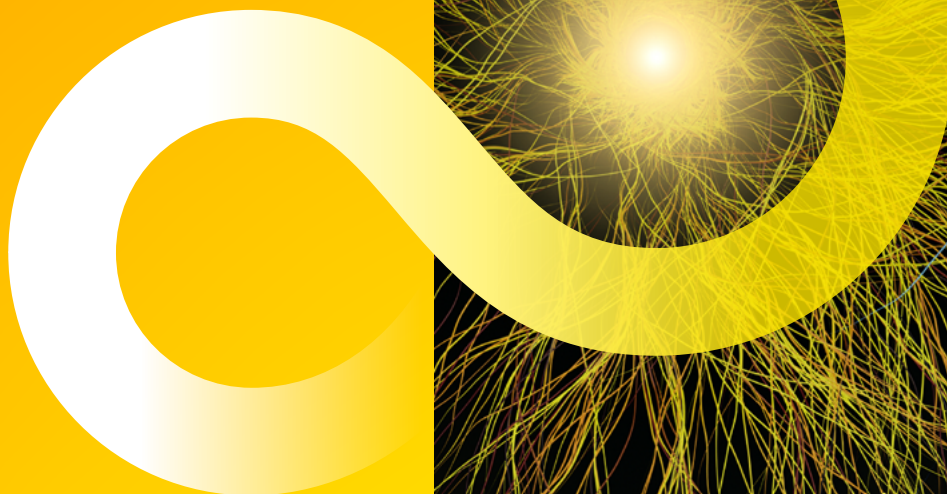




Corporate Metaverse

**Can it help to prepare for
an AI-based digital future?**



Contents

Corporate Metaverse	
Can it help to prepare for an AI-based digital future?	3
1. The Metaverse provides an important step into an AI-based digital world	4
2. How can the Metaverse help companies to prepare for the digital world?	6
3. Innovating in digital ecosystems with co-creation	9
4. Innovating with digital twins	10
5. How does Web 3.0 development help companies with their digital transformation?	11
6. Preparing for AI customers and partners with digital money	12
7. The Metaverse as an interface to a digital world at an inflection point	13



Corporate Metaverse

Can it help to prepare for an AI-based digital future?

After the hype around the Metaverse has subsided, it is time for companies to take advantage of what has been learned and employ the elements that will create lasting value. For most companies, engaging Metaverse development of “corporate” virtual worlds provides a huge opportunity. It allows them to engage some of the most powerful technology engines that have been developed to date, to work with AI-empowered digital twins, and to accommodate emerging “machine customers” in their value chains with blockchain technologies.

1. The Metaverse provides an important step into an AI-based digital world

Since it seems unlikely that the Metaverse will become the “future of the Internet” anytime soon, companies need a clear vision about how much it can provide to their long-term digital strategies. Does it offer a strategic approach towards a digital world that became so much more important and “smarter” during the pandemic? To provide an answer, it is useful to reflect on the roots of corporate strategies in the “physical world” and the current development of the digital world.

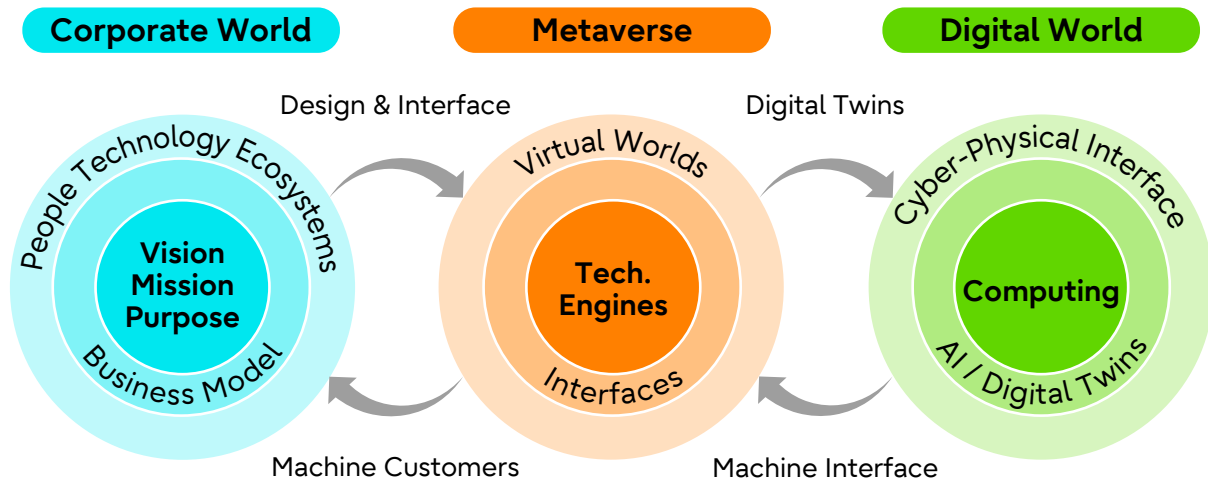
The corporate world is part of the physical world and builds on a company’s vision or purpose that defines its business model. Operations have been built by its employees, technology, and resulted in an ecosystem of partners and networks that is not easy to change. The ubiquitous use of digital technologies, for example, has become a catalyst for “digital transformation,” but has rarely been transformative enough to affect a company’s purpose or business model.

The digital world, on the other hand, evolves fast, based on information technologies and computing capabilities with few boundaries or a specific purpose. It has no physical space, is populated by digital twins of physical world objects and is increasingly capable of autonomous operations of its AI-based actors. Its relation to the corporate world is built on a cyber-physical interface of computers, mobiles, sensors, and robots. So far, much of the computing power of the digital world has been used to mimic or to control increasingly complex operations in the physical world. In the meantime, however, the development of the digital world and its interface to the physical world seems to be at an inflection point.

“Generative AI,” such as ChatGPT, is cracking the code of human communication and has started to produce new content, based on models within the digital world. A growing number of interacting machines and digital twins will further leverage the learning and autonomous operations within the digital world, which will speed its development tremendously. Instead of “outside-in,” the design of the cyber-physical interfaces will be increasingly developed “inside-out” from the digital world towards the corporate sector, which will change its design significantly. Even a comparatively simple chatbot like ChatGPT will change how companies research, report, and operate.

Google’s Internet search, the Android mobile OS, Nest home and Maps spatial interfaces, for example, have been developed to collect information and “understand” the physical world of its users. In the meantime, they have developed to become an increasingly important source of information that determines the actions of its users. Android Automotive OS is increasingly capable of operating entire cars in real-time and will almost certainly become an interface to autonomous operations in the physical world.

Chart 1 The Metaverse between the corporate and the digital world



At such an inflection point, companies need to be increasingly aware about how much and how fast their business will be affected by the evolving digital world and adjust their strategies accordingly. Using CAD (Computer Aided Design) for product development, for example, is relatively simple when it is based on measurements of physical objects and used for product or process optimizations. Using it for designing a digital twin with all relevant parameters so that it can interact in the digital world is a far more strategic process that can affect a company's business model and purpose. The design of a "virtual power plant," for example, looks very different from a physical power station when it evolves as part of a decentralized grid that integrates roof-top solar panels and car batteries in connected homes.

The Metaverse can help companies with their designs and models for a digital world because it is built on some of the most advanced technologies of the digital world – the spatial and interface engines of a global gaming industry that has become more than twice as large as the entire film industry. Its interfaces are constantly evolving along with experiences of a digital-native young generation, which brings human designs and interactions to live in a digital environment that gradually transforms them. The Metaverse therefore consists of a variety of different "virtual worlds" that are built on different technology engines and user communities that shape their structures, designs, and interactions.



2. How can the Metaverse help companies to prepare for the digital world?

Here is what ChatGPT has to say about this question:

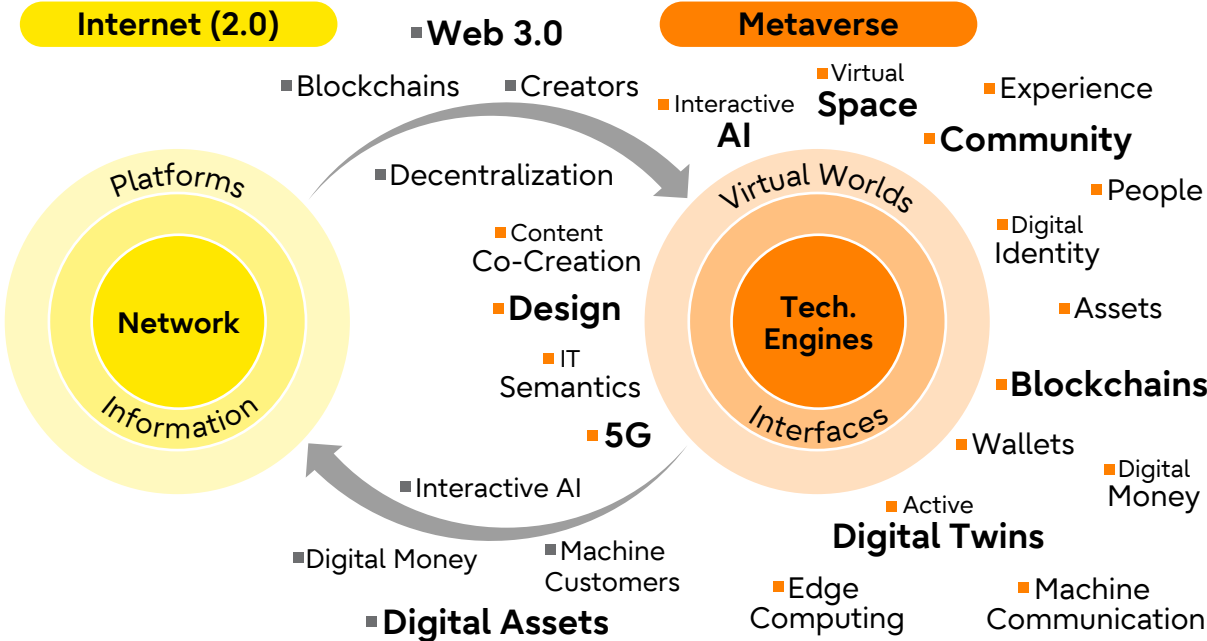
"The Metaverse refers to a virtual world or series of virtual worlds that exist in a shared space, allowing users to interact with each other and with digital objects in a seamless, immersive environment. Companies can prepare for the digital world by leveraging the Metaverse to:

- 1. Build new, immersive digital experiences: The Metaverse provides a platform for companies to build and offer new, more engaging digital experiences to their customers, employees, and partners.*
- 2. Enhance collaboration and teamwork: The Metaverse can help companies to enhance collaboration and teamwork by providing a shared virtual space for remote teams to work together and interact with each other in real-time.*
- 3. Drive innovation: The Metaverse provides a platform for companies to experiment with and test new digital products, services, and business models, helping them to drive innovation and stay ahead of their competitors.*
- 4. Diversify revenue streams: The Metaverse can provide companies with new revenue streams, such as digital goods and services, and can help them to diversify their businesses beyond traditional products and services.*
- 5. Engage customers in new ways: The Metaverse can enable companies to engage customers in new ways, such as offering immersive digital experiences, gamification, and social networking.*

Overall, the Metaverse can help companies prepare for the digital world by providing them with new opportunities for growth and innovation, and enabling them to stay ahead of the curve in a rapidly changing digital landscape."

Most IT consultants would agree with this answer, although significant challenges and shortcomings would also need to be discussed. For corporate sustainability, the energy use and CO2 footprint of the metaverse needs to be considered. Only some human interactions will gain from Metaverse interactions, and work in virtual environments can become quite stressful. Since much of the hype around the Metaverse has already faded, the more important questions therefore become: Which of the potentials can be used as important steppingstones towards digital business models that may or may not integrate the Metaverse? What can be done and learned in the Metaverse that cannot be achieved well-enough on the Internet?

Chart 2 From the Internet to the Metaverse



The Internet is rooted in network connectivity with a focus on data access and the provision of information. It has grown into a general-purpose technology (GPT) that has redefined how we communicate, interact, and work in the physical world. On the corporate (commercial) side, it has evolved as a marketplace with strong network effects, which favor large platforms and dominant players for integrated services.

The Metaverse, on the other hand, has technology engines at its core, which provide real time experiences between digital twins of users (avatars) and digital twins of physical world objects, which redefine how interaction between humans and digital designs take place. Its innovation is the creation of virtual worlds, which have evolved as games, but can be used to create digital twins of buildings, companies and entire cities.

In the Metaverse, companies can enter different virtual worlds, depending on their purposes and interests, and hone their skills together with other users and partners. Companies can re-think their hybrid work strategies by trying Meta's Horizon Workrooms with Zoom integration. They can develop their design and co-creation capabilities by testing 3D designs in Nvidia's Omniverse. They can explore potentials of new ecosystems and partnerships by creating learning centers and meeting spaces in Virbela's Metaverse. And they can certainly learn which digital social interactions work or should be avoided among the human avatars of Second Life, Horizon Worlds or VRChat.

Compared to developments on Internet platforms, the Metaverse also requires some additional enabling technologies, which are often summarized as "Web 3.0" upgrades to the existing internet: blockchain technologies, which allow the platform independent storage and transfer of digital assets; the empowerment of independent "creators" to develop and maintain their work independent from platform provider; and the decentralization of (Internet) platforms so that independent virtual worlds become possible. In the opposite direction, the Metaverse contributes to Internet capabilities by the development of digital twins, the increasing use of digital assets, and the emergence of machine and AI "customers."

From a corporate perspective, the value of the Metaverse can therefore be split in two essential functions: First, the social side of the Metaverse, which attracts communities into virtual spaces, leverages digital experiences, and builds the basis for a sovereign (platform independent) digital identity. Second, the digital twin (machine) side of the Metaverse, which depends on the development of "active" digital twins that can communicate, interact, and learn from developments in the digital world. Additionally, a third function springs from the preparation of the Internet for a more "personalized" Metaverse. The development of "Web 3.0" functions, that allow individuals and companies (creators) to "own" and trade their ideas, designs and copyrights beyond the platforms of dominant Internet companies.



3. Innovating in digital ecosystems with co-creation

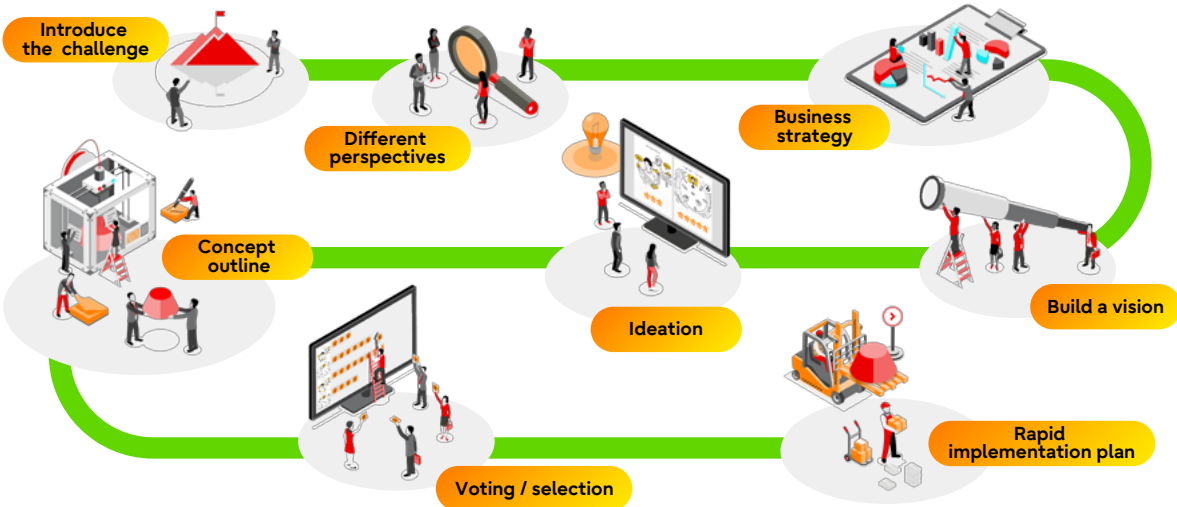
The first pillar of lasting Metaverse value added builds on the human experience side of the Metaverse. It allows companies to learn about interactions in the virtual world to design their own digital event spaces, inside and outside the company. Most companies are well-aware that engaging employees, partners and customers in the digital world works differently from what they did in the physical world during tradeshows, conferences and parties.

In the Metaverse, corporate teams are challenged by often very different worlds and user experiences. Game developer (Fortnite, Roblox, and Rec Room), for example, have shown how to add live (concert) performances into their experiences. VRChat is constantly striving to keep the “creativity” of its users in different virtual worlds in check. Esports have already become successful in building entire communities around their events.

The Metaverse gives companies a chance to work together within the digital event spaces that will host their partners and customers. Even more importantly, they will have the chance to co-create digital content together with their partners not just by meeting online, but by sharing the same emerging space. Fujitsu, for example, has a long tradition in developing innovative digital solutions together with its partners and customers in HXD (Human-Centric Experience Design) sessions. It builds on “Design Thinking” dynamics that evolve from mixing people with different backgrounds in an immersive environment to solve “wicked” problems and to start building prototypes for new solutions.

The Metaverse has therefore become an important addition to the existing cyber-physical spaces that have been used in physical locations, such as Fujitsu’s digital transformation centers. The Fujitsu CX Lab, a new virtual co-creation Metaverse facilitating creative dialogue among customers and partners is now driving ‘metaconversations’ about digital transformation across the world. It leverages the new digital shift culture of virtual engagement, enabling ecosystems to cross-fertilize ideas more easily and quickly. ([Fujitsu launches Co-Creation Metaverse to Stimulate Disruptive Value Creation](#))

Chart 3 Fujitsu HXD cyber-physical co-creation



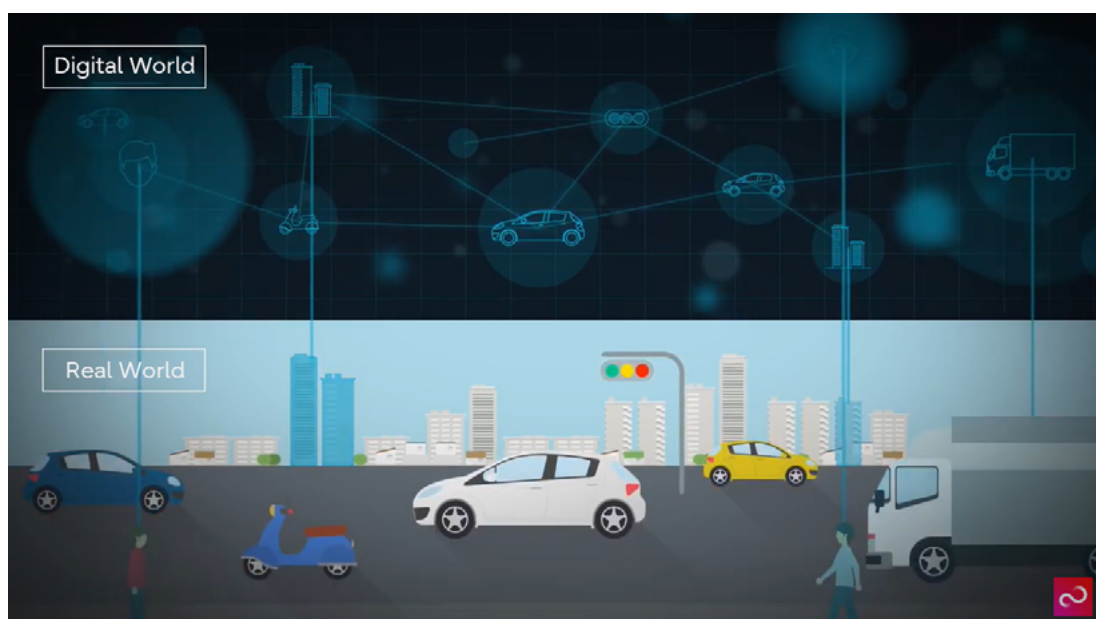
4. Innovating with digital twins

The second pillar of lasting Metaverse value added comes from the development of digital twins. The Metaverse' powerful technology core is built on gaming-engines, such as Unity and Unreal, or on powerful technology integrations, such as Nvidia's Omniverse, which uses Pixar's Universal Scene Description system and integrates Autodesk's 3ds design system. Meta's Horizon Worlds allows to design and build while being in the same virtual room. The tools, support and flexibility of digital twin development in the Metaverse are certainly unparalleled and have been unthinkable before. Designing and while using the designs in an environment that is continuously accessible for partners and customers adds another level to development potentials.

Most important might be the emerging ability of interactive optimization between human and AI-based digital twins in a connected ecosystem. The current versions of operational digital twins in most companies only consist of digital dashboards and control rooms that reflect the state of operations by integrating and interpreting data from a wide variety and range of activities across the company and its markets. The corporate Metaverse, in contrast, does not only reflect operations results, but it also visualizes and simulates operations while they are happening and interacts with users through instructions and interactive manuals. These functions are not limited to the narrow corporate environment. Since digital twins in a Metaverse can connect and cooperate with digital twins in other companies, new ecosystems can be built.

Fujitsu's Mobility Digital Twin, for example, has the ability to connect 10 million cars across different corporate fleets and use their spatial, functional and visual data to build, analyze and predict actions of an entire city scape. These functions become further developed in a 'social digital twin' together with Carnegie Mellon University (CMU), which could be used to model traffic, economic activity, and climate and public health measures. ([Fujitsu to develop 'social digital twin' - Cities Today \(cities-today.com\)](#))

Chart 4 Fujitsu Mobility Digital Twin



[Fujitsu Mobility Digital Twin - YouTube](#)

5. How does Web 3.0 development help companies with their digital transformation?

Here is ChatGPT's perspective, again:

"Web 3.0 is the next generation of the Internet, characterized by the integration of decentralized technologies like blockchain, AI, and the Internet of Things. Web 3.0 development can help companies with their digital transformation by providing them with new tools for data management, privacy, security, and interoperability. With Web 3.0, companies can build more secure, efficient, and transparent digital systems that can drive new business models and opportunities. For example, blockchain technology can provide secure, decentralized databases for managing and sharing data, while AI and the Internet of Things can enable smart, autonomous systems that can analyze and act on data in real-time. Overall, Web 3.0 development has the potential to revolutionize the way companies operate and interact with their customers and partners."

As has been pointed out, "Web 3.0" developments are related to, but not similar to Metaverse development. Companies who are working on the "next version of the Internet" are rather trying to fix some shortcomings of the current Internet. At the heart of developments are the creation of digital identities and protecting the sovereignty of individuals, companies, and entire governments. The most important step is the establishment of digital trust between users while not relying on a centralized information provider, as well as the reliable exchange of value (or digital assets) without depending on an intermediary, such as an e-commerce platform or payment processor.

The need of individual users and companies to control their own digital content, intellectual property rights, and digital assets is already driving a wave of developments today. Technologies for secure data platforms, such as International Data Spaces (IDS), will allow for interoperability of different cloud platforms, and are sponsored by major platform companies. As a reaction to the surprisingly persistent boom of crypto currencies, digital currencies (CBDCs) are being developed by major central banks. Governments are supporting the development of digital identity technologies, such as the European digital identity (eID), which will become the basis for personal information wallets and data access across networks.

Technology providers, at the same time, are actively and directly supporting the development of the next level of a trusted Internet with development tools at the corporate level. Fujitsu's "Web3 Application Platform," for example, offers communities of Web 3.0 developers access to high performance computing and its technologies for digital IDs, digital wallets, and blockchains. With this, the evolving ecosystem of startups, IT partners and universities is getting ready to support companies with key-technologies for their next step into the digital world. ([Fujitsu launches new platform to support Web3 developers globally : Fujitsu Global](#))

Among the technologies that are necessary to build a more decentralized, trusted digital world, while providing safe, flexible links to the physical world, blockchains and distributed ledgers (DLT) stand out. While blockchains gained a poor reputation as basis of Bitcoins and other crypto currencies when speculation on digital assets without "real" value took off, they provide an enormous opportunity at the corporate level. Public blockchains, such as Bitcoins or Ethereum, can provide users with secure wallets to hold and transfer digital assets, without having to know or trust the counterpart ("trustless"), or having to rely on intermediaries (such as e-commerce provider) to guarantee the transactions.

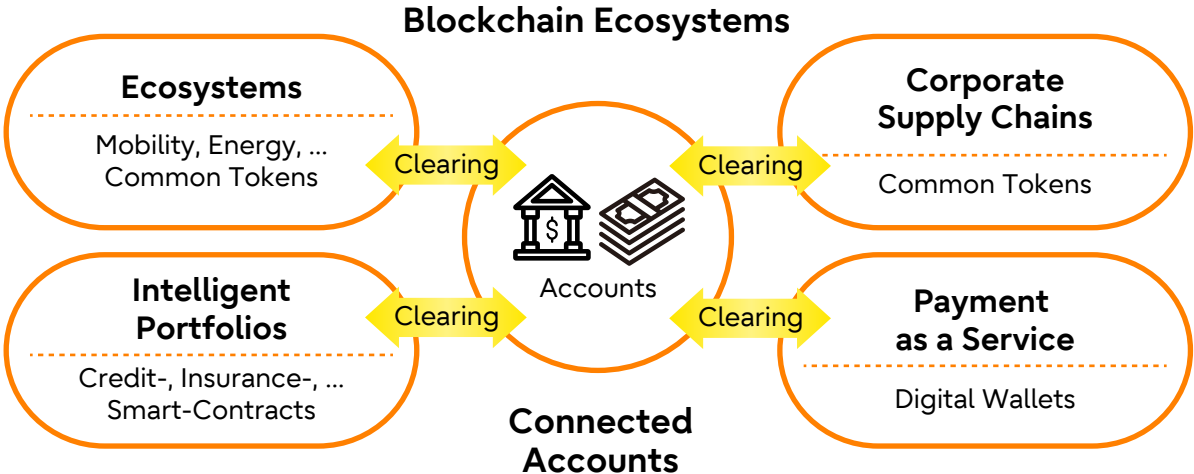
At the corporate level, blockchains can be used as semi-private “permissioned” blockchains together with partners in ecosystems, which allows the seamless, almost cost-free and automated exchange and payment of all sorts of transactions, from supply chain orders to CO2 emission reporting. A CAD design, for example, can be sent to another company’s 3D-printer and simultaneously be paid with a digital token without requiring any additional orders, receipts or payment transactions. A copy machine can order new paper with a digital token and automatically pay for the transaction by unlocking the same token when the paper has arrived.

6. Preparing for AI customers and partners with digital money

With Web 3.0 and Metaverse technologies, the idea of an “Industry 4.0” cyber-physical world finally comes to life when user interfaces become interactive and digital twins integrate into corporate operations. Corporate ecosystems automate their partner interfaces while AI-applications increasingly run the operations. Machines, including tiny “edge” devices, can order their supplies and services (and even pay for them). Companies will have to face a growing number of “machine customers” as a result. A growing number of real-time transactions will have to be secured and provided at the lowest possible cost. While semi-private blockchains increasingly provide such services, they so far remain limited to corporate projects because they cannot easily be exchanged outside their corporate ecosystems.

To solve this problem, Fujitsu’s “ConnectionChain” technology, which can connect different blockchains and ecosystems has been developed ([Fujitsu Develops Security Technology to Safely Connect Blockchains - Fujitsu Global](#)). Another, far larger concept, is being developed by a consortium of 74 leading Japanese companies and financial institutions. They are starting a new digital currency that combines the opportunities of private cryptocurrencies with the proven stability, trust, and relative privacy of banking-based currencies. In Japan’s ‘DCJPY’ project, members of the banking consortium create ‘digital coins’ against deposits in their bank accounts on a one-yen-to-one-coin basis. The ‘digital coins’ in the centralized banking blockchain become the source for new ‘private’ independent blockchains that can support transactions in local corporate ecosystems. These financial services can cover all three ‘original’ functions of money: They can become a medium of exchange, work as a unit of accounting, and can become a store of value.

Chart 5 Digital money and Web 3.0 integration



For payment functions, companies can use the coins across networks so that digital person-to-person payments finally work seamlessly. In industry transactions and accounting, the coins can be used for machine-to-machine orders and payments with automatic 'smart contracts.' In the future, these functions can grow tremendously because more and more transactions, from supply chain delivery to energy to CO2 accounting, will have to be traded in an increasingly 'circular' economy, which builds on reusing and sharing resources in innovative ways. Finally, financial services can move far beyond storing value and providing uniform rates of interest in bank accounts towards smart portfolios with integrated asset, loan, and risk management services.

7. The Metaverse as an interface to a digital world at an inflection point

The digital world seems at an inflection point when AI applications move beyond passively managing operations towards significantly augmenting our human intelligence and interactivity. The Metaverse offers an important opportunity for companies to understand, build and try the necessary interfaces to AI-augmented operations that will help companies to plan their digital strategies. In the Metaverse' digital spaces, companies can meet technology developers and co-create the cyber-physical interfaces that will define the design and operations of their business in the digital and the physical world.

This is not a small challenge; corporate executives will have to decide how much of the "computing" of the digital world they want to adopt and how much they want to change their operations and business models. Physicists have faced a similar challenge about a century ago, when they had to move on from a deterministic "Newton" model, which describes our human-centric physical world quite well, to a far less comprehensible probabilistic model of quantum mechanics. Their solution has been to let the world of quantum research evolve while integrating some of its tangible results, such as quantum computing. They did not embark on a full "quantum transformation" and adjusted their working models only where necessary.

For corporate executives, even when they decide that significant upgrades to their business models will not be necessary, some changes to adjust to an AI-based digital world will be required. Building interfaces with blockchain technologies to emerging machine transactions and experimenting with digital twin development should probably top the list. While this won't be easy and companies will have much less time than physicists had for their adjustments, companies will not have to invent new theories. They only need to start experimenting with the AI-based applications and Metaverse interfaces that have already been developed.

About the author



Dr. Martin Schulz

2020 Fujitsu Ltd., Chief Policy Economist

2000 Fujitsu Research Institute, Senior Research Fellow

Martin's work focuses on the impact of digitalization, government policies and corporate strategies. His analyses are widely quoted in international media – with regular interviews at CNBC, Bloomberg, NHK World etc. His latest articles include:

- What is necessary for a "hybrid digital" work model to succeed in the next normal?, Fujitsu Leadership Challenges, 2022
- "How Has the COVID-19 Pandemic Changed the Future?" Fujitsu Leadership Challenge, 2021



© Fujitsu 2023. All rights reserved. Fujitsu and Fujitsu logo are trademarks of Fujitsu Limited registered in many jurisdictions worldwide. Other product, service and company names mentioned herein may be trademarks of Fujitsu or other companies. This document is current as of the initial date of publication and subject to be changed by Fujitsu without notice. This material is provided for information purposes only and Fujitsu assumes no liability related to its use.

February, 2023 v1.0