



Establishing altruistic ethics to use technology for Social Welfare—How Japan manages Web3 and self-sovereign identity in local communities

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Abstract

Technologies of self-sovereign identity (SSI) and Web3 tools that strongly protect individual autonomy, combined with the ethics of Asian altruism, can effectively guide the governance of the emerging cyber civilization. In contrast, governance in Western industrial civilization stresses the pursuit of individual self-interest and struggles to balance the benefits of big tech with the protection of individual dignity and the preservation of the common good. We demonstrate, with reference to a local community in Japan, that SSI is successful in encouraging communal collaboration and well-being while providing individuals with greater control over their personal data. We also show that Web3 tools provide incentives for altruistic behaviors while safeguarding SSI. Integration of SSI and social protection demonstrates the potential for building an information society grounded in altruistic values, honoring individual dignity, and recognizing the government's role in protecting social welfare. Ultimately, this research unveils how altruistic values can be fostered through SSI and Web3.

Keywords Self-sovereign identity · Altruistic ethics · Asia · Web3

JEL classification B · K · M · P · Z

Introduction: architecture of the cyber civilization

As we confront the tradeoffs between the need for data privacy and the benefits available through data sharing, the Japanese approach to online privacy presents a unique path—a balance between protecting individual rights and fostering community growth. This paper gives a view of how Japan implements self-sovereign identity (SSI) technology (Feulner et al., 2022; Guggenberger et al., 2023) in conjunction with other Web3-related technologies to create a framework for community formation that does not rely on big tech platforms. Our analysis suggests that integrating SSI and Web3

technologies could contribute to a society that honors personal privacy while recognizing and rewarding individuals for voluntarily sharing data with their peers for community benefits (Becker et al., 2022).

In the era spanning from 1790 to 1990, the industrial economy thrived under the invisible hand of the marketplace, with individuals independently pursuing their economic interests driving significant wealth creation and improved living standards across the developed world. However, the emerging post-industrial cyber economy presents challenges to the invisible hand and uncoordinated individual actions. The relentless pursuit of individual self-interest has produced severe externalities such as climate change and extreme income inequality, threatening the existence of human civilization. The misuse of personal data poses threats to democracy, societal cohesion, and individual agency (Clemons et al., 2022a; Trzaskowski, 2022). Nevertheless, despite the challenges created by large online data sets, data sharing is essential for societal advancements, such as pandemic control and urban transportation networks. We must enable these advantages by proposing technologies that allow selective data disclosure, where users can opt-in and

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opt-out, and mechanisms to acknowledge and incentivize altruistic behaviors.

We believe a new architecture is required to enable this advancement. The new architecture is important because Western societies are currently grappling with the balance between promoting data usage and protecting privacy. Despite the essential role of digital platforms in improving social welfare, the discipline of social welfare computing highlights how much harm these platforms can cause through their actions. Some of the harm is part of the platform's design and business model, while some of it is unintended and the result of their externalities (Clemons et al., 2022b). A most critical issue arose with the violation of people's free will as data emerges as the key resource for value creation in the digital sphere. Personal information treated as a tradable commodity creates a significant conflict between the protection of personal dignity protection and the collective use of data in ways that contribute to social welfare (Trzaskowski, 2022). Network externalities in many online business models lead to the creation of big tech companies that monopolize and exploit the value of data that rightfully belongs to its originators (Zuboff, 2019). Social media platforms relying on revenue from target marketing have the incentive to stimulate controversial and divisive rhetoric in order to generate traffic and ad revenue; indeed, a significant portion of their usage is directly by agents who want to create social polarization and disinformation. The currently available solutions to the issue, which include total government control over data and complete anarchic control by individuals (including potential terrorists and criminals), are not acceptable. Thus, we are currently faced with the choice of relying on paternalistic authoritarian governments or commercially motivated big tech companies, or we risk descending into the dangerous world of online polarization and digital anarchy. While recognizing the numerous opportunities and values that come with data sharing, we would neither want to be controlled by Big Brother at the hands of tech giants or by authoritarian governments nor face the lawless chaos of a world in which unregulated actors can exploit the vulnerabilities that unlimited data sharing can create. In this paper, we propose a potential resolution to this dilemma—the merging of technologies that provide adequate privacy while encouraging and providing incentives for altruistic behaviors, allowing individuals to determine their own principles for sharing their personal data. Japan's community-oriented data approach provides initial guidance in achieving that, and we aim to explore its potential application worldwide.

We present the case of Mebuku ID, a Japanese system that provides SSI functionality while giving individuals the option to link their credentials with the national identity

system as the trust anchor.¹ Additionally, we illustrate how Web3 technologies are implemented in building local communities in Japan, using tools such as NFTs (non-fungible tokens) to acknowledge individual contributions to the community.

Our goal is to describe a potential architecture, or platform ecosystem, to facilitate the development of an altruistic and benign cyber civilization. We believe that this architecture would enable the design and functioning of a society consisting of technical, economic, and governance systems that are characterized by the value created with digital information (Kokuryo, 2022). This approach accentuates the necessity for a new legal and ethical foundation to reflect the change in nature from a traditional 20th-century industrial economy to the emerging information economy. Embracing this perspective, we propose solutions integrating technical and regulatory measures with renewed ethical motivation and incentives.

Simultaneously, while we propose the adoption of altruism in the governance structure of the data economy, we are also mindful of the nature of human beings who will not and indeed cannot be altruistic all the time. We need to provide adequate incentives for people to act in ways that appear altruistic so that they may be rewarded for their actions, even if their actions are not entirely without self-interest. Moreover, we probably need to build in penalties for selfishness. We will demonstrate how issuing user tokens for altruistic behavior can help create such incentive structures. We believe this initiative will contribute to building a society where privacy is protected and individuals willingly contribute data for societal welfare, based on a firm understanding of how that data will and will not be used.

To accomplish this goal, a fundamental change is required in the prevailing architecture of online platforms. The emerging cyber civilization differs from the industrial civilization in the magnitude of the value that can be created by the ethos of sharing, i.e., the logic of a “potluck economy” (Kokuryo, 2022), in which society encourages individuals to share possessions with other individuals to create commonly shared value (Belk, 2014; Bardhi and Eckhardt, 2012). Sharing data can, in principle, be a great example of the potluck economy. An individual's data costs him or her nothing to release, but when combined with data from thousands or millions of others the value can be enormous. This can allow urban planners to create better designs for transportation systems, enable public health officials to control the outbreak of epidemics in their earliest stages, or allow demographic experts to assess where the economy will face the need for workers with specific training and expertise.

¹ A trust anchor is an entity for which trust can be assumed, and for which trust does not need to be established or proven.

This principle of encouraged altruism contrasts with that of the industrial model, where individuals are expected to be motivated to pursue bigger and exclusive shares of the economy's outputs. Moreover, at its worst, the industrial model of an economy will systematically involve the abuse of data, perhaps in aggressive first-degree price discrimination against individuals attempting to purchase life insurance, or in well-designed and well-executed manipulation of populations through well-crafted targeted disinformation campaigns (Clemons et al., 2022b).

At its core, we are highlighting the non-rivalrous nature of information (Currah, 2007), which signifies that its value does not diminish as an additional person accesses it.² However, the establishment of exclusive property rights and market mechanisms for their exchange, particularly of rivalrous goods that can only be possessed by one entity at a time, has historically fueled economic growth. These systems encouraged individuals to work diligently and competitively for an even bigger share of these rights. This competition, rooted in the desire to acquire more property and thereby more wealth, spurred innovation, increased productivity, and ultimately led to significant industrial growth. It would be fair to say such ethics helped to vastly increase industrial output and relieve many people of material poverty.

During the rise of industrial civilization, attempts were made to incorporate non-material, non-rivalrous goods into the market mechanism by finding ways to make them rivalrous. The most notable example is the copyright law, which made information tradable by legally enforcing its newly created rivalrous character (Currah, 2007). Since the creators of information goods also needed to purchase material goods for survival, they relied on copyright production to earn income, which gave them access to the required material goods. However, the vulnerability of these arrangements, especially to intentional copying and reuse without appropriate payment, repeatedly caused piracy issues as new technologies emerged. Innovative, and sometimes stretched, arrangements have meanwhile been made to maintain property rights for intangible goods (Okonkwo, 2021). And, again, it highlights the danger of uncontrollable and unanticipated reuse and misuse of information that individuals may choose to disclose for the sorts of altruistic reasons given above without means to allow users to revoke the permission at a later stage.

As the relative importance of information grows in the economy, this inherent contradiction is reaching the tipping point. The game changer here is the network externality

² Some information, like trade secrets or the information needed for insider trading, does indeed lose value the more it is shared. But information needed to analyze an urban mass transit system or to limit the spread of a pandemic is indeed non-rivalrous.

associated with data, where the value of data increases as it is shared. Consider the advancements in medicine enabled by discovering patterns in the medical records of patients (Wayman & Hunerlach, 2019). A single piece of medical data may hold little value beyond its relevance to the person concerned. However, when a large number of medical records are aggregated and their patterns analyzed, the collective data holds greater value than the sum of its individual parts.

While recognizing the value of data sharing, we do not want such data to be used against the interest of the individuals who provide them. Moreover, it is necessary to consider some payment to the people who provided data, given the value created by their sharing data. We believe that such behavior cannot be regulated solely by traditional norms of individual ownership and self-interest in pursuit of a larger share of the created value. While these competitive ethics have served well to advance the industrial market economy, they are inhibiting our capacity to leverage the network externalities of data that can be unlocked by altruistic sharing. Therefore, in this paper, we explore solutions based on a renewed emphasis on individual ethical behavior, in addition to technological and legal tools. A re-evaluation of prevailing Western ethical principles is required, particularly those of the individualism inherent in current Western governance systems.

The structure of this paper is as follows: It begins with an examination of the ethical implications of the transition from an industrial civilization with a manufacturing-based economy to a data-driven digital economy (Royakkers, et al., 2018). This is followed by an analysis of how emerging technologies might adopt the philosophy of self-sovereign identity (SSI), fostering community engagement and harnessing the potential of decentralized technologies such as Web3. Specific cases that adopted such an approach in Japan are examined. Finally, we present a discussion of how the Japanese model of using Web3 could cultivate an altruistic economy through self-sovereign identity and propose future directions for architecting altruistic ethics in the use of technology for social welfare.

Industrial and cyber civilizations

To fully comprehend the transition from an industrial civilization to a cyber civilization—a transformative shift that requires us to reassess our ethical foundations—we need to understand the nature of these two civilizations (Table 1). Kokuryo (2022), in the previous special issue on social welfare computing (Clemons et al., 2022a, 2022b), highlighted that during the pre-internet era, limited traceability was the primary driver of the property rights-based market economy. Mass-produced goods from modern factories required a vast

Table 1 Cyber civilization and industrial civilization

	Cyber civilization	Industrial civilization
Source of value	Network externality of data	Economies of scale
Norm	Sharing	Competition
Incentive	Recognition for contribution (use of NFT)	Monetary reward
Mechanism	Access right licensing (using verifiable tokens)	Exchange of ownership for money (free market)
Ethics	Competition for greater recognition of contribution. Altruism. Promotion of altruism	Pursuit of self-interest based on individualism
Privacy protection	By honoring the dignity of others and by technically giving SSI greater control over identity	By legally and regulatorily protecting the rights of individuals

market to justify the investment, leading to selling to distant, anonymous customers. As shipped goods became untraceable, transactions had to be “settled” by exchanging full ownership rights for items of value, typically gold or silver.

The spread of the market mindset may have been accelerated rather than initiated by industrialization. Signs of the development of capitalism preceded the Industrial Revolution in the age of mercantilism. Braudel (1992) documented how Mediterranean merchants broadened trading activities and shaped capitalistic civilization in their pursuit of wealth. Portuguese and Spanish voyagers followed and globalized this wave. The earliest economists, like Adam Smith, understood the logic of markets and the impact of their invisible hand on both supply and demand, in the earliest days of the Industrial Revolution (Smith, 1776). Then, the Industrial Revolution followed, with the individualistic pursuit of wealth replacing altruistic ethics dominant in medieval Catholic societies (Sakaiya, 1991). Weber (1933) pointed out the role of protestant ethics in attitudes toward frugality and savings as a key driver for further development. In the context of this paper, it is suggested that protestant ethics played a significant role in the development of industrial civilization, which required the accumulation of capital.

The ethics of individualism helped advance the economy greatly by protecting and promoting a market economy founded on personal ownership of property and the pursuit of self-interest. The pursuit of personal economic success was greatly encouraged and drove people to open new frontiers and create new businesses. Ethics based on individualism and institutions that embodied these ethics were helpful in greatly increasing the production of material goods. Institutionally, the establishment of a market economy infrastructure was the cornerstone of aggregating and integrating activities of self-interest with collective societal prosperity. Nation-states created economic mechanisms such as stock markets and central banks, and laws were established to protect and codify ownership rights. We should perhaps include economic theories as an impetus to cultural institutionalization. We note that Adam Smith (1776), originally a philosopher, developed a theory in support of the

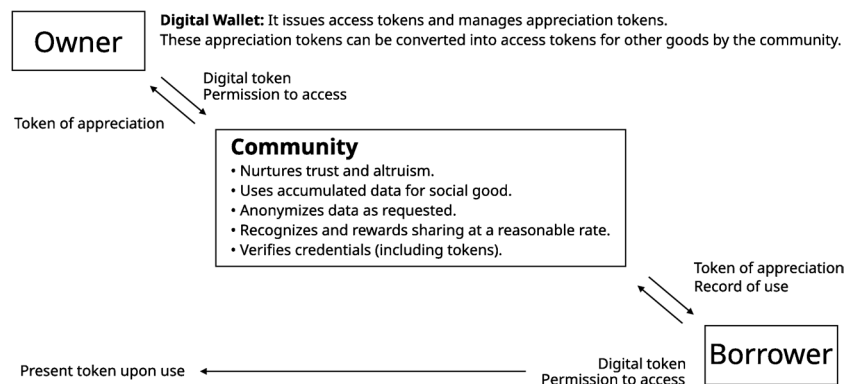
pursuit of rational self-interest that would eventually lead to greater prosperity for society as a whole. Freedom and individualism thus became seen as inseparable notions of the free market economy.

Individualism and the free-market economy served the industrial world efficiently, at least in terms of the production of goods. Thanks to the jobs created by the manufacturing industry, notable productivity gains saved many people from starvation and raised them into the middle class. While the system was originally designed for tangible manufactured goods, it was extended to include intangible goods such as copyrighted intellectual property. However, the inclusion of intangible goods faces constant challenges, including piracy issues in the digital world where copying costs are minimal (Kokuryo, 2022).

The low marginal cost of digital goods has mixed impacts on the market mechanism of the industrial economy. For most digital products, like music, the cost of creating and supplying an additional copy is very low (Shapiro & Varian, 1999), and in some cases, practically zero. As we know from economic theory, price in a perfectly functioning, traditional market is determined by marginal cost.

Additionally, there is almost no cost to distributing content, once created. Unfortunately, the advertising model that some big tech firms have adopted uses the distribution of inaccurate and inflammatory content to generate traffic, polarizing societies and increasing proved to have the dangerous consequence of incentivizing confrontations in order to increase revenues. This created serious social divides threatening democracy (Lessig, 2019). Therefore, firms using data for selfish profit-seeking contradict the aims of social welfare (Clemons et al., 2022b). Rather than representing people, this could be seen as an excuse for the government to take control of the data, which might result in the authoritarian misuse of the data and the suppression of people. Given that the problem is deeply rooted in the core ethics of society and is causing instability in democratic societies, we must re-evaluate the foundational ethics of society. However, since there is no marginal cost to sharing, if sharing produces societal value and is safe, altruism

Fig. 1 Infrastructure for secure sharing



can succeed. But if data sharing were very expensive for individuals or were very expensive then they would not do it.

If the market system based on property rights cannot address the digital economy, how should the next generation of economic institutions be designed, and what ethical system should govern the new cyber civilization? Based on the discussions above, the task is to design an architecture of (1) technical systems, (2) wealth creation mechanisms, and (3) ethics and governance systems that together meet the following needs simultaneously: honoring individuals while encouraging data sharing.

Our understanding of the sharing economy provides insights into these requirements. Essentially, sharing economy businesses offer temporary access to goods either for monetary compensation or due to altruistic motivation (Bardhi and Eckhardt 2012; Belk, 2014). In the context of this paper, data sharing can be understood as a world in which moral rights to data and control over data remain with the originating individual, who can grant or withhold access rights to that data to specified recipients of the data and for specified purposes (Miernicki and Ng 2021). Platforms must be designed to not only allow individuals to choose selectively who can access what data but also to provide a strong level of safety that is sufficient to instill trust in people who share their data. At the same time, society should encourage and reward individuals for altruistically providing data for the welfare of all, which must be underpinned by a trust in the technology's ability to safeguard data, effectively providing the necessary assurance to facilitate such incentives.

While education and nurture are important for the social acceptance of data sharing, we need mechanisms to reward social welfare contributors. Instead of exchanging ownership for money, people may be awarded shared or temporary access to other people's possessions. Figure 1 illustrates how such a contribution and reward mechanism might work. The owner of assets issues a token for the use of its assets and passes it on to the borrower. In the process, the community anonymizes the transaction as requested by the owner or borrower. Either the owner or the community can be responsible for issuing the token. In either case, the owner and borrower

identities are verified with individual secret keys contained in distributed wallets. Tokens can also be transported to any other platform, preventing any party from being held captive in a particular community. The borrower uses the token as a key to access the asset within a specified time window. A token of appreciation for the contribution is then issued, which can be stored in the contributor's digital wallet. The collection of appreciation tokens helps increase the social status of the contributors and they may use their acquired status to gain access to services they desire.

Emerging Web3-related technologies to meet the needs of emerging cyber civilizations

Many of the design concepts depicted in Fig. 1 have their origin in the vision of Web3. Although the term "Web3" still lacks an established definition, it broadly encapsulates applications designed around decentralization, such as the control of data, identity, and applications that employ blockchain (Lage et al., 2022). However, the reputation of Web3 remains a subject of controversy as of May 2023, largely due to speculation in cryptocurrencies and their use in support of illegal transactions. Events like the FTX scam in 2022 and the subsequent collapse of a "stable" coin have further exacerbated this negative perception, leading us to what we refer to as the "crypto-winter" of 2023.

Yet, amidst these reputational challenges, some Web3 technologies and philosophical principles remain promising and could potentially be relevant to the implementation of the kinds of sharing communities that we envision. This section reviews a few of the concepts and technologies that are recently recognized as useful outside of the blockchain community.

Self-sovereign identity

Self-sovereign identity (SSI) is a design philosophy that allows individuals to control their identity (Allen, 2016).

This can be accomplished by individuals taking direct control of identity credentials. The notion of SSI has been advocated and implemented by the Web3 community, although blockchain is not an essential component (Feulner et al., 2022). The technical foundation for SSI rests in distributed identity (DID) (W3C, 2022a; W3C, 2022b). By enabling individuals to take exclusive control of their data and create digital signatures, and by having trusted third parties verify their identity (attributes), DID allows individuals to control their identity without relying on the platform providers to manage access to various services. One of the most important functionalities of SSI is “selective attribute disclosure” (Slamanig et al., 2014). DID lets individuals selectively choose whom to give their personal information to as well as which attributes of it. In other words, individuals have much greater control over personal information, rather than being forced to give blanket approval to sharing personal information, as is the case today. Indeed, individuals now have the right to share all, some, or none of their data, with all, some, or no potential recipients. Most importantly, this is not an all-or-nothing granting of access rights, as is largely the case today, but selective granting with control over what is shared, with whom, and for how long. In the past, notions of SSI have been discussed mainly in the Web3 community with the assumption that it will be implemented with the use of blockchain. There are, however, other ways of realizing SSI. In January 2022, ENISA, an EU agency for cybersecurity, issued a report entitled “Digital Identity: Leveraging the Self-Sovereign Identity (SSI) Concept to Build Trust,” endorsing it as part of its eIDAS (electronic Identification, Authentication and Trust Services) scheme (ENISA 2022). On July 19, W3C officially announced its official recommendation for DID (W3C, 2022a). As an early implementation of the idea, a Japanese example will show us how SSI can utilize trustworthy third parties such as democratic governments as trust anchors so that misuse of the technology can be traced and checked against democratically acceptable procedures.

Digital tokens

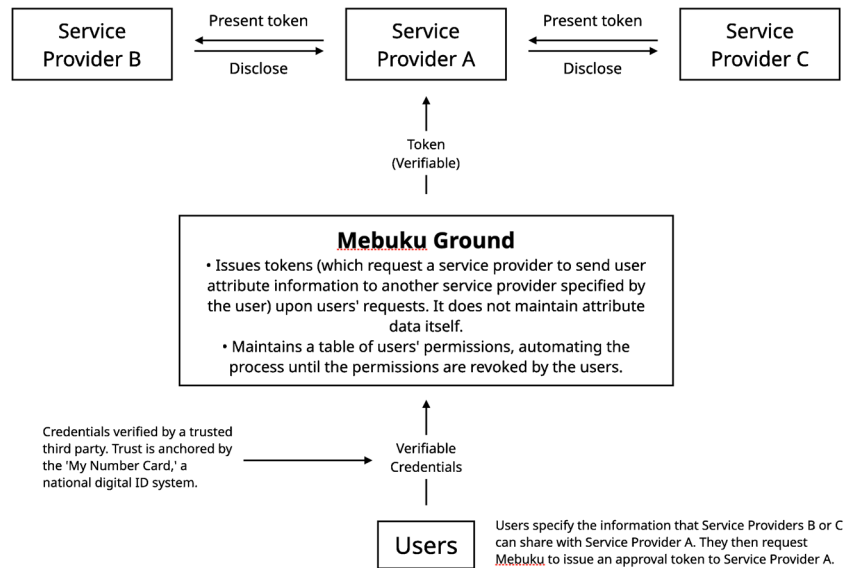
Web3 has been characterized as a token economy (Voshmgir, 2020). Digital tokens, including crypto-currency and NFTs (non-fungible tokens), authenticate claim rights to objects using digital signatures. With blockchain, transactions are recorded on the chain, thus ensuring the integrity of the record. Strong advocates of decentralization view public blockchains as essential to achieving the goal of integrity. Alternatively, one might add that there are quasi-Web3 applications that leverage digital tokens either on private

blockchains or without blockchains and maintain oversight to prevent illegal use, such as money laundering and counterfeiting both of which the technology is inherently exposed to. As an example of successful use, the Korean COVID-19 vaccine passport, COOV, uses government-issued IDs for the identification of individuals as well as private blockchain for the verification of certificates (Lee & Smith, 2021). Notably, the term “token” is used variously in different technical communities. In the Web3 community, it is usually used to mean some kind of digital certificate that proves the ownership of various kinds of assets. In the cybersecurity community, the word is often used to mean credentials used for authentication (identity tokens) and authorization (access tokens). Their common attribute is that they are all forms of verifiable credentials that aim at proving the authenticity of the digital information being exchanged. One kind of digital token, the NFT, has an important meaning in the context of this paper. NFTs are digital tokens that can be issued by and to anyone. Thus, they can be used to show appreciation (with or without financial compensation) toward anyone that the issuer wants to reward. As will be discussed in detail in the following case study, NFTs can thus be used as currency of trust in local communities to reward contributors to social welfare.

Smart contracts

Another key Web3 technology is the smart contract, an automated contract execution process embedded in software and hardware (Wang et al., 2019). It is an important concept in the Web3 community, as it is a means to establish a decentralized economy that does not require a centralized authority to ensure the execution of a contract (Christidis & Devetsikiotis, 2016). Many of the NFT applications use this function to distribute proceeds from second-hand transactions back to the original creators. Smart contracts also represent an important tool for creating decentralized autonomous organizations. By embedding the charter of an organization in the decision-making protocols, the organization will be able to run without the hierarchical decision-making process that it usually needs. With legal approval, the organization can be run by anonymous participants. Technically, smart contracts existed in a limited and simple form even before Web3, as seen in automated ticketing machines, teller machines, electronic toll collection, and vending machines. The significance of the Web3 smart contract is that it can function for digital goods on digital networks free of centralized platforms. Digital assets acquired on one platform can be easily transferred to others. In that sense, a smart contract is another technology that affects self-sovereignty in the cyber civilization.

Fig. 2 Mebuku Ground architecture for SSI



Decentralized autonomous organizations (DAOs)

DAOs utilize blockchain technology to facilitate self-organization and self-governance (Filippi, 2021). This technology aims to empower communities to achieve their objectives, while concurrently rewarding contributors through a decentralized governance system (Gogel et al., 2023). These models also emphasize the importance of altruistic values, as seen in the Japanese model, which encourages societal contributions and harnesses the positive benefits of emerging Web3 technologies (Parker, 2023). DAOs operate based on predefined rules known as smart contracts, automatically executed and maintained on a public blockchain, ensuring decentralized, transparent, and autonomous operations. By facilitating participatory decision-making and transparent dialogue, DAOs cultivate a sense of ownership and responsibility within their communities, thereby generating self-sustaining ecosystems that promote collaboration and shared creation of value.

Mebuku self-sovereign ID and community building

We shall now introduce the case of Mebuku Ground Inc., a company that is implementing the self-sovereign identity service in the city of Maebashi, Japan. In addition to its progressive technical architecture (Fig. 2), the company places a strong emphasis on “data governance,” with a policy of honoring the moral rights of consumers and citizens over the economic ownership rights of investors or sponsors. It declares that the data will not be used for advertising purposes while offering to assist users in search of services they need.

The company was set up in October 2022 as an identity service provider (IdP) as well as a selective attribute token service provider. It was created by the local business community as part of local community revitalization. Maebashi was chosen and funded by the central government as one of seven advanced digital regional development areas (Digital Green City Program) in Japan.

Mebuku Ground employs FPoS technology developed by MyFintech Inc. to generate pairs of public and private keys in the secure elements (secured hardware) of a user’s mobile phone, which guarantees that only the individual has access to the secret key. The generated public key is then sent to MyFintech with a digital signature of the user’s national ID card. Next, Mebuku Ground issues tokens that contain those attributes that the user wishes to disclose to service providers. Users can selectively choose which attributes to disclose while masking others.

In addition to the core authentication service, Mebuku Ground runs a platform on which user attributes that a service provider possesses can be transferred to another service provider together with digitally signed tokens of permission issued by Mebuku Ground, based on user instructions.

Recognizing the need for governments to protect society from the threats of wrongdoers, credentials issued by Mebuku Ground for authentication are anchored in the Japanese national digital “my number” ID card system. 80 million cards with digital IDs are now in the hands of Japanese residents. By anchoring Mebuku ID in the national ID, it can be used for transactions that AML (anti money laundering) regulations require. As credentials issued by Mebuku Ground itself do not contain personal information, the Mebuku ID can be used anonymously, giving service providers only minimally necessary personal information (age, etc.) in addition to temporary identification codes. If,

for legal and security reasons, the individual needs to be traced, democratic due process can be applied to reveal the information contained in the national ID. Another feature Mebuku Ground has added is the selective attribute disclosure function (Slamanig et al., 2014), which the company calls “dynamic opt-in.”

Systems at work at Mebuku Ground are technologically very close to the eIDAS scheme (Guggenberger et al., 2023). At the same time, Mebuku Ground is unique in its emphasis on relying on and nourishing the development of trust-based relations in local communities. This is reflected in an essential component of the company, namely, its governance structure. For example, the company charter states that it aspires to be the facilitator of community collaboration. To embody this philosophy, the company counts 57 local businesses and educational institutions as well as the city of Maebashi itself among its shareholders. The charter also stipulates the creation of a “data governance committee,” which ensures the philosophy of honoring the moral rights of data originators. The committee also has veto power over the company’s use of data. To ensure its independence, the majority of committee members, including the speaker of the city meeting, are outside members. By offering a safe environment for the exchange of data in the community, the company aims to mobilize private businesses to deliver vital services that deal with sensitive personal data. For example, food allergies are a major problem in child raising. Institutions such as nursing schools know that their operations can be greatly streamlined if there is a systematic way of supplying meal providers with relevant information on each child’s food requirements (Fig. 3). Mebuku Ground makes this possible by issuing tokens to the meal provider that permit nursing schools to share this information anonymously. The permission will remain effective until the parent decides to revoke the permission by invalidating the token. The vision here is not only about suitable technology but about the trust people have in their local community businesses.

While the decision is yet to be made, the use of Web3 technology is one of the options considered at Mebuku Ground. The AML-compliant Mebuku system can be lawfully used to manage “digital assets” in digital wallets (Podgorelec et al., 2022) including cryptocurrencies and NFTs, while also securing high levels of anonymity—unless pursued by democratic due process (Bandara et al., 2021). As we will discuss in the next section, Web3 technologies are starting to be heavily used for local community revitalization which relies on NFTs as tokens of recognition for the contributions people make to the community. In that sense, the synergy between Mebuku ID and Web3 seems obvious.

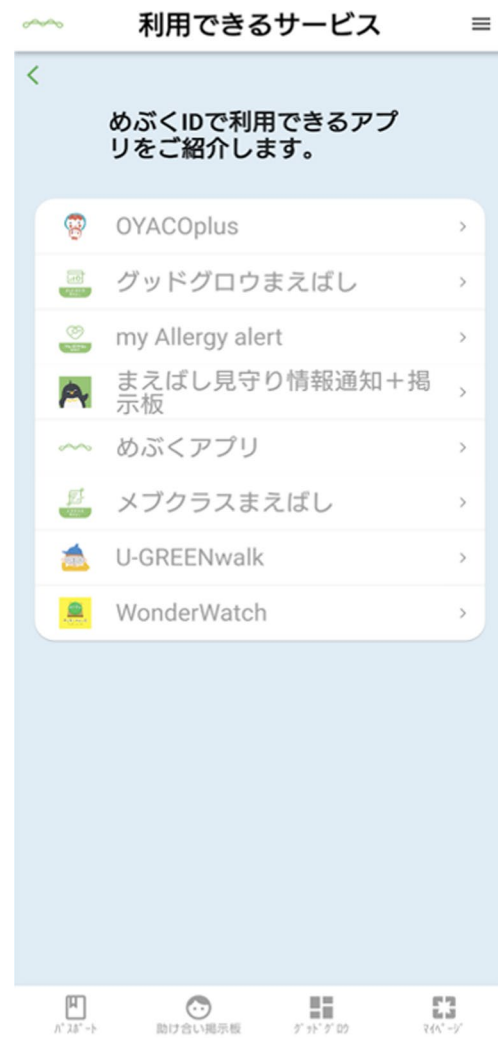


Fig. 3 Mebuku menu (as of May 23, 2023)

DAOs and NFTs revitalize towns at the edge of disappearance

DAOs and NFTs

In Japan, DAOs are increasingly used for engaging local and regional communities and improving social issues (LDP Headquarters for the Promotion of Digital Society, 2023). One example comes from the small town of Yamakoshi, which has a population of around 800 people. In 2004, Yamakoshi was devastated by a severe earthquake. While the villagers rallied together to rebuild the town, the combination of the aftermath and other societal challenges drastically reduced the town’s population, pushing it to the edge of disappearance.

In 2021, however, the town embarked on a unique initiative. They created a series of “Koi” non-fungible tokens (NFTs, named “Coloured Carp”) which serve as an electronic residency card. These NFTs, which are digital art pieces symbolizing Nishikigoi, the town’s renowned carp species, also serve as proof of membership in the Nishikigoi DAO. By purchasing this NFT, you are registered as a “digital villager”, enabling you to engage in governance and participate in community activities. This approach transformed the once struggling town on the brink of disappearance into a thriving community while also attracting e-residents from around the world. The digital villagers, through their NFTs, contribute to the town’s sustainability by providing financial resources and participating in democratic decision-making processes geared to the town’s development. Yamakoshi DAO is now working towards a count of 10,000 digital villagers. (山古志住民会議, 2022).

Inspired by this success, other municipalities facing difficulties with underpopulation issues have started exploring similar initiatives (LDP Headquarters for the Promotion of Digital Society, 2023). For instance, in 2023, the non-profit organization “Japan’s Most Beautiful Villages” was established as a consortium of towns across Japan committed to leveraging Web3 technologies to confront societal issues and rejuvenate the communities. Embracing the concept of digital residencies, these towns have created avenues for digital residents to participate in local initiatives and governance. In addition to fostering this virtual connection, the digital residents also get benefits when they visit the towns physically, enabling digital connections to real life.

As these cases exemplify, the Japanese usage of Web3 has the potential for revitalizing local communities, particularly in rural areas facing the challenge of a dwindling population and the resulting overpopulation of major cities like Tokyo. Local communities such as Shiwa-town have begun using Web3 technologies to foster economic development. This approach also enables communities to capitalize on their unique cultural heritage and historical sites, creating new opportunities for tourism and economic growth. Ultimately, the Japanese model of altruistic data sharing offers a compelling vision for harnessing the power of Web3 to promote social welfare and foster collaboration across various sectors. It is also important to note that simple altruism might not be enough to motivate widespread participation. There might be a need to consider additional incentives for individuals to become more actively involved.

Tokenomics, which involves the design and implementation of economic systems within blockchain networks using digital tokens, provides a potential mechanism which recognizes and rewards individual contributions to community-driven projects. By aligning incentives among stakeholders,

tokens can ensure that the value generated by contributors is fairly distributed, promoting a sense of equity and fairness. For example, platforms such as Dework and Snapshot utilize tokenomics to incentivize and reward contributions. Dework, a decentralized work ecosystem, allows individuals to undertake tasks for DAOs, rewarding them with tokens that carry value within the ecosystem. Snapshot, a tool for gasless voting, enables token holders to propose and vote on issues pertaining to their DAOs, with the weight of a member’s vote proportional to their token holding.

However, this incentive system also has its challenges. The value of tokens can fluctuate significantly due to market dynamics, potentially leading to wealth inequality within communities (Gogel et al., 2023). The speculative nature of tokens could also detract from their intended purpose of incentivizing meaningful participation. Additionally, questions of accountability and governance in token-based reward systems need careful consideration (Smith, 2023).

Despite these concerns, tokenomics offers the potential to build communities that recognize and reward contributions in an altruistic manner. Tokens could symbolize an individual’s commitment to collective welfare, serving as a form of social capital. For example, tokens are being issued to individuals for sustainable behaviors, such as recycling or reducing carbon emissions (Strauf, 2023). These tokens could be redeemed for goods or services, fostering a culture of environmental responsibility (Ghantous, 2023). Civic participation could be rewarded similarly, with tokens issued for attending community meetings or volunteering and promoting active engagement in local governance (Gogel et al., 2023).

Tokenomics could offer a way to cultivate a more altruistic information society. Through fostering active community engagement and directly tying recognition and rewards to individual contributions, tokenomics has the potential to democratize access to opportunities and redistribute wealth more equitably.

Discussion: Governing technologies with altruistic ethics

The Japanese model presents a distinctive strategy for integrating Web3 and related technologies into society, emphasizing altruistic values, community governance, and individual dignity. This model, in essence, draws on Asian schools of thought that promote harmony, selflessness, and interconnectedness and envisions an information society that places social welfare as its core. This is most prevalent in Chinese and Japanese Confucian traditions.

Confucian philosophy, with its emphasis on altruistic behavior, plays a profound role in shaping the adoption and utilization of Web3-related technologies in societies like

Japan. Many Asian philosophical beliefs, including Confucianism, Buddhism, and Daoism, advocate harmony, community values, and a sense of interconnectedness among individuals. These principles inspire actions for the benefit of others, placing community welfare and societal well-being ahead of individual gains. DAOs, for instance, resonate with the wisdom generally inherent in Asian philosophy, which has often been underappreciated. While Japan has embraced altruism influenced by Asian teachings, it is worth noting that the spirit of altruism is a universal trait, transcending borders and cultures. We believe there is a rich reservoir of wisdom that can provide the guiding principles of altruistic ethics and combine them with technology for social welfare.

The potential of Web3 can be regarded as well-suited in its capacity to create an information society deeply grounded in altruistic values. Embracing altruistic ethics, some towns in Japan, such as Shiwa-town, have harnessed Web3 technologies with inherent security to support social causes and promote community engagement. This approach allows individuals to exercise self-sovereign powers while contributing to the world altruistically, with society recognizing and appreciating their efforts.

The acceptance of Web3 as the enabler of a viable solution to social issues in Japan has been made less difficult than elsewhere, thanks to Japan's strict regulations that have protected the country from negative crypto crises (Digital Agency of Japan, 2022). Japan had restrictions in place requiring exchanges to obtain copies of national identity certificates upon opening accounts, in addition to the requirement of segregating customer assets from the exchanges. With these regulations, Japanese investors largely escaped the fall of FTX. Consequently, the negative perception of Web3 is not as strong in Japan as in some other places. That has left the Japanese to consider the benefits of digital tokens, with various organizations and government agencies starting to view blockchain with social welfare instead of monetary benefits in mind.

Web3 technologies are paving the way for a token economy, providing an alternative to traditional market economies. This new economy emphasizes access rights to goods and services rather than transfers of property rights. Kokuryo's vision of a "potluck" economy (2022) reflects this shift, promoting the social sharing of goods through access right licensing and incentivizing individuals to share data for network externalities.

As countries like Japan begin to see Web3 as a viable element of their technology infrastructure, hybrid models that combine traditional approaches with blockchain to maintain nation-state control while honoring data self-sovereignty have become popular. While this may not reflect true decentralization as proposed by crypto enthusiasts, we believe that Web3 technologies infused with selfless

values and drawing inspiration from Asian philosophy can enable societies around the world to create a more equitable, collaborative, yet safe digital future. This, we believe, embodies the true essence of the values that Web3 advocates are pursuing. The vision relies on fostering an environment where individuals can exercise self-sovereign powers, contribute altruistically to society, and receive due recognition for their efforts. Therefore, it is essential to balance technological innovation, individual dignity, and social welfare as we continue to explore the potential of Web3 technologies.

At the same time, we acknowledge that this path is not without its challenges. Even in Japan, despite the development of technology for altruistic and controllable data sharing, there are few significant examples available. Furthermore, while our vision leads to greater autonomy and freedom, the empowering principle of individual control over digital identity could potentially expose users to the risk of losing access to their data and funds or falling victim to unauthorized access. Consequently, comprehensive education on literacy and ethics becomes an essential prerequisite, enabling users to navigate these potential challenges effectively. We believe a paradigm shift is required to thoughtfully "design" the architecture (Ito, 2016) of SSI using Web3 technologies. This dialogue should be infused with wisdom drawn from principles that respect harmony and interconnectedness, while also recognizing our role and responsibility as part of the system we at once influence and inhabit. This necessitates an approach that goes beyond the binary choices in data protection or data sharing. Instead, we should bring together government regulations, cultural sensibilities, technological advancements, scientific guidance, and business interests for us to understand and jointly design the system for social impact (Ito, 2016).

Conclusion

In this paper, we have examined the potential of combining SSI technology and Web3 to develop the architecture for a cyber civilization that emphasizes individual dignity, altruistic values, and social welfare. We focused on Japan's approach that draws inspiration from Asian philosophy, advocating harmony, interconnectedness, and selflessness. The cases in Japan demonstrate how Web3 technologies might cultivate community engagement and advance modern societal issues. By embracing Asian principles of altruistic behavior and prioritizing communal welfare, Japan has established a society that incentivizes contributors to embrace participation, while also successfully regulating negative crypto crises. The technology has been

demonstrated to be feasible. But adoption and use remain quite limited, even in Japan.

Although our hybrid approach based on Web3 may not fully complement crypto enthusiasts in terms of complete decentralization, we believe that the merging of Web3 technologies with altruistic values lays the foundation of a more collaborative and secure future. This vision empowers individuals with self-sovereignty over data, nurturing a culture of contributions to society and inspiring through recognitions. It is up to governments and organizations to find the right balance between technological innovations and social welfare. Nevertheless, the utmost priority is to establish an incentive structure that promotes sharing, while ensuring optimal security for individuals.

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