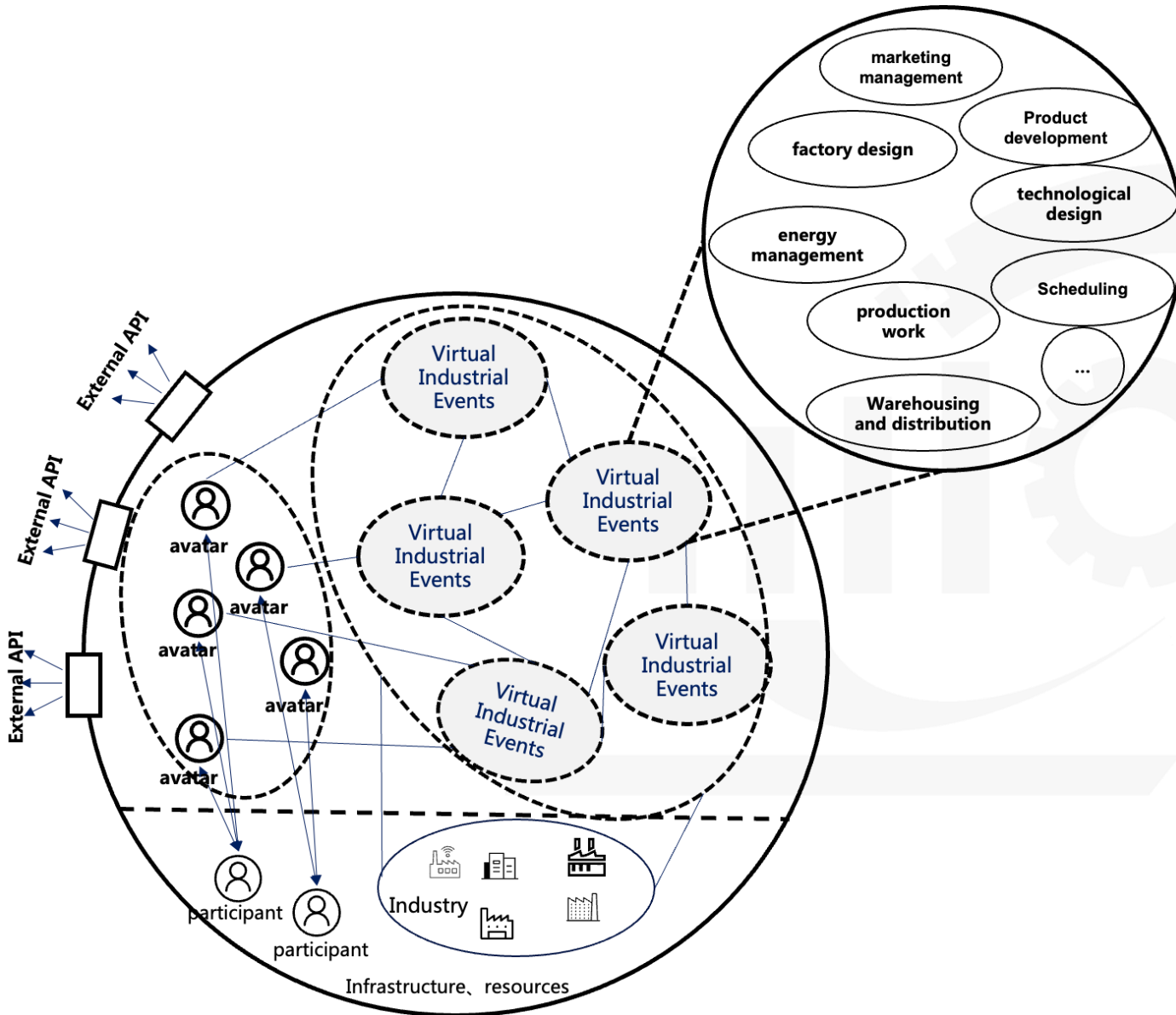
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数字基础设施Ⅰ建设者Ⅰ运营者Ⅰ创新者

# A vital development field of the Metaverse

➤ The industrial metaverse is the landing and expansion of the metaverse in the industrial field.

➤ The industrial metaverse is a typical representative of the development direction of the metaverse from reality to virtual.
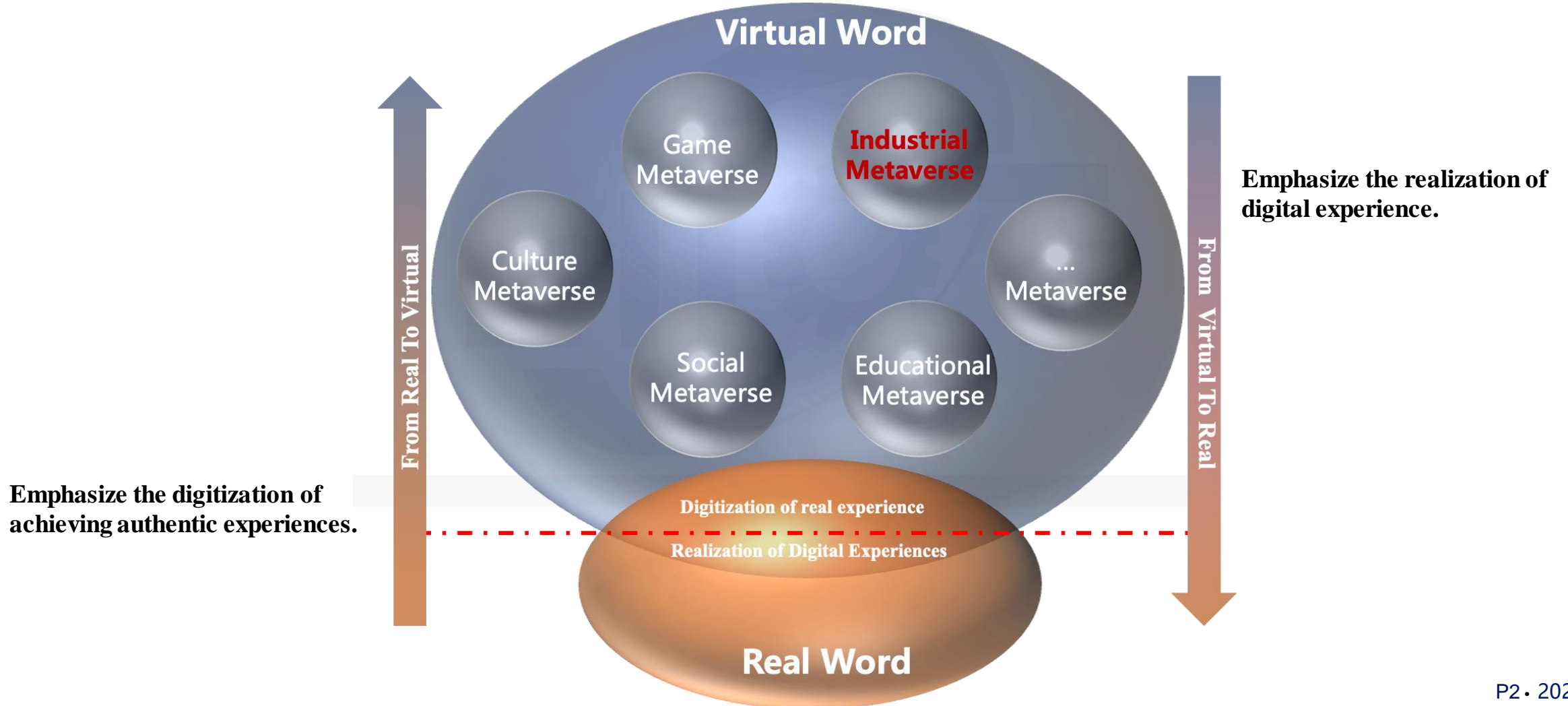
> **Real-world**

- The foundation of the Industrial Metaverse, including participants, infrastructure, and other resources.
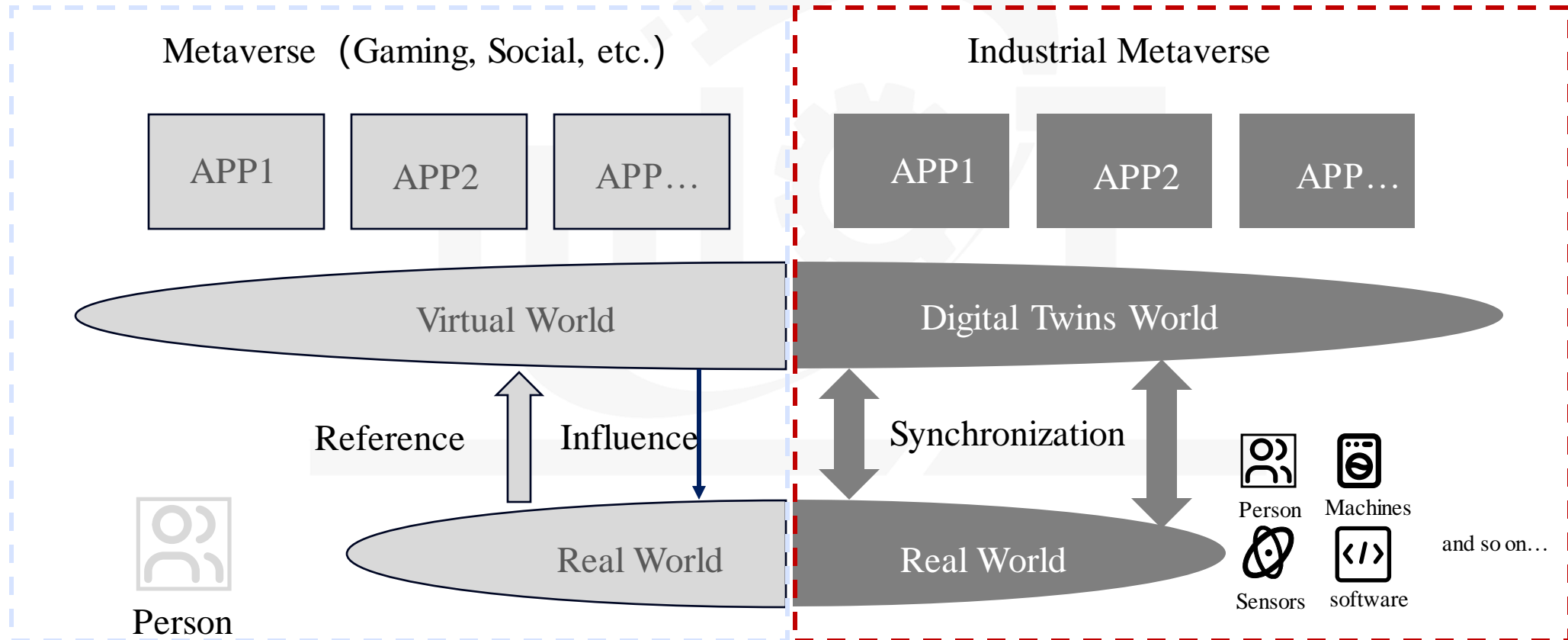
> **Virtual world**

- Virtual Industrial Events: Digital twins from the real world
- Avatar: Carrier of digital identity and digital assets
- Extended API: Interface with other metaverses

# Industrial Metaverse needs to comply with the real world fully

1. Created virtual world

2. APP that enhances user experience

3. Connecting people

**Diff.**

1. Highly consistent with reality

2. App that solves industrial problems

3. Connecting people, machines, software…

Metaverse (Gaming, Social, etc.)

Industrial Metaverse

| APP1 | APP2 | APP… |

| APP1 | APP2 | APP… |

Virtual World

Digital Twins World

Reference    Influence

Synchronization

Real World

Real World

Person    Machines

Sensors    software

and so on…

Person

➢ XR defines the form of the metaverse, but digital twins are the key to the industrial metaverse.

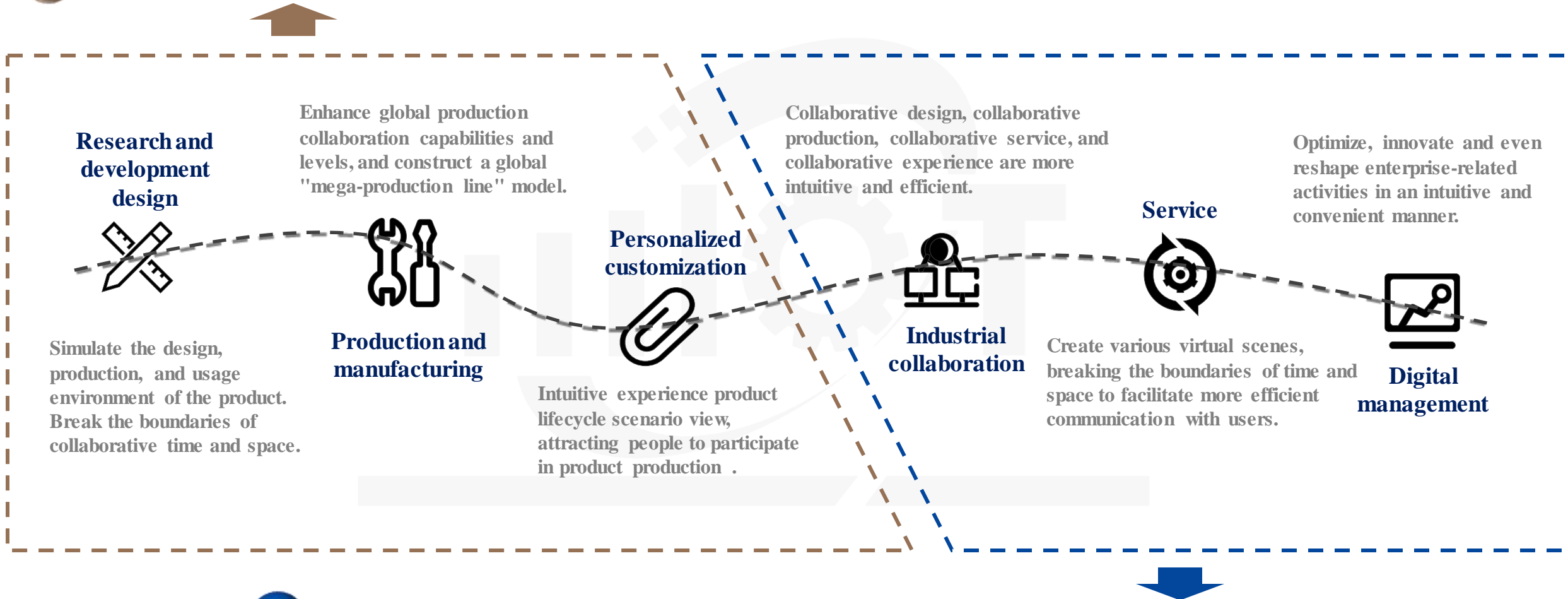**User experience is the core**

**Digital twins is the core**
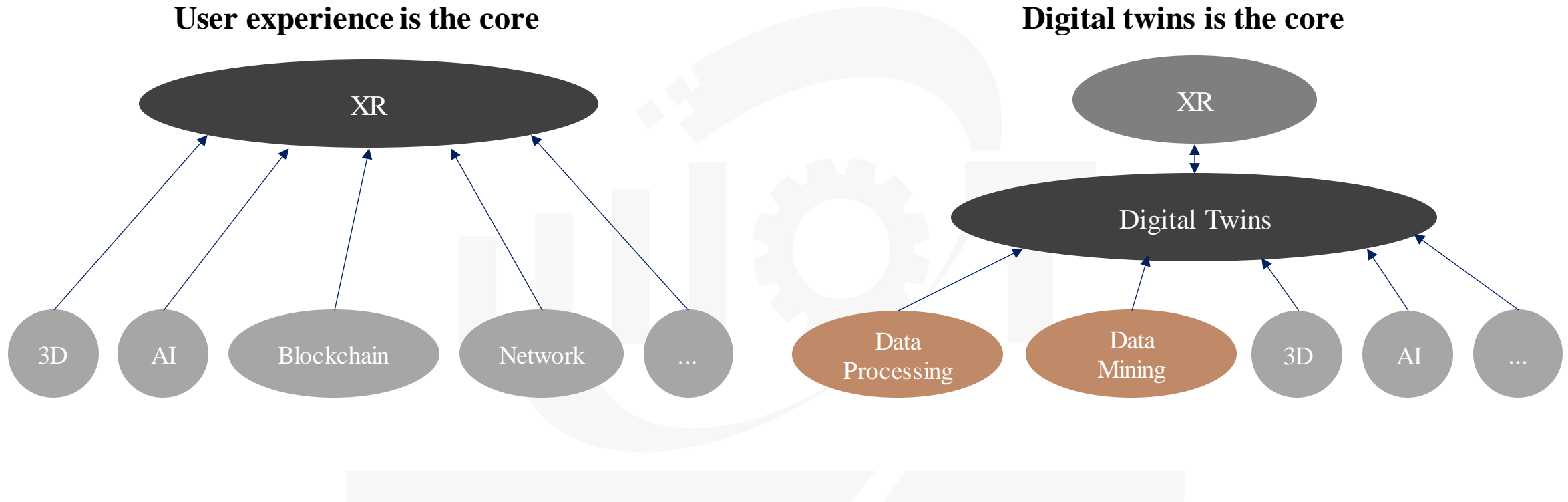


■ XR is the most important technology, all technological applications are aimed at improving user experience.

■ Digital twins is the most important technology, all technological applications are aimed at solving the industrial problems.

# The significance of the Industrial Metaverse

**1** Production gradually achieves spatialization of design and globalization of production.

**Research and development design**

Enhance global production collaboration capabilities and levels, and construct a global "mega-production line" model.

Collaborative design, collaborative production, collaborative service, and collaborative experience are more intuitive and efficient.

Optimize, innovate and even reshape enterprise-related activities in an intuitive and convenient manner.

**Personalized customization**

**Service**

Simulate the design, production, and usage environment of the product. Break the boundaries of collaborative time and space.

**Production and manufacturing**

**Industrial collaboration**

Intuitive experience product lifecycle scenario view, attracting people to participate in product production .

Create various virtual scenes, breaking the boundaries of time and space to facilitate more efficient communication with users.

**Digital management**

**2** The management service system gradually achieves efficient management and diversified services.
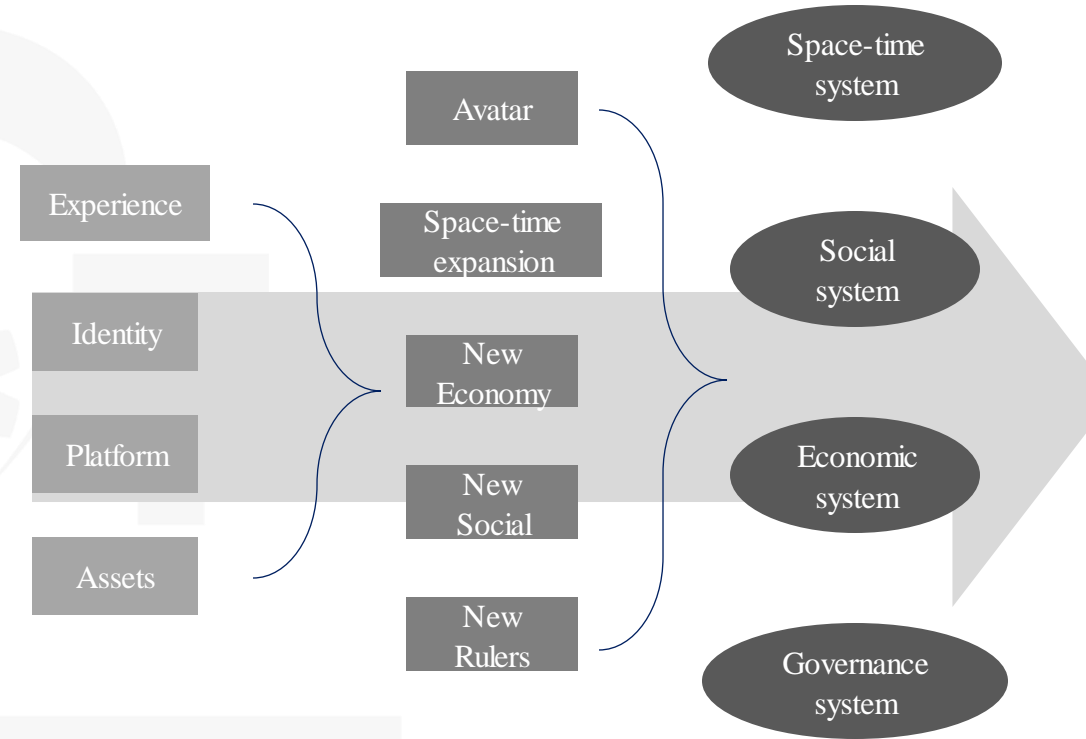
# The Framework of Industrial Metaverse
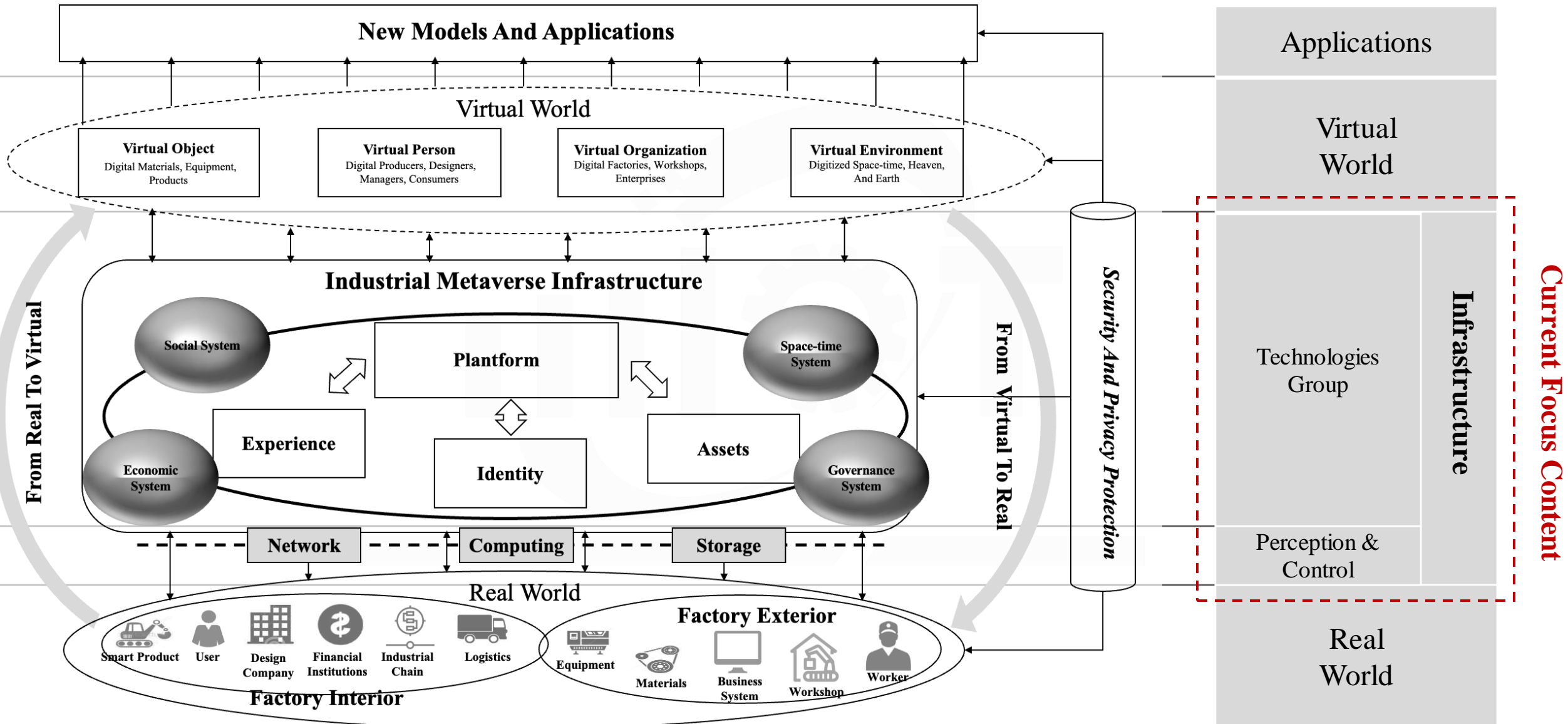
# The Infrastructure of Industrial Metaverse

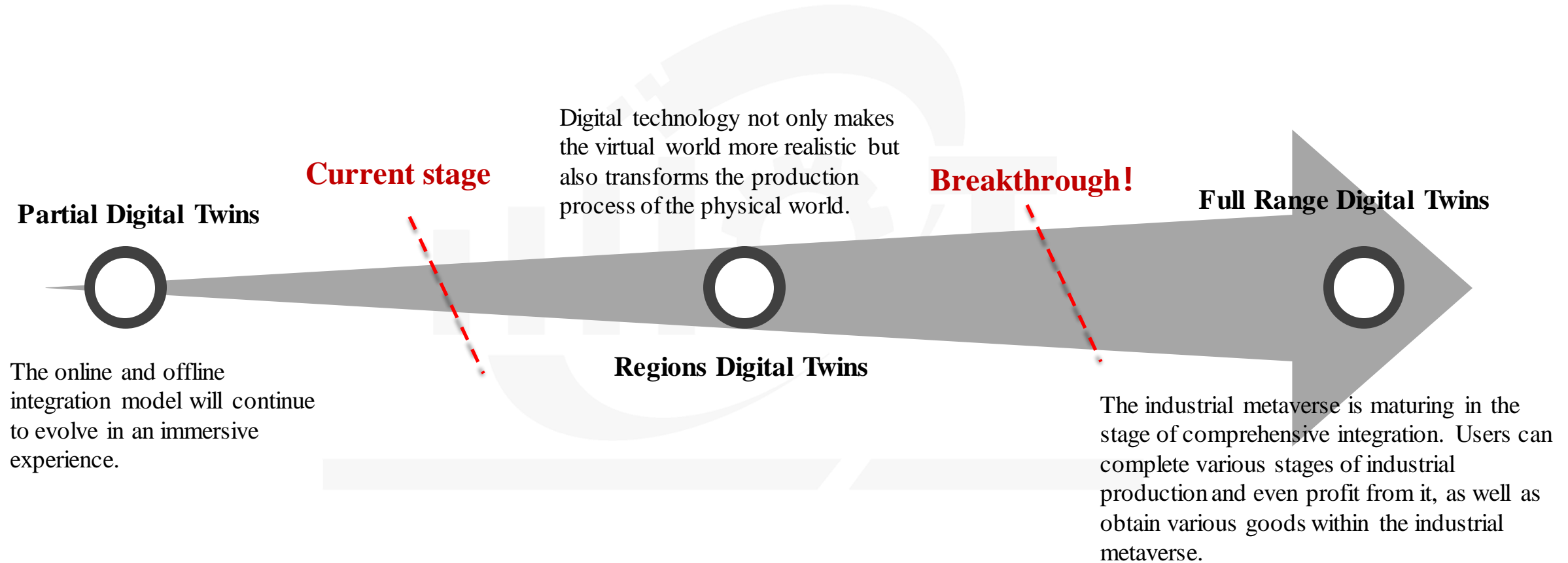➢ Perception and control
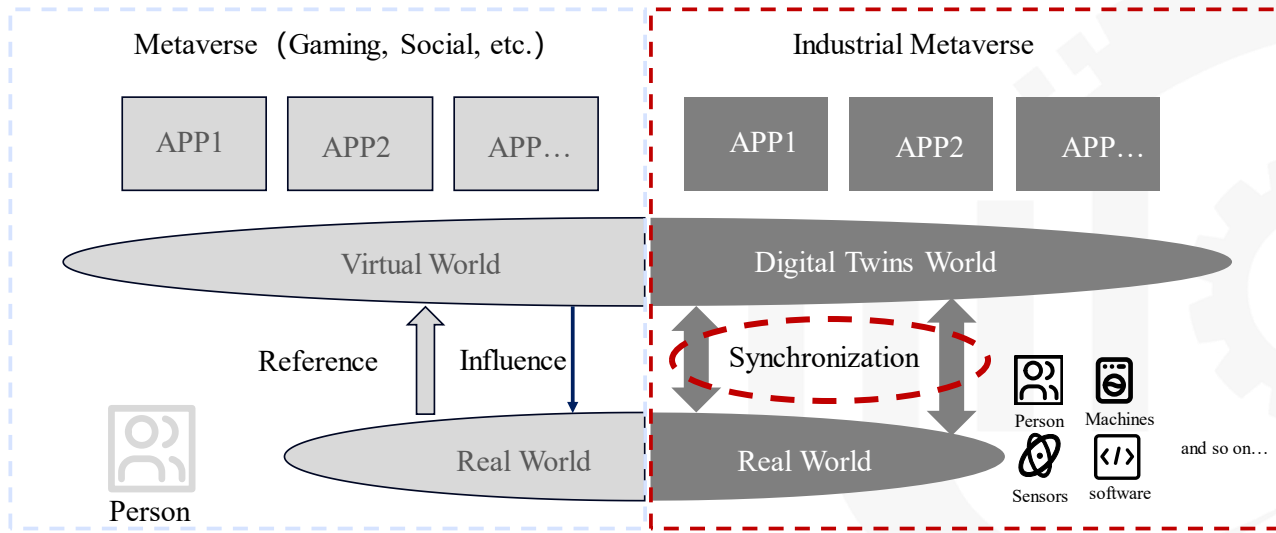
➢ Technologies Group



The industrial metaverse focuses on perceiving and controlling the real world.

■ The virtual world can promptly sense events happening in the real world.

■ The real world can promptly receive feedback from the virtual world.

By comprehensively applying experience, identity, platform, and asset systems, form the spatiotemporal system, social system, economic system, and governance system .

# ((•)) The trend of Industrial Metaverse

➢ According to the level and scope of combining virtuality and reality, it can be divided into **Partial Digital Twins, Regions Digital Twins, and Full Range Digital Twins.**

**Partial Digital Twins**

**Current stage**

Digital technology not only makes the virtual world more realistic but also transforms the production process of the physical world.

**Breakthrough!**

**Full Range Digital Twins**

**Regions Digital Twins**

The online and offline integration model will continue to evolve in an immersive experience.

The industrial metaverse is maturing in the stage of comprehensive integration. Users can complete various stages of industrial production and even profit from it, as well as obtain various goods within the industrial metaverse.

■ The Industrial Metaverse is still in the stage of **Partial Digital Twins** and moving towards **Regions Digital Twins.**

- FG-MV-I006 Technical Report
  - ◆ The Reference Architecture of Industrial Metaverse is under development.
- Spark Chain Infrastructure
  - ◆ To provide underlying support for digitalizing industrial identity and assets, plans are underway to establish a foundational network covering the entire globe.
- Application Exploration
  - ◆ In the future, typical scenarios in industrial production, such as steel, cables, ships, and other industries, will be explored to implement the Industrial Metaverse.
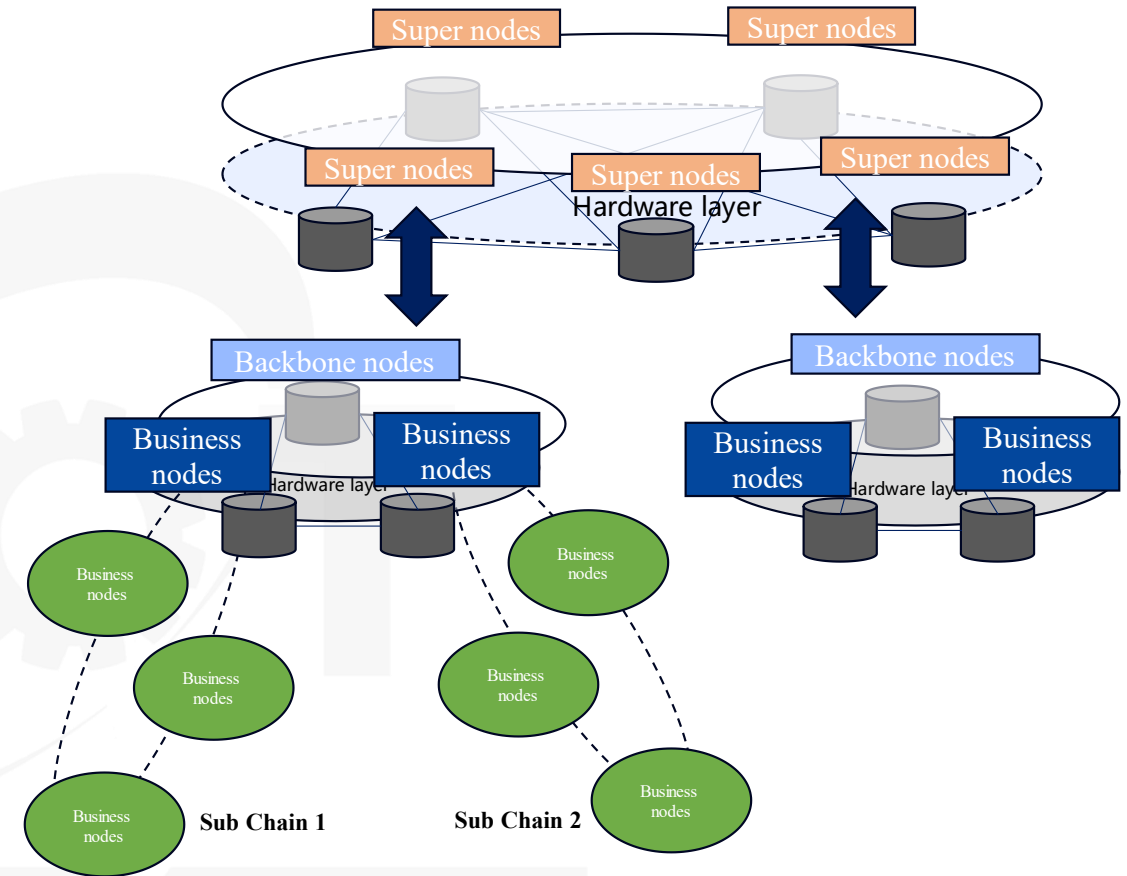


Based on licensed public permission chain technology and distributed identity technology, the Spark Chain Network is built as a new infrastructure to provide functions such as multi-identity fusion management, digital identity, and public data sharing for individuals, enterprises, devices, and digital assets.

We welcome your participation in Industrial

Metaverse standard development!



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