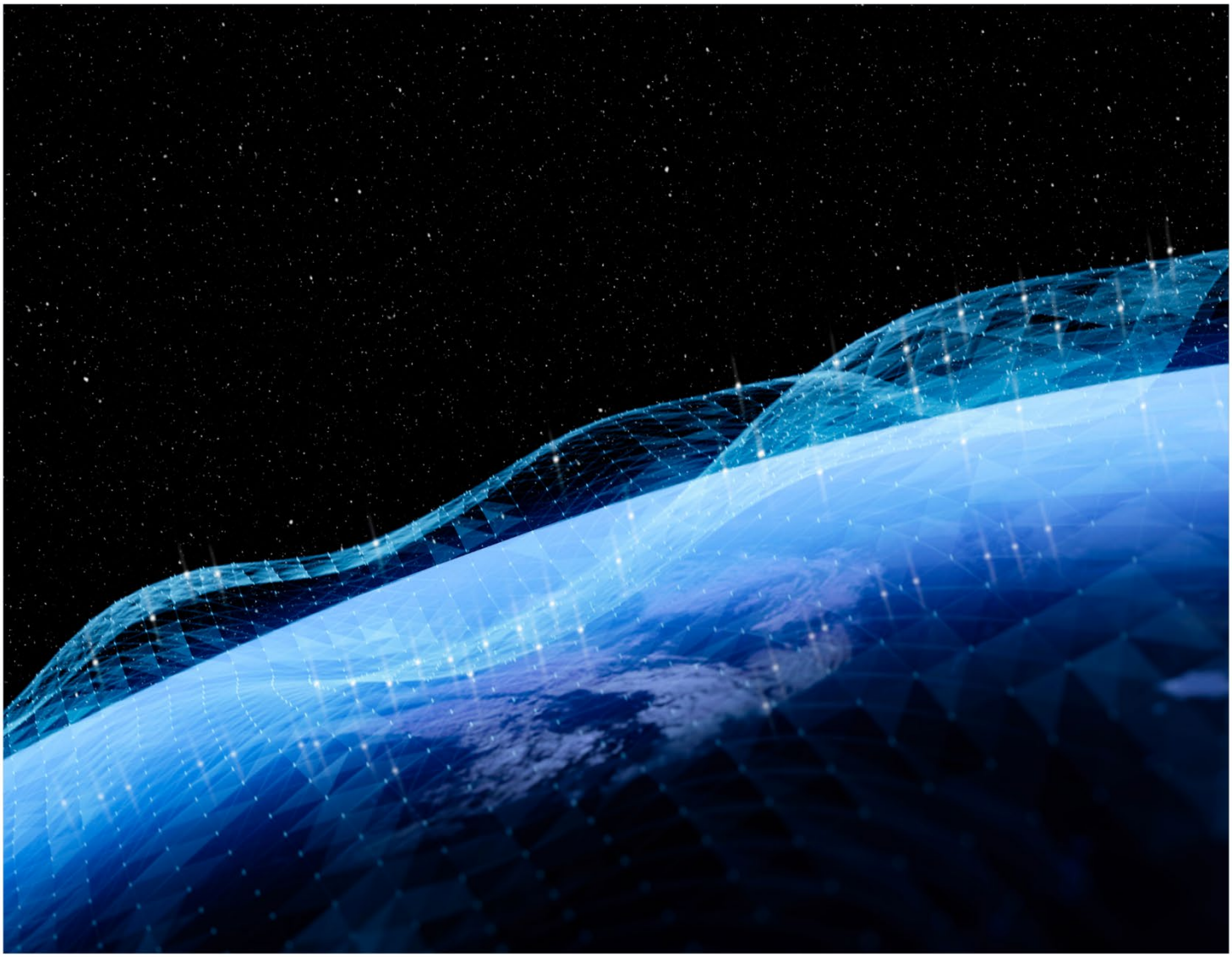
GBBC
Global Blockchain Business Council

INSIGHT REPORT

GLOBAL STANDARDS MAPPING INITIATIVE (GSMI) 2.0
STANDALONE REPORT

SOUTH KOREA

November 2021



The GBBC would like to thank our many partners, members, and supporters who worked tirelessly and enthusiastically over the past months to produce this standalone report as a part of GSMI 2021, version 2.0.

Contributors

Korea Policy Center for the Fourth Industrial Revolution, KAIST	Kibae KIM (co-chair)
	So Young KIM (co-chair)
KAIST	Yoojin BANG (GSMI fellow)
Blockchain Labs	Jonghyun KIM
Blockchain Law Society	Jungyup LEE
Korea Blockchain Association	James JEON
Korea Blockchain Industry Promotion Association	Hyung Joo KIM
Korea Blockchain Startup Association	Soohyuck CHOI
Korea Society of Blockchain	Soo Yong PARK
Open Blockchain DID Association	Sehyun OH

This research was supported by the Project of Promoting Inclusive Growth through Artificial Intelligence and Blockchain Technology and Diffusion of Precision Medicine funded by the Ministry of Science and ICT through KAIST's Korea Policy Center for the Fourth Industrial Revolution. We appreciate the full support of Dong Joon Lee (Graduate School of Science and Technology Policy, KAIST) for editing assistance.

Executive Summary

This report offers an overview of blockchain adoption through an analysis of policy and business cases of South Korea.

Although South Korea leveraged information and communication technologies to advance its economy in the 2000s (which has expanded its focus from manufacturing and exporting in the 1970s and 1980s), its innovation in blockchain has been stagnant since the announcement of the emergency measure and technology roadmap amid the Bitcoin shock in December 2017.

In this report, six use cases are introduced in three parts. The first part covers the policy and regulations for blockchain as virtual assets. South Korea amended the Act on Reporting and Using Specific Financial Transaction Information to comply with the Financial Action Task Force's recommendations revised in 2018. As a result, on the enforcement due date, September 25th, 2021, out of forty-three Virtual Asset Service Providers (VASPs) registering their virtual asset businesses at the Korea Financial Intelligence Unit, only four companies provided fiat money services. Furthermore, they must abide by the travel rule in six months and adapt to the emerging markets of NFTs and the metaverse.

The second part looks at South Korea's blockchain R&D. Seventeen ministries have funded four hundred and seventeen projects to cultivate blockchain inventions since 2015. Significantly, the Ministry of Science and ICT's Blockchain Convergence Technology Development Program supported fifty projects between 2018 and 2021. Their R&D focused on virtual assets during the initial stage in 2015 and soon shifted its application to various domains, including identification and logistics. In addition, the Busan Regulation-Free Special Zone has piloted seven blockchain projects on financial services, public security, tourism, logistics, real-estate, and MyData.

The last part reviews two cases of government blockchain adoption. The Korea Customs Service was one of the first agencies in the world to introduce blockchain into customs clearance. It stopped the project before commercialization due to the burden of transforming the public data systems into blockchain-based systems and insufficient partnerships with counterpart governments. In collaboration with private sectors, the government has now also provided the world's first blockchain-based vaccination certification services and extended it to a globally integrated Decentralized Identity (DID) system.

These South Korean cases highlight three ambiguities in blockchain policies. First, blockchain involves both financial and industrial features. As the government regulates the

former and promotes the latter, it needs a new regulatory framework embracing the two features together. Second, integrating services on a blockchain platform will bring forth seamless automation of industries across manufacturing, financial services, and public services. South Korea, having accumulated capacities in manufacturing, is in need of a comprehensive strategy to encompass all services on a platform. Third, the two cases of the government's adoption of blockchain suggest that innovations in blockchain can be facilitated through effective cooperation among government ministries and agencies regarding particular businesses of private sectors.

With the history and legacy of remarkable industrialization, South Korea has the technological foundation and the concrete capabilities (e.g., logistics, personal data) to advance and adopt blockchain technology. Consequently, its policy is not simply to invest in virtual assets but also to develop a virtual-physical world woven by blockchain. The new environment demands South Korea transform its policy stances on blockchain, from specialization to comprehensiveness and cooperation. These are the main lessons of South Korea for other countries adopting blockchain.

Introduction

A wave of blockchain innovation hit South Korea in 2017. Surplus capital flowed into bitcoin as China took action to limit cryptocurrency mining and trading. Soaring investments in bitcoin triggered an emergency declaration in December 2017 among twelve ministries and agencies, including the Ministry of Science and ICT and the Financial Services Commission, which had studied blockchain since 2016. They warned against speculative investments in risky virtual assets and prepared the technology roadmap for blockchain - a pillar of the fourth industrial revolution in 2018. However, their cross-cutting emergency measures did not lead to the articulation of regulations outlining specific taxonomies of virtual assets, as was done in the U.K. and Switzerland.

After playing a critical role in the cryptocurrency market — accounting for 12% of trading volume in December 2017 — South Korea became much quieter in 2018.[1] Many blockchain startups emerged in early 2018 only to fail when the price of bitcoin dropped abruptly in November 2018. It remained doubtful whether blockchain and cryptocurrency could provide relevant business models before the price rebounded in May 2019. South Korea's innovations in blockchain technologies have been relatively stagnant until today. At the same time, there is news of Digital Currency Electronic Payment and the Blockchain Service Network from China and stablecoins and Non-Fungible Tokens from Silicon Valley. What happened to South Korea? Did it miss the opportunity of being the driver of blockchain

innovation after the Bitcoin shock in 2017? Are the institutions and industries going through a calm transition phase of blockchain adoption?

The South Korea Working Group examined blockchain innovation in South Korea with six significant cases. The first two case studies examine the implementation of customer due diligence and travel rules complying with the Financial Action Task Force's (FATF) recommendations, and the innovation for extending virtual assets to the metaverse. The following two case studies examine the R&D status in blockchain programs of the government and the projects in the Busan Regulation-Free Special Zone (RFZ) for Blockchain. Finally, the last two case studies are about applying blockchain to the customs service, implementing a blockchain-based vaccine certification service, and performing R&D for an integrative global decentralized identification service.

South Korea's cases highlight three ambiguous stances on blockchain. The first ambiguity is between finance and industry. South Korea traditionally regulates financial services to stabilize the economy while promoting R&D for its competitiveness. Its policymakers distinguished virtual assets from underlying technologies to fit its regulatory framework instead of embracing both. The second ambiguity is between platforms and products. Blockchain technology provides platforms for data transactions and is likely to interoperate with legacy systems. The final ambiguity is about the government's roles and responsibilities. The vaccine passport case shows the conflict of responsibilities between ministries. Moreover, the Busan RFZ case reveals the susceptibility of regional innovation to the central government's volatility; this is detrimental to blockchain innovation, which requires effective public-private partnership for success.

Government stances towards blockchain are rooted in a legacy of industrialization. South Korea achieved fast-track industrialization, transforming itself from one of the poorest agricultural economies to one of the most industrialized powerhouses in the world. It has become a significant player, overcoming the disadvantages of insufficient resources and small market size with manufacturing innovation, specialization, and globalization. Now, it faces a challenge to upgrade the manufacturing-oriented industries through blockchain. For these reasons, examining South Korea's experience can be helpful to developing countries and manufacturing-oriented countries in preparing for the fourth industrial revolution.

Blockchain and Digital Assets

Anti-Money Laundering and Countering the Financing of Terrorism

Business Registration

The Financial Action Task Force revised its recommendations in October 2018 to impose an obligation for VASPs to prevent money laundering and terrorist financing. Accordingly, South Korea amended the “Act on Reporting and Using Specific Financial Transaction Information.” The Act imposes the obligation for VASPs (exchanges, wallets, and storage service providers) to report to the Korea Financial Intelligence Unit (KoFIU) and to abide by anti-money laundering rules. In addition, VASPs must register their business at the KoFIU, which requires a certificate from the Information Protection Management System (ISMS) and real-name verified accounts by banks.[2]

Significant concerns arose about how to enforce the Act, as there were concerns that only a few VASPs could survive under the Act. Of the 79 domestic VASPs estimated by the Financial Services Commission, only 43 providers received the ISMS certification, according to MSIT.[3] The KoFIU entrusts commercial banks to issue a VASP’s real-name account verification. Still, commercial banks have expressed worries about the risks of financial crimes related to small VASPs.[4] Only four major virtual asset exchanges — Upbit, Bithumb, Coinone, and Korbit — succeeded in signing real-name account contracts with the banks and completed their registration at the KoFIU. The fate of the other VASPs is uncertain. Among the small VASPs in Korea are Jidak, Huobi Korea, and Gopax, which continue to discuss real-name account contracts with commercial banks.[5]

Criticism has also been leveled against the discrepancy between regulation and blockchain. The Act focuses on the regulation of VASPs and investor protection. As a result, the Act is not suitable for VASPs in other fields, such as custody business or lending, nor for promoting industrial development.[6] Therefore, a new approach to virtual assets is needed. But the South Korean government is not active in institutionalizing the virtual asset market, instead taking a reserved stance on DeFi and NFT.[7] On the other hand, the U.S. and the E.U. divide virtual assets into financial investment products and non-financial investment products, with the former regulated by the existing securities law system and the latter controlled by the capital market law system; South Korea also needs standards to classify virtual assets by type.

Customer Due Diligence and Travel Rule

The Financial Action Task Force on Money Laundering (FATF) also recommends VASPs comply with the travel rule, which requires recording the originator and beneficiary's information for a transfer. The Act on Reporting and Using Specific Financial Transaction postponed the enforcement of the travel rule to March 25th, 2022. In line with FATF's Recommendation 16 and its Interpretive Note to Recommendations 15 and 16, the Act requires the beneficiaries of VASPs to record the name and account of the senders and recipients for virtual asset transfers and report it to the KoFIU if necessary.[8]

Due to its anonymity of on-chain transaction data, a VASP identifies its customers with their wallet addresses in wallet-to-wallet transactions. Therefore, the travel rule requires VASP to reconcile the real-name regulation with their trust framework based on the disclosure of transactions between anonymous customers. The exposure of a customer's real name and wallet address allows a surveillance unit to trace all of the customer's transactions. Moreover, VASPs also need to maintain the quality of their services (esp., transferring speed) while complying with the travel rule. Therefore, the VASPs need a standard for travel rule solutions that exchanges the customers' information.[9]

Four major Korean VASPs (Upbit, Bithumb, Coinone, and Korbit) launched a joint venture to develop a travel rule system in June 2021. Furthermore, the Korea Blockchain Association invited KAIST, the Global Blockchain Business Council, and the International Digital Asset Exchange Association to the Task Force for the Global Implementation of Travel Rule Standards (GI-TRUST). The task force addressed the challenges and provided solutions to VASPs in their adoption of travel rule solutions (e.g., OpenVASP, Sygna Bridge, Traveler, and VerifyVASP). They also discussed the standards for travel rule solutions and piloted them in the Korean environment.

The GI-TRUST task force suggests that adopting a travel rule solution requires a consensus among a group of VASPs; interoperability matters between travel rule solutions. For example, some of them abide by the message format standard and translate one message format to another. However, a more vexing challenge is that travel rule solutions involve message exchange protocols and identifying VASPs and customers. Therefore, enforcing the travel rule on virtual assets requires technology standards and the guidance for their safe use by the KoFIU.

DeFi to Metaverse

With the development of metaverse technology, blockchain is gaining renewed attention, as it can enable virtual asset-based economic activities along with gameplay on the metaverse. In particular, NFTs can prove that users can own items within the metaverse platform. This adds permanence to items or goods used in metaverse's economic activities and helps to trade items freely outside the platform. However, the Game Rating and Administration Committee does not allow the release of blockchain games because the virtual assets used within can be freely traded outside the game, creating a risk of being used in gambling.[10]

NFTs also raise copyright issues. The tokenization of creative activities in metaverse means that tokens can become an asset. Therefore, NFTs require a new framework covering the intellectual properties of tokenized characters and protecting joint owners according to their shares. Accordingly, the Ministry of Culture, Sports and Tourism announced its plan to create guidelines for NFT transactions.

The South Korean government expressed its interest in the metaverse, announcing a plan to invest 46.6 trillion won to foster the metaverse industry over the next five years, as part of its "Digital New Deal 2.0". The programs intend to develop open metaverse platforms, produce content, and secure core technologies. The government is also concerned with socio-cultural adverse effects such as crime and moral insensitivity occurring in the metaverse world.

Blockchain Applications to Industries

Governmental Blockchain Program

Various ministries in South Korea have funded 681 projects related to blockchain since 2015 (Figure 1; counting only one for a new project and its successors). Blockchain R&D started with two projects for virtual assets in 2015, which were funded by the Small and Medium Business Administration (Predecessor to the Ministry of SMEs and Startups). The share of funding for virtual assets research decreased to 37.5%, and the scope of research extended to security and data processing in 2016, while the number of blockchain projects increased to sixteen. The trend of quantitative growth and spectrum diversification continued in the following years. Finally, the ministries funded 417 projects with 180 billion KRW (around 160 million USD), and only nine projects (121,274 million KRW) focused on virtual assets in 2020.

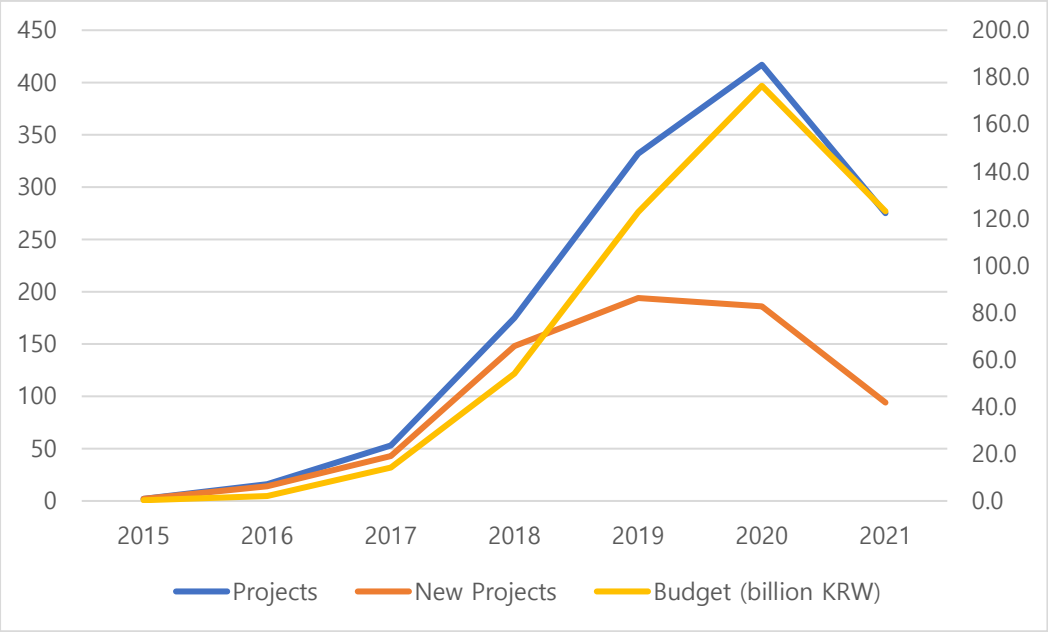


Figure 1. The trend of the number of projects and their budget
(Accessed on August 10th, 2021 from https://www.ntis.go.kr. It does not reflect the last half-year of the government budget.).

MSIT has run the Blockchain Convergence Technology Development Program since 2018. The program supported 58 projects with 29 billion KRW (around 25 million USD). It contributed to the qualitative growth of blockchain innovation, focusing on smart contracts and IoT. Furthermore, the Ministry extended its program to include the data economy. MSIT launched the Program of Blockchain Technology Development for the Data Economy in 2021. It supported four projects with 8.4 billion KRW (around 7.5 million USD) to develop databases and consensus algorithms for blockchain.

The R&D of the MSIT follows the technology roadmap described in the Strategy for Advancing Blockchain Technologies[11] and enters the piloting stage in 2021.[12] It selected fifty-five consortiums (149 companies) for fifteen projects through open competition in 2021. Two of them are for social safety, four for digital identity, two for logistics, and one for sharing economy.

Along with the government's investment, the private sector has steadily developed blockchain technologies. As of August 10th, 2021, the Korea Intellectual Property Office received 3,901 patent applications, and among them, 1,789 were issued. Seven hundred forty-two patents among the remaining 2,112 patents were not granted or expired. Of the issued patents, 188 patents deal with virtual assets, and 1,601 relate to blockchain technologies, such as authentication, security, and data processing. The patent trend also shows that technological innovation focuses on non-virtual assets, although virtual assets might have attracted innovation initially.

	Applied	Granted	Total
Patents related to Virtual Assets	409	188	597
Blockchain Patents not related to Virtual Assets	1703	1601	3304
Total	2112	1789	3901

Table 1. The number of patents on blockchain
(Accessed on August 10th, 2021 from https://www.wipson.com. The Applied patents include inactive patents.).

Busan Regulation-Free Special Zone for Blockchain

In July 2019, the South Korean government established the Regulation-Free Special Zone (RFZ) to implement a regulatory sandbox.[13] The Act on Special Cases Concerning the Regulation of Regulation-Free Special Zones and Special Economic Zones for Specialized Regional Development calls for the following: (1) establishing the RFZ, (2) considering regional governments and private sectors as the subjects of the RFZ, (3) introducing brief examinations for a temporary license, and (4) excluding cases that threaten life, safety, and the environment from regulation-free exceptional cases.[14]

The first round of competition for RFZs ended in July 2019, selecting seven provinces and metropolitan cities, including Busan for Blockchain. During the following round, the Ministry extended the project scope related to blockchain from MyData services to logistics, tourism, public security, and financial services.[15] For example, Busan is currently issuing Dongbaekjeon, a blockchain-based local currency, and experimenting with Security Token Offerings (STO) and Decentralized Identity (DID) through the RFZ. The services could interoperate with Busan's planned virtual asset exchange, which is expected to be launched in early 2023, and support STO, NFT, and DeFi services.

The RFZ for Blockchain implies two political points. First, the RFZ geographically localizes the change in regulations, ensuring the regulatory system can remain stable. However, the commercialization of blockchain also returns economic benefit to other regions. Second, the RFZ allows Busan to make its economy more efficient and harnesses the potential of South Korea; for example, when it connects Busan to Sejong with autonomous vehicles and Daegu with collaborative robots.

The RFZ for Blockchain also has two implications for international financial institutions. The favorable regulations of South Korea provide a well-controlled test bed to gauge the impact of changing rules and technologies. Once the blockchain applications are commercialized and proven to work in the market, they may expand to other economic platforms. This business model is more profitable and is likely to challenge the existing market.

However, the RFZ for Blockchain has Korea's conventional limitations. First of all, the program is susceptible to the government's regime change. The new mayor's cabinet, the central government, and the Busan RFZ organization committee need time to re-align their plans for Busan, Korea, and the blockchain industries, respectively, as the vice-mayor and the mayor resigned successively last year. Furthermore, Busan needs financial incentives to cultivate a sustainable blockchain ecosystem, as financial sources are clustered in Seoul and taxation is the central government's jurisdiction. Dr. Seong Gon Kim, Executive Director of the Korea Blockchain Industry Promotion Association, said, "the Busan RFZ needs a long-term policy with a stable fund basis, including the interoperation of their services with Busan's virtual asset." He stated that Korea could learn from Germany and Switzerland about the cooperation between the state government and the federal government, according to his experiences in the European Blockchain Center as a guest professor.

Sector (Round)	Project	Partners	Concerned Regulations
Logistics (1st Round)	Smart Oceanic Logistic Platform Services on the Ground of Blockchain	BPN Solution; Busan Technopark.	Trucking Transport Business Act; Personal Information Protection Act; Act on the Protection, Use, Etc of Location Information.
Tourism (1st Round)	Smart Tour Platform Services on the Ground of Blockchain	Hyundai Pay; Korea Tour Pass.	Personal Information Protection Act; Electronic Financial Transactions Act; Act on the Protection, Use, Etc of Location Information.
Public Security (1st Round)	Service of Provisioning the Public Security Video on the Ground of Blockchain	Coinplug; Salada.	Personal Information Protection Act; Act on the Protection, Use, Etc of Location Information.
Financial Service (1st Round)	Service for Activating the Regional Economy on the Ground of Electronic Transactions	Busan Bank.	Electronic Financial Transactions Act.
Financial Service (3rd Round)	Real Estate Collective Investment and Gain Sharing Service on the Ground of Blockchain	Sejong Telecom; Igis AM; D.S. Networks AM; B-Brick.	Financial Investment Services and Capital Markets Act; Personal Information Protection Act.
My-Data (3rd Round)	Data Reward and Transaction Service on the Ground of Blockchain	Glosfer; IMR; The Level; Yeolmae Company; Healthcare Data.	Personal Information Protection Act; Act on the Protection, Use, Etc of Location Information; Electronic Financial Transactions Act.

My-Data (3rd Round)	Medical My-Data Non-Face-to-Face Platform Services on the Ground of Blockchain	AI Platform; Sejong Telecom; Jae Young Soft; Pusan National University Hospital.	Medical Service Act; Personal Information Protection Act.

Table 2. Projects Operating on Busan Regulation-Free Special Zone for Blockchain

Blockchain Adoption in Government

The government has examined various public services and blockchain technologies and has supported them for years. The Korea Customs Service tested blockchain for customs in 2020, the first trial in the world. Currently, the government believes that Decentralized Identity (DID) can improve the security of public services, including online voting of the National Election Commission, social welfare management of the Ministry of Health and Welfare, the postal and financial services management of the Korea Post, and the renewable energy transactions of the Ministry of Trade, Industry, and Energy. The Korea Disease Control and Prevention Agency (KDCA) has been implementing a blockchain-based vaccine certification service since April 2021. The report also introduces the Korea Customs Service's (KCS) blockchain for the customs service and the KDCA's blockchain-based vaccine certification.

Blockchain for the Custom Service

The KCS announced in December 2017 that it completed a test of blockchain for export customs clearance after partnering with the Shipping Logistics Blockchain Consortium, made up of thirty-eight organizations, and led by Samsung SDS. Their report describes that if an exporter shares export customs clearance documents in the blockchain network, it becomes impossible to modify them. Therefore, the KCS can operate a simple customs service while maintaining the security, reliability, and accuracy of the information.[16] Afterward, the KCS designed the proof of concept and successfully operated the service on a testbed in October 2020.

However, the project stopped before the commercialization stage. Although in the planning stage, the KCS and the consortium had expected the commercialization in early 2022; the Ministry of Economy and Finance rejected the budget request of the KCS for the R&D because of the practical difficulties in changing the overall information system to accommodate blockchain and a failure of collaboration with the Vietnamese government. In summary, the Korean case contrasts with the later R&D of the Asian Development Bank steadily pursuing their pilot tests.[17]

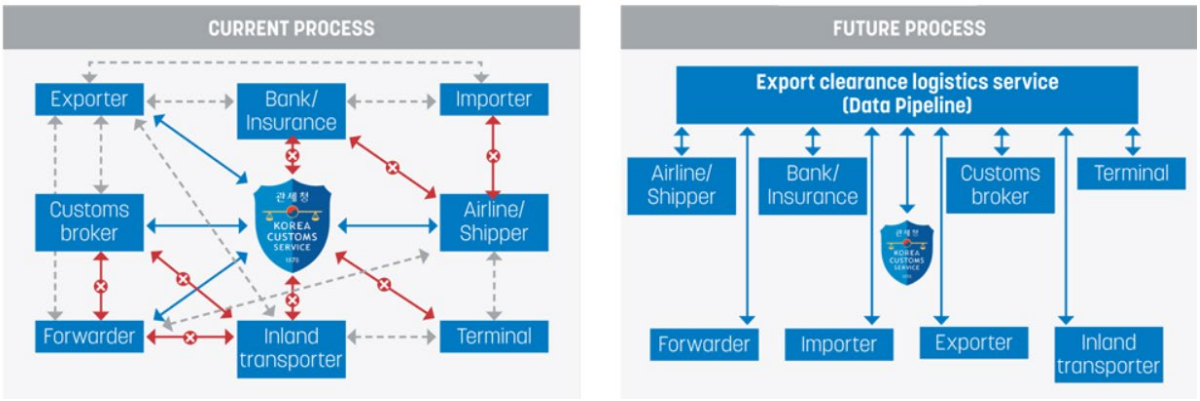


Figure 2. Blockchain-Based Customs Service
(Accessed on August 10th, 2021 from https://mag.wcoomd.org/magazine/wco-news-88/korea-pilots-blockchain-technology-as-it-prepares-for-the-future/)

Blockchain for Vaccine Passport

Blockchain Labs provided its blockchain-based DID technology to the KDCA, after which KDCA released an electronic vaccination certification application, COOV, in April 2021. Two million people downloaded it in June 2021. The application confirms vaccination history without directly disclosing personal information. However, if necessary, it may be selected to include personal information when displaying a QR code. In addition, its blockchain infrastructure combines a public blockchain's versatility and a private blockchain's advantage in privacy.[18]

On the other hand, the Korea Internet & Security Agency (KISA), an agency of the Ministry of Science and ICT, selected the DID Alliance consortium as a preferred bidder for the vaccine passport project through competition in April 2021. It was supposed to provide blockchain-based identification technologies for vaccine certificates. However, KISA's plan hit a roadblock because the KDCA supported COOV as the only vaccine certificate service in Korea.[19] COOV will interoperate with various public and commercial services (e.g., welfare cards for the disabled and financial recognition payment); however, the extension of services from the vaccine certificate will stop if KISA rejects the Information Security Management System request of a COOV-related business. Government ministries should cooperate and develop joint standards for a vaccine passport.[20]

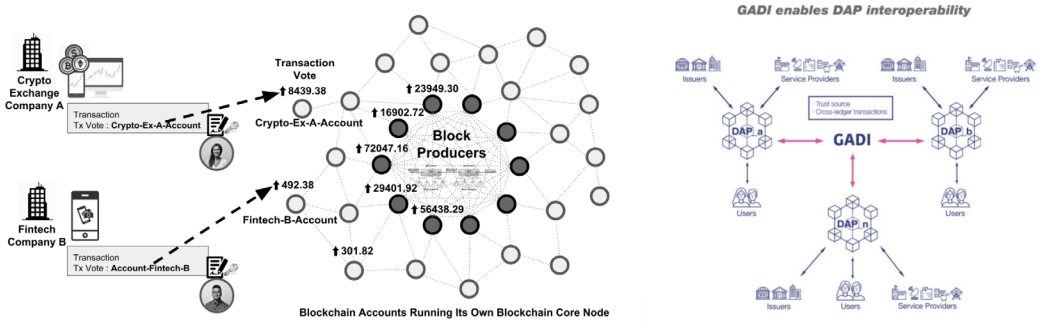


Figure 3. Conceptual diagram of blockchain of the Blockchain Labs' infrastructure (Left) and the DID Alliance's GADI (Right) (Accessed on September 25th, 2021 from https://infrablockchain.com/ko/technology/ and https://www.didalliance.or.kr/content.php?catcode=11120000)

Blockchain Binds What the World Divided

Blockchain has a thousand faces. Blockchain supports the automation of various transaction services (e.g., virtual assets, supply chains, identification). The various facets of blockchain demand new approaches to blockchain development, commercialization, and interoperation.[21] South Korea's case study highlights three issues unique to blockchain. First, blockchain complicates policy responses, forcing regulators and legislators to balance restriction, promotion, and intervention Second, the business ecosystem of interoperating blockchain systems requires strategic branches to application and platform development. Third, blockchain regulations necessitate a new division of responsibilities among the government ministries.

Blockchain: Finance or Industry?

South Korea distinguishes the financial function of blockchain from its non-financial parts. On the one hand, the government of South Korea has modified its regulations for blockchain-based virtual assets in compliance with the recommendations of the G20 and the Financial Action Task Force. As the Amendment of the Act on Reporting and Using Specific Financial Transaction Information states, four of seventy-nine VASPs registered at the KoFIU on September 25th, 2021 to cooperate with AML/KYC/CFT rules. The remaining VASPs provided only virtual asset services or stopped their businesses due to the lack of regulatory requirements of the ISMS certification and real-name bank accounts.

On the other hand, the government and private sector endeavor to promote blockchain. First, the Ministry of Science and ICT has invested 0.4 billion USD in research and development for four years since 2018. Second, enterprises actively invented technologies related to virtual assets, identification, supply chain, and data processing with blockchain. Third, the public and private sectors continue to cooperate in commercializing blockchain.

South Korea does not officially separate virtual assets from blockchain technologies. However, the government's division of roles leads to approaching blockchain from different stances. The Financial Services Commission (FSC) deals with the financial aspect of blockchain, the Ministry of Science and ICT manages the technology component, and the Ministry of SMEs and Startups (MSS) oversees entrepreneurship related to blockchain. Although the FSC has faithfully institutionalized blockchain regulations in compliance with the G20 and FATF, it has so far included no blockchain companies in its financial regulatory sandbox. Additionally, MSS cannot provide financial support for VASPs integrating funding into their business. There are no virtual asset services in Busan Regulation-Free Special Zone for Blockchain. Moreover, the government's R&D programs intend to develop advanced security and data storage technologies instead of promoting 'services', such as virtual assets for real estate. Therefore, only nine projects deal with virtual assets among the total 438 projects since 2015. South Korea seems to regulate virtual assets and promote blockchain technologies.

Blockchain: Product or Platform?

Creating a robust blockchain ecosystem does not just require simple development of blockchain use cases, but also demands a comprehensive framework including virtual asset services. South Korea has accumulated experience in manufacturing and contributed strategically to certain products in the global market. For example, Samsung and SK Hynix provided more than 70% of memory chips to the world in the first quarter of 2021.[22] Its achievements in high-end IT manufacturing are a result of accumulated time in the global market of home appliances.[23] Furthermore, South Korea's ICT manufacturing support capabilities make it a large player in smartphone market. However, it lacks global experience in leading platform businesses, such as operating systems and CPUs of personal computers and smartphones. For South Korea to adopt blockchain and become a leading player in the global platform competition, it requires the utilization of accumulated knowledge.

South Korea provides best practices for government-industry collaboration in decentralized identification. For example, the Busan Regulation-Free Special Zone for Blockchain contains seven pilot projects in this area; however, if it develops technologies for each use case and business model, integrating them into a business ecosystem will also be challenging. The Ministry of Science and ICT recognizes the platform feature of blockchain. Their technology roadmap to blockchain society emphasizes providing blockchain as a platform to transform seven pillars: financial services, real estate transactions, postal services, voting, donation, social welfare, and renewable energy.

Blockchain: One of the Ministries or Cross-Ministries?

Ministries of South Korea divided their roles related to blockchain after their joint announcement regarding the excessive investment in Bitcoin in December 2017. For example, the Financial Services Commission regulates virtual assets, the Ministry of SMEs and Startups promotes grassroots industries, and the Ministry of Science and ICT cultivates technologies.

Although dividing roles and responsibilities is the government's typical behavior, blockchain needs a cooperative approach by sharing a grand vision. The Korea Customs Service's case shows the problem in the conventional procurement system; blockchain for customs services requires planning the digital transformation of the information systems for customs, domestic supply chains, and global trade, whose roles span across the agencies of the Ministry of Economy and Finance, including the Korea Customs Service, and those of partner countries. Its pilot may have been more impactful if it had consulted a global organization like the World Economic Forum.

Furthermore, the vaccine certification cases show that blockchain is likely to provoke conflict among ministries. For example, the Korea Disease Control and Preventing Agency (DCPA) adopted a blockchain-based vaccine certification system, COOV, in April 2021. Vaccine certification is a primary service of the global DID system that the Ministry of Science and ICT is developing in collaboration with the DID Alliance led by SK Telecom. However, the DCPA has little incentive to provide its vaccination information to the MSIT consortium. Similar conflicts will occur with the Ministry of the Interior and Safety if the global DID system includes criminal records and the Ministry of Justice if the system links to the immigration information.

Finally, the Busan Regulation Free Special Zone for Blockchain case obscures the division of ministries in Korea. The Busan RFZ does not invite conglomerates with manufacturing facilities and communication infrastructure, as the Ministry of SMEs and Startups supports the program. The municipality requires a costly negotiation with the central government (esp., the Financial Services Commission) to interoperate their businesses in the regulatory sandbox with its virtual assets and incentivize the participation of enterprises in their business ecosystem. Creating a blockchain ecosystem in a local city calls for the cooperation among ministries under a comprehensive, long-term vision.

Conclusion

South Korea has achieved remarkable growth in the last 60 years, rising from the ashes of the war into one of the most vibrant economies in the world. The country imports natural resources such as oil and minerals to process them for export. Moreover, it exports cars, ships, semiconductor devices, and smartphones. South Korea internally has an advanced value network and innovation system, and externally made up 3.0% of world trade volume (9^{th} largest) in 2020.

The tradition of its industrialization, accumulated through time, is the strength of South Korea. Its culture is focused on advancing blockchain technologies and developing business models for various domains other than financial services and virtual assets. In other words, blockchain innovation in South Korea is likely to be bound with real world assets such as logistics, real estate, personal data, and identification. Furthermore, it is in an excellent position to disseminate blockchain innovation through trading partnerships.

However, these strengths can also resist blockchain adoption. Most of all, South Korea has specialized its competence into a few parts (e.g., DRAM, smartphone devices) in compliance with global platforms such as IBM's framework and Google's Android. Specialization in worldwide value chains might be its best strategy to survive its lack of natural resources and insufficient domestic market and lead the global economy. South Korea needs a well-designed strategy from a comprehensive viewpoint and a cooperative stance to lead a specific part of the blockchain ecosystem.

Endnotes

ADB. *Blockchain Technology for Paperless Trade Facilitation in Maldives*. October 2020 (https://www.adb.org/publications/blockchain-technology-paperless-trade-facilitation-maldives).

Alsop, T. “DRAM manufacturers revenue share worldwide from 2011 to 2021, by quarter,” STATISTA 2021.05.12. (https://www.statista.com/statistics/271726/global-market-share-held-by-dram-chip-vendors-since-2010/).

Blockchain Labs. “PASS INFRA: Blockchain-Based COVID-19 Vaccination Verification & Management System,” 2021.02.28.(https://ncv.kdca.go.kr/menu.es?mid=a12509000000).

Chairman of the Trade, Industry, Energy, SMEs, and Startups Committee. 2018. “Bill on the Wholly Amendment of the Act on Special Cases Concerning the Special Economic Zones for Specialized Regional Development,” National Assembly, Act No. 15705, September 20th, 2018.

Cheng, E. and Ming, C. “Bitcoin briefly falls 11% after South Korea moves to ban new cryptocurrency trading accounts,” CNBC 2027.12.28 (https://www.cnbc.com/2017/12/28/bitcoin-drops-11-percent-as-south-korea-moves-to-regulate-cryptocurrency-trading.html).

Cusumano, M.A., Yoffie, D.B., and Gawer, A. “The future of platforms,” *MIT Sloan Management Review* 61 (3): 46-54, 2020.

National Assembly of Korea. “Act on Reporting and Using Specific Financial Transaction Information,” No.17299, Amended on 2020.05.19., Enforced on 2020.05.20.

FSC. “[Public Release] As a result of a full investigation of the collection account of VASPs, 14 disguised accounts were found” Press Release of the FSC, 2021.07.28 (https://www.fsc.go.kr/no010101/76312?).

Han, M.-J. 2020. “Current Status of the Designating the Third Round of Regulation-Free Special Zones,” Press Release of Busan Metropolitan City Hall, 2020.07.06. (Accessed on August 28th, 2020: http://www.busan.go.kr/nbtnewsBU/1443413?curPage=&srchBeginDt=&srchEndDt=&srchKey=sj&srchText=).

Kim, D. “The next generation of rising star, blockchain for the game companies… According to government regulations, they sigh,” *Newdaily News,* 2021.04.19 (http://biz.newdaily.co.kr/site/data/html/2021/04/19/2021041900101.html)

Kim, T. “The act on reporting and using specified financial transaction information specializes only in ‘exchange regulations’… Impairs the virtual asset industry,” *I News,* 2021.08.12 (http://www.inews24.com/view/1395891)

KCS. *Korea Customs Completed the World’s First Blockchain-based Export Customs Clearance Service Technology Verification*. 2017.12.21 (https://eiec.kdi.re.kr/policy/materialView.do?num=172512)

Kwon, D. “[Special Article] DeFi and NFT’s innovation and regulation,” *Decenter News,* 2021.07.06 (https://decenter.kr/NewsView/22OT2TCZ4V)

Lee, G. “What is Travel Rule? … Another hand that holds back the exchanges,” *Bloter News,* 2021.08.23 (https://www.bloter.net/newsView/blt202108200013)

Lee, G., et al. “Blockchain-based vaccine passport is made by SKT… It is scheduled to be issued by Jupy,” *Bizchosun News,* 2021.03.31 (https://biz.chosun.com/site/data/html_dir/2021/03/31/2021033102140.html)

Lee, J.D., et al. Time of Accumulation: Made in Korea, Suggestions for the Future of Korea. Knowledge Nomad, Seoul, South Korea, 2015.

Lee, S. “The core summary of the act on reporting and using specified financial transaction information that shook the coin market,” *Nate News,* 2021.08.11 (https://news.nate.com/view/20210810n38625)

Lim, M. “Starting to standardize digital vaccine passports… Does it become DID killer app?,” *Ajunews,*

2021.08.14 (https://www.ajunews.com/view/20210814022626597)Ministry of SMEs and Startups. 2019_03. “Designating as Regulation-Free Special Zones,” Public Notice of the Ministry of SMEs and Startups, No. 2019-41, 2019.08.09 (Written in Korean).

MSS. Nodate. Regulation-Free Special Zone (Written in Korean, Accessed on August 28th, 2020: https://rfz.go.kr).

Moon, J. “Four major virtual asset exchanges survive: Small and medium-sized exchanges such as Gdac, Huobi Korea, and Gopax are struggling,” *Consumer News*, 2019.09.17 (https://consumernews.co.kr/news/articleView.html?idxno=635642).

MSIT. “Blockchain Technology Development Strategy Implementing a Reliable Fourth Industrial Revolution,” Policy Information of the Ministry of Science and ICT, 2018.06. (http://www.msip.go.kr/web/msipContents/contents.do?mId=NzM=)

MSIT. “Incorporating blockchain into our lives: Ministry of Science and ICT planning in full-scale promotion of 15 blockchain pilot projects in 2021,” Press Release of the Ministry of Science and ICT, 2021.05.27 (https://www.msit.go.kr/bbs/view.do?%20sCode=user&mId=113&mPid=112&pageIndex=&bbsSeqNo=94&nttSeqNo=3180285&searchOpt=ALL&searchTxt=).

WEF. *Bridging the Governance Gap: Interoperability for Blockchain and Legacy Systems*. White Paper of World Economic Forum, 2020.12.09.

WEF. *Inclusive Deployment of Blockchain for Supply Chains: Part 6 – A Framework for Blockchain Interoperability*. White Paper of World Economic Forum, 2020.04.09.

---

[1] https://www.cnbc.com/2017/12/28/bitcoin-drops-11-percent-as-south-korea-moves-to-regulate-cryptocurrency-trading.html

[2] National Assembly of Korea. “Act on Reporting and Using Specific Financial Transaction Information,” No.17299, Amended on 2020.05.19., Enforced on 2020.05.20.

[3] https://www.fsc.go.kr/no010101/76312?

[4] https://news.nate.com/view/20210810n38625

[5] https://consumernews.co.kr/news/articleView.html?idxno=635642

[6] http://www.inews24.com/view/1395891

[7] https://decenter.kr/NewsView/22OT2TCZ4V

[8] National Assembly of Korea. “Act on Reporting and Using Specific Financial Transaction Information,” No.17299, Amended on 2020.05.19., Enforced on 2020.05.20.

[9] https://www.bloter.net/newsView/blt202108200013

[10] http://biz.newdaily.co.kr/site/data/html/2021/04/19/2021041900101.html

[11] http://www.msip.go.kr/web/msipContents/contents.do?mId=NzM=

[12] https://www.msit.go.kr/bbs/view.do?%20sCode=user&mId=113&mPid=112&pageIndex=&bbsSeqNo=94&nttSeqNo=3180285&searchOpt=ALL&searchTxt

[13] https://rfz.go.kr

[14] Chairman of the Trade, Industry, Energy, SMEs, and Startups Committee. 2018. “Bill on the Wholly Amendment of the Act on Special Cases Concerning the Special Economic Zones for Specialized Regional Development,” National Assembly, Act No. 15705, September 20th, 2018.

[15] http://www.busan.go.kr/nbtnewsBU/1443413?curPage=&srchBeginDt=&srchEndDt=&srchKey=sj&srchTex

[16] https://eiec.kdi.re.kr/policy/materialView.do?num=172512

[17] https://www.adb.org/publications/blockchain-technology-paperless-trade-facilitation-maldives

[18] https://ncv.kdca.go.kr/menu.es?mid=a12509000000

[19] https://biz.chosun.com/site/data/html_dir/2021/03/31/2021033102140.html

[20] https://www.ajunews.com/view/20210814022626597

[21] WEF. Bridging the Governance Gap: Interoperability for Blockchain and Legacy Systems. White Paper of World Economic Forum, 2020.12.09.

[22] https://www.statista.com/statistics/271726/global-market-share-held-by-dram-chip-vendors-since-2010/

[23] Lee, J.D., et al. Time of Accumulation: Made in Korea, Suggestions for the Future of Korea. Table 2.