Establishing the Foundation
for the Web 3 Age

「Blockchain Industry Promotion Strategy」

November 2022

Jointly by relevant ministries

Progress of pursuing policies for establishing blockchain industry promotion strategies

☐ **Presentation of policies related to blockchain in the past**

○ Jun. ’18: Announced 「Blockchain technology development strategy(Ministry of Science and ICT)」

○ Jun. ’20: Announced 「Blockchain technology diffusion strategy(jointly by relevant agencies)」

○ May ’21: Announced 「Virtual asset transaction management plans (jointly by relevant agencies)」

☐ **Operation of group for establishing strategies**

○ Apr. ’21 ~ Oct. ’21: **Blockchain working group meeting within the new industry strategy support TF** (3 times in all)

◇ **(Attendance)** Relevant agencies such as the Ministry of Science and ICT and Ministry of Economics and Finance, relevant institutes (KISA, NIPA), private sector experts, etc.

◇ **(Discussed items)** Finding services that citizens can feel and areas for mediation between agencies, etc.

○ Jun. ’21~Oct. ’22: Operation of **blockchain strategy working-level TF** (20 times in all)

◇ **(Attendance)** Ministry of Science and ICT and relevant institutes (KISA, NIPA, IITP, ETRI, TTA), etc.

◇ **(Discussed items)** Plans for drafting detailed strategies for promoting the blockchain industry

○ May ’21~Jul. ’22: **Blockchain corporate briefing and on-site visits** (9 times)

◇ **(Attendance)** Ministry of Science and ICT, KISA, platform/IT/communication companies, blockchain technology companies, private sector experts, etc.

◇ **(Discussed items)** △Insufficient basis for the blockchain industrial ecosystem △difficulties in finding service models, △Legal and system issues △insufficient experts, and other on-site opinions

○ Jun., Dec. ’21: **Web 3 and NFT**-related advisory meetings (2 times)

◇ **(Attendance)** Ministry of Science and ICT, KISA, ETRI academic and industry experts, etc.

◇ **(Discussed items)** △Share trends of Web 3 △Find new businesses and additional tasks

○ Jun. ’21~Nov. ’22: **Blockchain legal system regulation improvement finding** meeting (8 times)

◇ **(Attendance)** Ministry of Science and ICT, NIPA, KISA, legal and judiciary experts, etc.

◇ **(Discussed items)** △Plans for finding tasks for regulatory improvements based on demand △ Receive opinions from experts related to laws

◇ **Following the blockchain technology development (‘18) and expansion (‘20) strategy, established the ‘blockchain industry promotion strategy’ so that blockchain can become the core infrastructure for the age of Web 3**

Contents

Ⅰ. Background

☐ Start of the Digital Age of Discovery and Rise of Web 3

○ In the **15th century**, the **demand for spices** that took Europe by storm interlocked with the **development of shipbuilding/navigation technologies** to set off a period where humanity made huge strides during the **"Age of Exploration"**

○ In today's **21st century**, the **boom in digital demand** due to the COVID-19 pandemic was combined with **key technologies** of the fourth industrial revolution such as **AI, data, and blockchain**,

- The **"Digital Age of Exploration" dawned** toward the **new continent** with **new industries and technologies** that can determine whether it will be possible to attain **technological hegemony in the future**

○ In light of the **global great transition period**, the Internet is **evolving** from Web 2.0 to **Web 3.0** in order to **reflect new technologies as well as a changed way of living***

* (Life) Requiring contact-free reliability, (Production) Expanded digital ownership, (Consumption) Increased customized service demand, etc.

- If **Web 2.0** was a service that **promoted opening, sharing, and communication** between users by turning knowledge possessed by individuals into **data and contents**,

- **Web 3 selects and provides** customized **knowledge focusing on individual** as a **future-oriented service that will be configured through the metaverse based on blockchain**

* Recently, "Tim Berners-Lee," the founder of WWW, **mentioned the difference between the "Web 3" wherein individuals possess data** and the **"Web 3.0"** that **provides customized knowledge** (Nov. '22), but **it is being used without differentiation in the market**

<Evolution to Web 3 and generation categorization>

Category	Web 1.0	Web 2.0	Web 3
Features	Information provided in **one direction**	Information provided in **two directions**	**Customized** information provided
	Search	Open, share, communication	**Compensation, ownership, decentralization**
Major Service	Search portal Google YAHOO!	Platform, YouTube, social media, etc. YouTube	Metaverse, NFT, decentralized app (Dapp), etc. brave Roblox

☞ **Web 3 mitigates the issues of Web 2.0*, and it is worth paying attention to as a land of opportunity that can create new industries in a more open, fair environment**

* Platform companies using user data to expand market dominance and gaining monopoly that interferes with competition

☐ Global attention being focused on Web 3

○ Web 3 is still in its **infancy stage**, but the **ripple effects of changes are expected to be huge; hence the heightened domestic and foreign interest*** **in finding new cash crops**

* The Web 3 startup "Mysten Labs" attracted approximately 36 million USD in investments from VC including Samsung Next

- Web 3 is used by users **possessing and managing their own data** to **prove value by receiving economic compensation, etc.**

○ This is expected to serve as a **catalyst for new industrial growth** that **overcomes the limitations of restricted consumer experience and development*** in existing platform ecosystems

* In Web 2.0, consumer experiences are restricted to the provided platform or app ecosystem, and the developer must carry out development work considering each operating device or platform; thus having limitations in growth

☐ Trusted technologies of the age of Web 3, rediscovery of blockchain

○ In addition to the **metaverse** (metaverse new industry leading strategy, Jan. '22), blockchain is **once again drawing attention as a key technology** that can **concretize the vision of Web 3***

* In **Web 3**, **blockchain** acts as the **transparent and reliable framework** through data decentralization; the **metaverse** is in charge of the **Web 3 service configuration form,** and **NFT** is in charge of the **value compensation system**

World's message on blockchain

· "**We are interested in blockchain in relation to Web 3 and it is a very interesting and amazing technology**" (Sundar Pichai, current Alphabet & Google CEO/Feb. '22)

· "Blockchain and smart contracts have **huge potential for constructing a new business model**" (Eric Schmidt, former Google CEO/Dec. '21)

· "Blockchain is a **very important technology for realizing digital benefits** for growth, welfare, etc." (OECD/May '20)

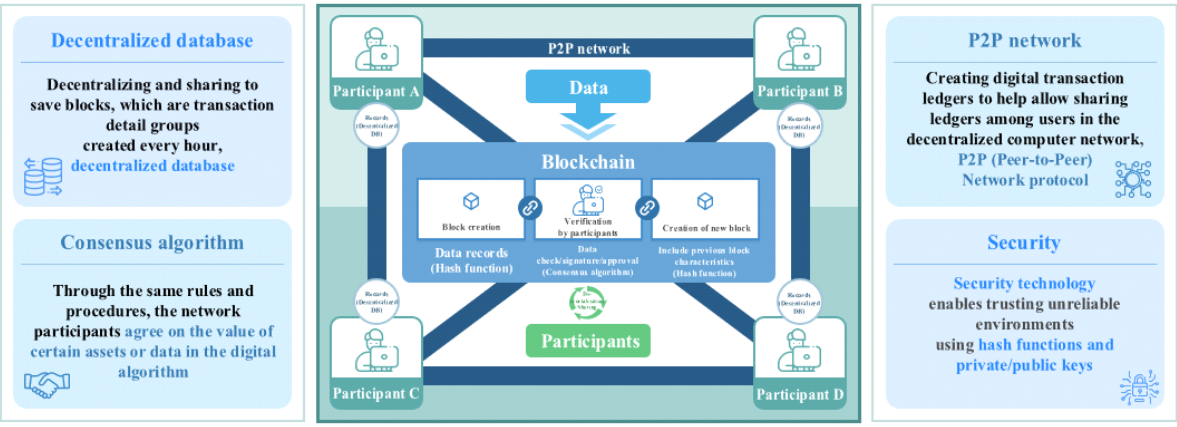
○ The government has been focusing on **forming the initial market of blockchain technologies**, but now **a new response to the trends of such technologies and markets is needed**

☞ **It is time to inspect the environmental changes and achievements and pursue redesigning policies so that blockchain can become established as the core infrastructure for the age of Web 3**

(Note 1) Concept and value of blockchain

☐ **(Concept) Digital ledger that safely shares by decentralizing** series of data blocks connected in a chain structure for participants using encryption technologies

<Blockchain structure and technology concept schematic diagram>



☐ **(Value) Technology that can prevent data from being forged/fabricated** by a few people because all participants save and share blocks containing data

○ Expected to **improve accessibility among contracting parties based on digital trust** and allow **transparent and consistent data transmission and management**, so it expected to not only find use **as the core basis for Web 3** but also **promote various new digital industries**

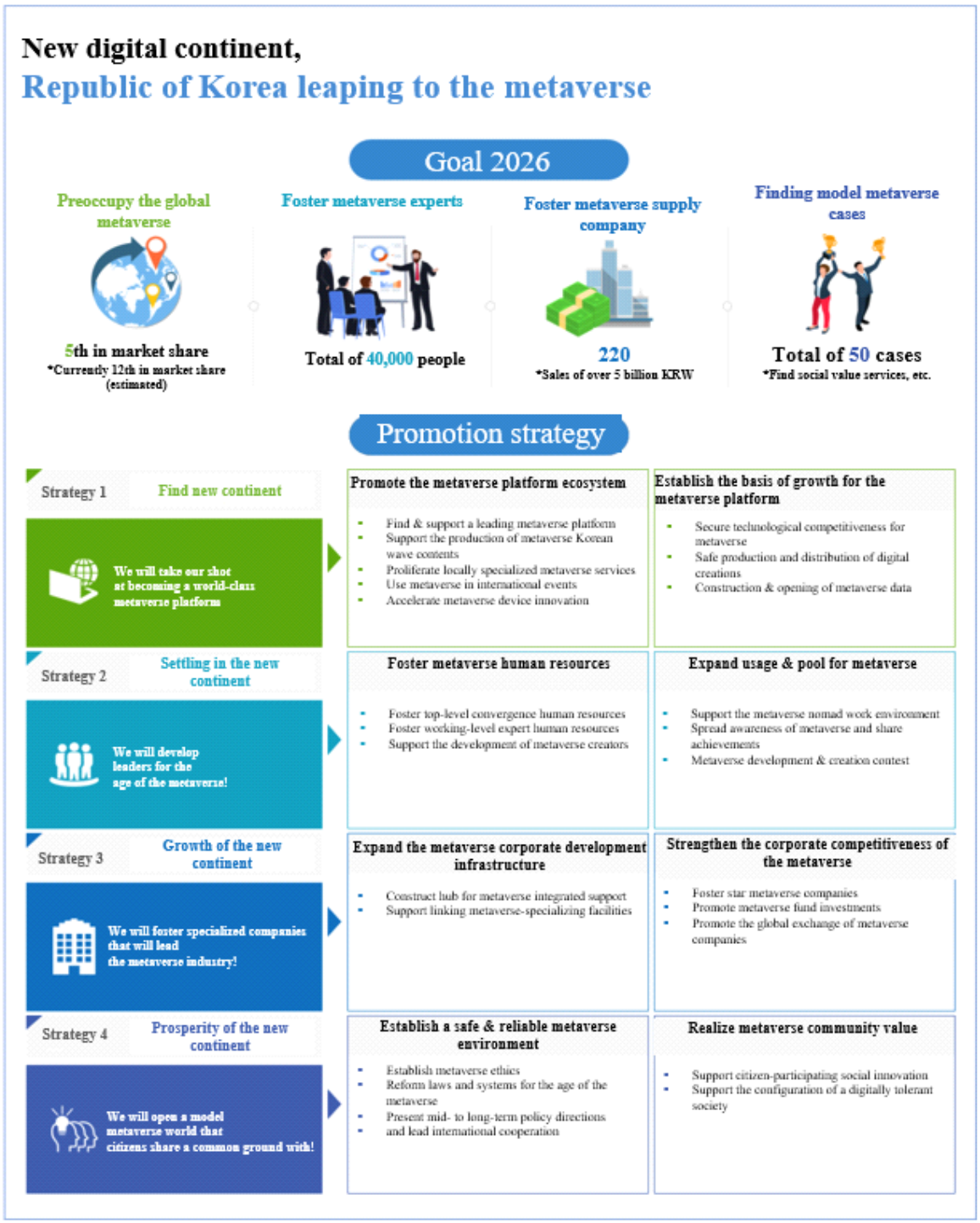
<New types that appeared based on blockchain (examples)>

· **NFT** (Non Fungible Token)
 · Technology(token) that gives **digital signature with ownership of digital files** such as digital art, collectibles, music, video, etc. to **certify ownership** of the owner, and which allows anyone to know the **ownership transfer route**
· **DID** (Decentralized IDentity)
 · **Digital identification system** wherein the user **selects only the information needed for authentication and provides it to the verification institute** in case of a need for authentication identity or qualification, which can **strengthen the protection of personal information**
· **CBDC** (Central Bank Digital Currency)
 · **Digital currency produced, issued, and distributed by central banks** of each country, and which can make offline payments, inter-nation remittances, purchase digital assets, etc. using mobile devices

(Note 2) Metaverse new industry leading strategy (Jan. '22)

○ Announced strategy to **search for new channels for economic growth in Korea** and to **configure a desirable metaverse society** using the economic and social changes to be brought about by the metaverse

<Main contents>



Ⅱ. Domestic and Overseas Environmental Changes

<Overview>

◇ Blockchain appeared as a technology that advocates **'decentralization'** that makes the existing **centralized Internet replaceable in a safer direction**

○ Since the **appearance of virtual assets** such as Bitcoin, there has been a **tendency for interest and discussions** to be focused less on its technological value and more on its nature as **virtual assets**

◇ With the **environmental changes and technological development, nations and global companies have gained interest in the various application services of blockchain aside from its value as virtual assets**

○ In particular, **awareness is gradually rising with Internet innovation trends toward Web 3** and the **appearance of NFTs**

1 National and social trends

□ Spreading globally as private and government sectors lead industrial promotion together

○ Since `20, **various application fields based on blockchain such as NFT and CBDC have been rising quickly,** and **discussions are being held actively in each nation and society**

○ While there are differences in detailed strategies and situations between nations, **government roles are being strengthened to foster technologies and industries related to blockchain and to preoccupy the market**

- **(USA)** The **private sector is leading the expansion of the ecosystem**; recently, **the federal government has been moving in earnest to secure global leadership in digital assets and CBDC**

US	· **(Technological development) Private foundations (Ethereum, Linux), venture capital companies, and global companies are leading development**
	· **(Establishing the basis) The federal government is searching for digital asset policies and pursuing full-fledged CBDC research*** to maintain currency leadership in the **digital finance system** as well * Announced the United States' first "administrative order on digital asset development strategies" (Mar. '22)
	· **(Establishment of regulations)** Expand **legislation activities** for **securing competitiveness in blockchain*** * Blockchain Innovation Act passed the US Congress (Jun. '21), California enacted the Digital Financial Asset Act (Jun. '22), New York announced the guidelines for Stable Coin business (Jun. '22)
	· **(Securing human resources)** Fierce competition in the **private sector to recruit human resources*** for the digital asset and blockchain technologies * Severe difficulties in finding personnel for existing big tech companies (Amazon, Google, MS, etc.) due to the growth of the blockchain-oriented industry (Apr. '22)
	· **(Expanded utilization)** The National Association of Realtors **announced plans for using blockchain in the real estate industry** (Mar. '22)

- **(Europe)** Constructed the "**Europe Blockchain Service Infrastructure** (EBSI)" with the goal of leading the global blockchain market, aiming to establish a **pan-European blockchain technology/industry ecosystem**

 **EU**	· **(Technological development)** Continuously expanding **research and innovation investments*** such as preparing technology-centered initiatives, Green New Deal, expansion of application innovations for solving social issues * Invested budget of about 20 billion KRW to find multi-national projects based on the EBSI ('22)
	· **(Establishing the basis) Secured blockchain infrastructure (EBSI) for all of Europe led by the public sector***, secured interoperability between blockchains and between blockchain-existing system, and strengthened standardization activities * **(Goal)** Secure key standards for Europe's digital infrastructure and provide blockchain-based public services **(Entity) European blockchain partnership** of the European Commission (joined by 29 countries) **(Status)** Completed construction of **38 nodes** and currently in operation all around Europe (Dec '21)
	· **(Establishment of regulations)** Announced the **electronic Identification, Authentication, and Trust System (eIDAS 2.0)** (Jun. '21)* that newly established a digital identity wallet system in Europe and also took into account the regulatory framework on digital assets (MiCA) (Jun. '22) * **Established the European Digital Wallet Consortium** joined by multiple countries to achieve eIDAS2.0 (May '22)
	· **(Expanded utilization) The implementation and utilization of blockchain are being expanded in the public sector** such as cross-border document notarization, diploma certification, identity authentication, data sharing, etc. (May '22)

- **(China)** Solidifying **technological and industrial leadership focusing on the state-led blockchain infrastructure (BSN)** that secured global **interoperability**, looking to **lead the market**

 **China**	· **(Technological development) Convergence with next-generation technologies*** such as **blockchain**, big data, etc., and expansion of application range * Make a world-class ecosystem for Chinese blockchain by '30 (Jun. '21, Xinhua News Korean version)
	· **(Establishing the basis)** Secure public-private linked scalability through **reinforced interoperability and standardization** based on **state-led global blockchain infrastructure (BSN)*** * **(Goal)** Construct a global digital payment system, construct an overseas blockchain network, and publicize technologies **(Entity)** State and private businesses participate centering on the Chinese national information center **(Status)** ① Enterprise BSN: In order to provide a blockchain-based environment (IDC, cloud, etc.) secure 1119 nodes around the world (Jul. '22) and then apply in about 40 public services ② BSN Spartan: Provide non-cryptocurrency public blockchain network (Sep. '22)
	· **(Foster industry)** Select **blockchain** as one of the **seven core industries of the digital economy** to provide **full support** * Present road map with the goal of increasing industry-contributing additional value by more than 10% of the GDP by selecting cloud, IoT, blockchain, AI, etc. (Mar. '21, Chinese economic industry news brief)
	· **(Expand utilization) Increasing utilization fields throughout society such as** real estate registries, agricultural product history tracking, procurement bidding, copyright protection, electronic contracts, medicine and health, etc. (Jul. '22)

2 Industry/service trends

☐ Blockchain that started as security technologies now being utilized for a greater diversity of services

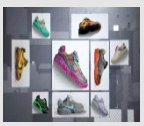
○ The efforts of companies that are looking to go beyond application in existing business fields and to **acquire innovative application cases** is now being **visualized into the formation of new ecosystems**

○ In addition to **global big tech companies** in the ICT sector, **various industries** including fashion and entertainment **are looking into using and implementing blockchain services**

- **(ICT) Making efforts to expand business fields** through **integration/convergence with existing services** such as blockchain-based cloud service (BaaS), DID, etc.

Amazon Managed Blockchain	· **(Amazon)** Provide blockchain-based service "**Amazon QLDB**" and "**Amazon Managed Blockchain**" · **(Google)** Composed **personnel and organization dedicated to blockchain technologies** (Jan. '22) · **(Microsoft)** Launching and official operation of the decentralized identity (DID) technology "ION"

- **(Fashion) Issue NFT directly** or **use for authentication and ownership certification** through **startup acquisition or cooperation in the industry**

	· **(Nike)** Acquired blockchain-based "Cryptokicks" patent and unveiled the **first virtual sneakers "Nike Dunk Genesis" after acquiring the NFT startup "RTFKT"** (Apr. '22)
AURA	· **(LVMH, Prada, Cartier)** Organized the **blockchain consortium "Aura"** for luxury brands, which is joined by **about 20 luxury brands to date**, and registered over **10,000 products** (May '22)

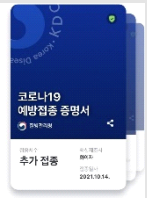
- **(Games, Entertainment) Stage of pioneering new markets such as NFT issuance/transaction services through P2E (Play to Earn) games** and cooperation with sports organizations, but **side effects are occurring**

AXIE INFINITY	· **(Sky Mavis)** Launched the NFT game **"Axie Infinity"** and became a **unicorn company** posting more than 4 trillion KRW in total revenue; due to **bridge network hacks** for linking with other virtual assets, however, **damages of about 700 billion KRW occurred** (Mar. '22)
NBA TOP SHOT	· **(Dapper Labs)** Launched the "NBA Top Shot" service that **issues NBA game highlight videos as NFTs**, exceeded 1 trillion KRW in total sales, sixth in collectible NFT sales (Jul. '22)

3 Domestic trends

☐ (Public) Advent of public services for all citizens and new markets

○ **Pursuing the spread of various services of blockchain technologies** through the **substantiation of government service fields** such as vaccination certificates



· **(Vaccination certification)** The **COVID-19 vaccination certification app COOV** that applied DID technologies has been downloaded more than 16 million times since its release (’21 government innovation excellence award)

· **(Mobile identification) Began mobile driver’s license service in earnest** (Jul. ’22)

○ In the financial sector, the Bank of Korea completed **CBDC trial tests*** (Aug. `21~Jun. `22) and also activated the **domestic issuance and transaction of NFTs****

* The Bank of Korea completed CBDC trial tests and collaborated with financial institutes to **perform additional tests** (Nov. ’22)

** Three NFT works titled "Space" by painter Kim Whan-ki were sold for a total of 737 million KRW (Mar. ‘22)

☐ (Industry) The ecosystem centered on SMEs is expanding with the positive participation of conglomerates

○ From the **focus on application service development** mainly with early technologies and venture companies, platform and IT companies as well as **large companies in manufacturing and distribution began participation** (Note 3)

- **Some are establishing departments or subsidiaries dedicated to blockchain,** and others are **increasing the relevant investments** through MOU, etc.

※ Shinhan Financial Investment established the "Blockchain Department" (Jul. ’22), and CJ OliveNetworks established the "NFT Lab" (Jan. ‘21), etc.

- **Blockchain is being integrated in various services,** and **platform services with proprietary technologies*** are being developed in each field

* Aergo Enterprise (Blocko), Loopchain (Icon-Loop), Klaytn (Kakao), Nexledger (Samsung SDS), etc.

○ However, there are no **institutionalized laws or systems** in the blockchain sector such as NFT and DID; therefore, **corporate positions are unstable** for those developing and participating in services

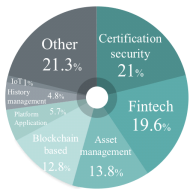
☐ (Technology) There is a gap with advanced countries in terms of technological levels, and momentum is needed to narrow it

○ **(Technological gap) The technological gap for blockchain with advanced countries is being narrowed by investing in R&D and obtaining empirical examples*, but there is still a disparity**

※ Technological gap compared to US (100%) ('18) 80.8% (2.3 years) → ('19) 83.4% (1.9 years) → **('20) 85.6% (1.6 years)**

○ **(Patents) Although there has been a stark rise in patent applications related to blockchain in Korea**, most are related to **application technologies* such as certification security and fintech**

* Order in certification Security > Fintech > Asset management > Foundational technologies (Jul '20, Intellectual Property Office)



Blockchain patent ratio

○ **(Standard) Blockchain platforms are being developed** per entity, but there is no separate standard, and there are limitations in the **interoperability of blockchain services**

4 Future outlook

☐ Expected to be used as the economic and social trust basis of the age of Web 3

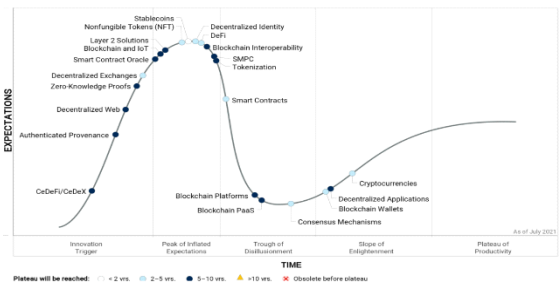
○ Whereas early application cases had the **goal of checking the effectiveness of implementing blockchain**, in the future, **development is expected** to go in the direction of preparing for **Web 3 and metaverse society**

- It will be used **for convergence with other technologies, and the provision of global services** and the **service ripple effect will be expanded even further**,
- Derivative technologies such as **NFT·DID** are **expected to expand its field** as technologies that can **guarantee trust in economic and social relations of the upcoming age of Web 3**

<Gartner's blockchain technology outlook (`21)**>**

▲ **(Growth-Positive)** Online transaction frequency and items expanded due to the increase of contact-free transactions with COVID-19, **and this will lead to growth in the blockchain market as well**

▲ **(Key growth sector-Application innovation service** Various application innovations based on smart contracts and innovation services such as DeFi·DID **will have an impact on the entire society**



(Hype Cycle for Blockchain, `21)

(Note 3) Key status related to blockchain of Korean companies

☐ In addition to companies specializing in blockchain, **the service ecosystem is expanding** to various industrial sectors such as **platform, communication/IT, game/entertainment, finance, and manufacturing companies**

○ **(Platform)** Attempt to expand the global blockchain service ecosystem based on the company's platform through blockchain development fund investments, development of Dapp, launching NFT services, etc.

Corporate	Main contents
Kakao	· **Established growth fund worth 300 million USD**, focusing on expanding the global blockchain service ecosystem and NFT projects through role adjustments among subsidiaries
Line	· Integrated blockchain into its platform through a blockchain subsidiary to expand its **ecosystem**, **launched the NFT publishing platform "DOSI" targeting 180 countries around the world**

○ **(Communication/IT)** In addition to services that integrated blockchain technologies in existing services such as local currency, electronic documents, logistics, etc., also entering businesses related to NFTs

Corporate	Main contents
KT	· Launched the **NFT platform "MINCL"** and sales in the blockchain sector **increased by about 7 times compared to the previous year** through local-currency issuing services, etc.
SKT	· Introduced an **NFT marketplace** in its metaverse platform "**Ifland**", Offers curation -type **NFT marketplace "TopPort" service**
LG U+	· Using Klaytn, issued its character "**Moono" NFT** and entered **the community-type NFT market**
LG CNS	· Using services such as **public, finance, and digital certification through "Mona Chain,"** which is a corporate enterprise blockchain platform for authorization based on Hyperledger fabric
Samsung SDS	· Offers the corporate enterprise integrated blockchain platform "**Nexledger Universal**" and blockchain performance reinforcement solution "**Nexledger Accelerator**"

○ **(Game/Entertainment)** Pursuing the construction of platform for game/sports-related transaction using blockchain and digital goods manufacturing/distribution/transaction platform

Corporate	Main contents
Com2uS	· **Launched NFT-based games** (Nov. `22) using its **own main net, trades contents NFTs** in web novels and webtoons by operating an **NFT marketplace**
Hybe, SM	· Pursuing the **construction of NFT-based digital goods manufacturing, distribution, and transaction platform** using their K-pop stars
Dunamu	· Collaborating with KBO to **produce NFTs of domestic professional baseball players and key moments during games**, which are being sold to baseball fans

○ **(Finance, securities)** Participation of financial institutes in the private sector in CBDC trial tests, also expanding business with NFT services and virtual asset consignment services, etc.

Corporate	Main contents
Woori Bank	· In addition to the **technological verification of the CBDC trial system**, constructing a blockchain platform that can also be used in the NFT issuance, remittance, and payment as well
Shinhan Bank	· Trial test related to **CBDC utilization** and constructed **platform**, joined the **NFT association "Grid"** together with Shinhan Card, Shinhan Financial Investment, and other subsidiaries

○ **(Manufacturing)** Convergence and integration of blockchain (NFT, etc.) in its existing products, or searching for ways to pioneer new markets beyond its existing business areas

Corporate	Main contents
Samsung Electronics	· Plans to **install an NFT platform** that allows purchasing contents and conveniently watching them on the **TV** for the first time in the world, **increasing investments in NFT companies**
LG Electronics	· Announced plans to apply the **NFT-based artwork trading platform** in the TV to be released later through collaboration with artists
Hyosung	· Operating the NFT marketplace for **checking copyrights and tracking illegally distributed contents** using NFTs by establishing a subsidiary

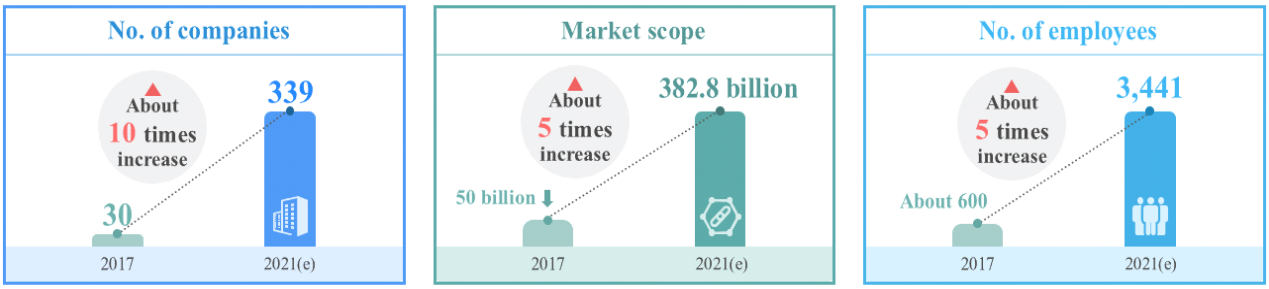
○ **(Distribution)** While issuing NFTs linked to actual items or membership benefits, use for enhancing the reliability of the distribution process, checking authenticity, preventing resale of stolen products, etc.

Corporate	Main contents
CJ Logistics	· Collaborated with CJ OliveNetworks to construct **a "blockchain medicine logistics system"** that safely manages data in the **manufacturing, logistics, and distribution** process of medicines
Hyundai Department Store	· Added the electronic wallet (H.NFT) service that can save and manage NFTs issued by Hyundai Department Store in the Hyundai Department Store Group's **integrated membership service**
Lotte Home Shopping	· Issued 10,000 "Bellygom NFTs" that offer **benefits to NFT owners** by customer level and opened "NFT Shop" in the mobile shopping app
CU	· Collaborated with the NFT artist "LayLay' to hold events of giving **digital art NFTs to customers**
LG Household and Health Care	· Pursuing NFT businesses that **sell character NFTs with cosmetic products** by creating a universe using the cosmetic product brands
Shinsegae	· Issued **10,000 "Puuvilla NFTs"** linked with the benefits of using the department store, provides **digital luxury brand guarantee services** based on blockchain

Ⅲ. Past Policy Achievements and Future Promotion Direction

☐ Achievements ▶ Contribute to finding services and developing technologies for the initial market formation

○ Since `17, there has been a **large increase in the number of companies, market scope, number of employees, etc.,** and government support has had a **positive effect on the formation of the early blockchain market**



- The government **enhanced competitiveness** through the **"technology development strategy"** in `18, and it is looking to **find services** such as DID through the **"technology proliferation strategy"** of `20

<Government efforts for the development of blockchain>

Finding services	· Established blockchain-based **electronic wallets for soldiers and carried out a total of 58 pilot services for work innovation and for finding outstanding cases** in the public and private sectors such as **donation platforms** (`18~)	
Technology development	· **Developed** 15 performance improvement technology tasks of blockchain and 9 platforms per industry **such as high-volume data distribution technologies, webtoon contents settlement monitoring platforms, etc.** (`18~`21)	
Corporate fostering	· 32 cases of blockchain **convergence technology and service technology verification** in various sectors such as medicine, marine, trading, etc. and supported **30 consulting cases** that led to **15 cases of attracting investments and 16 cases of commercialization**(`19~)	
Designation of special district	·**Since designation of blockchain special district**(Aug. `19), created 233 jobs, applied for 36 patents, raised 12.3 billion KRW in investments, and applied 18 special regulatory examples (`19~)	

○ Blockchain is attracting attention with **DID in `20** and **NFTs in '21**, and it is a field characterized by market **creation/expansion continuing every year*** compared to other technologies,

* Before `17, virtual assets (coins)▶`17~18 ICO▶`20 DID▶`21 NFT▶`22 and later Web 3

- It is now time for the government to **support the business efforts and investments of the private sector** in order to respond actively to the **rapid changes in trends** led by the private sector

☐ Future directions ▶ Form ecosystem that can preemptively respond to changes

○ **For the promotion and global leadership of the blockchain sector** that is continuously experiencing **rapid growth,** it is **imperative to respond rapidly to the changing environments, technologies, and markets**

- Furthermore, it is necessary to respond to new blockchain **utilization sectors and service demands** such as **NFTs that have become a pillar of the digital market economy**

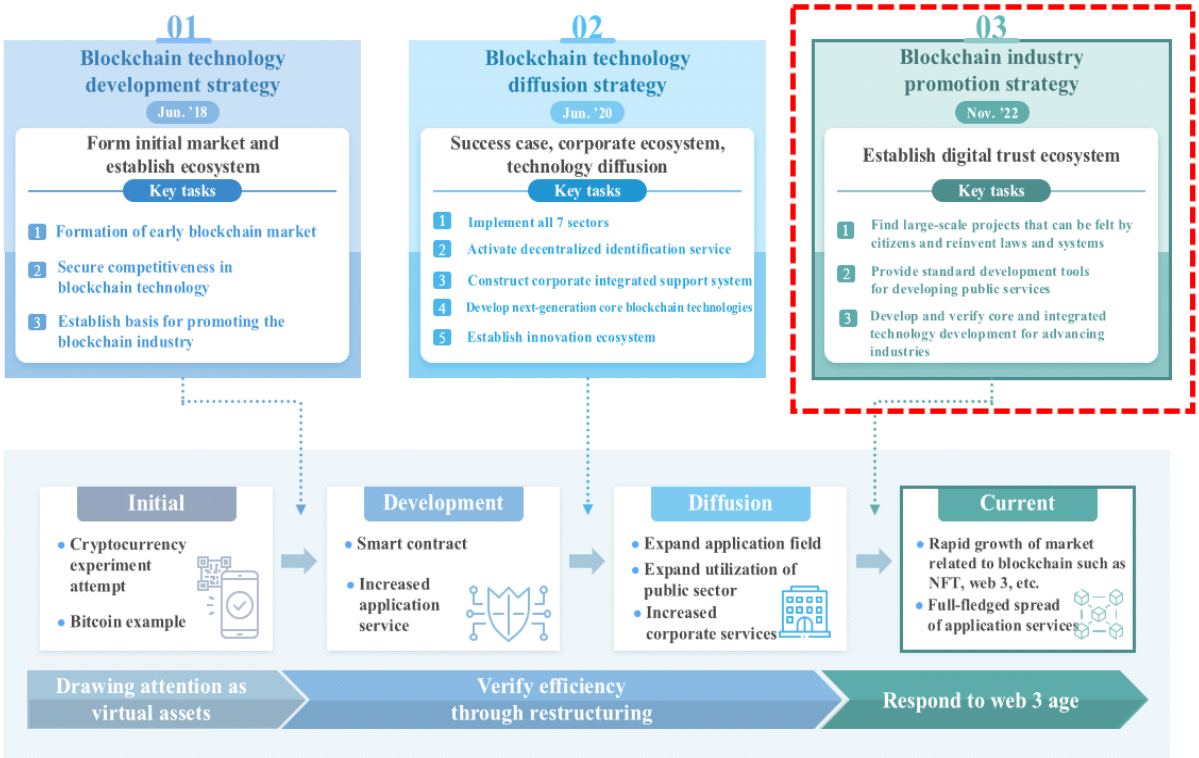
▶ The government plans to establish a **strong, flexible private-sector ecosystem that can respond to the changes and demands** of the blockchain sector, which is a **core infrastructure for the upcoming age of Web 3**

❶ **Implement large-scale services that allows** citizens to **feel blockchain in everyday life,** and **present directions for making improvements to regulations** that interfere with growth in order to **establish an active ecosystem**

❷ Introduce **common standard/development tools** for **blockchain-based public services** for more **efficient public service development** and **inter-service data linking support**

❸ Develop **core technologies that can overcome the limitations of blockchain** such as speed and data capacity and **develop convergence technologies to find new industries and thereby reduce the technological gaps with leading countries**

<(Note) Blockchain strategy and role of the government>



Ⅳ. Vision and Goal

Fostering the new web 3 era and the blockchain industry
to establish digital trust ecosystem

Goals

Blockchain supply company
339 → 500

Strengthen industrial ecosystem basis

Blockchain revenue
382.8 billion → 1.2 trillion

Achieve market activation

Blockchain technology level
85.6% → 93%

Secure technological competitiveness

Promotion strategy

1. Find large-scale projects that can be felt by citizens and reinvent laws and regulations
2. Provide standard development tools for developing public services
3. Develop and verify core technologies for industry development

8 major promotion tasks

01 Find large-scale projects that can be felt by citizens
02 Establish NFT regulatory innovation road map
03 Reform laws and systems related to blockchain
04 Construct blockchain trust framework (K-BTF)
05 Support finding and spreading innovation services based on K-BTF
06 Development of blockchain core/integrated technologies
07 Construct basis for blockchain technology verification based on regions
08 Foster company-customized practical/core blockchain personnel

Ⅴ. Focus Promotion Tasks

1. Find large-scale projects that can be felt by citizens and reform laws and systems

01 Find large-scale projects that can be felt by citizens
02 Establish NFT regulatory innovation road map
03 Revise blockchain-related laws and systems

1 Find large-scale projects that can be felt by citizens ('23-)

◇ **(Status) Various pilot services were discovered in many areas and small scales for the formation of the early blockchain market**, but **advanced support is needed for companies** that are now in orbit

▶ **(Promotion direction) Established an innovative support system** such as pursuing **large-scale projects** that can be felt by citizens to **pursue the systematic growth of blockchain companies and expand the relevant industries throughout society**

☐ **Revision of support system for finding blockchain services that can be felt by citizens**

① **(Finding innovative services) Shift support from services for forming the initial market to mid- and large-sized projects for finding services that can be felt by citizens**

- **Expand the budget per support project** and **reduce the total number of projects** to **focus on finding services with high ripple effects**,
- Revise the existing "**blockchain pilot project**" (small-scale) to "**blockchain focus project**" (large-scale) to **find services that can be felt** like mobile driver's licenses
  · **(Expanding projects)** Select **fields** that can maximize the effectiveness, ripple effects, etc. of **blockchain technologies** for **full-fledged implementation and expansion support**

<'22 blockchain expansion project task (example)>

· **(Focus project** (large-scale project)**) Large-scale projects** for **finding innovative services in the everyday life of citizens** through the **participation and cooperation of multiple institutes**

<Large-scale projects felt by citizens (plans, see 4 for details)>

- **[Resident voting] Blockchain-based online voting for participation by residents**

  - In preparation for full-fledged online (resident) voting, use blockchain technologies to construct a large-scale online voting system that guarantees secret votes and reinforces anonymity and verifiability

- **[Education history] Realized blockchain-based "digital badges"**

  - Construct a platform that can save and certify the history information of private and public SW education institutes as badges in individual digital wallets

- **[Welfare benefits] Construct system for linking and managing official support funds**

  - Construct a linking/management system to prevent fraudulent reception, over-payment, and erroneous payment so that citizens can take advantage of official support funds efficiently

② **(Improve the universal support system) Improve the universal support system** to enhance **service perfection** by **utilizing capacities regardless of the general environment of companies**

- **(Expand period) Allow up to 10 months for the service development and testing period of participating companies,** which used to be 5-6 months through early notifications, etc.
- **(Commercialization support) Organize and operate a full-time expert consulting group to develop into fixed commercialized models** after a company develops services

③ **(Problem-solving support)** In addition to the existing integrated consulting*, **newly pursue one-point consulting that solves issues** occurring in the **service development and commercialization process**

* Business model development and advancement consulting for companies and institutes that require the application of blockchain technologies (`19~)

④ **(Expand national participation)** In order to have **citizens directly feel the achievements of blockchain projects** and to allow the proposal of **service demand**, pursue the **participation of the "national participating group"** (blockchain experience group) throughout the **project life cycle** (selection-development-substantiation)

- The "**national participating group**" ❶**directly votes** for projects planned by the public and private sectors, and ❷**presents opinions for improvements** after experiencing the service during **development**,
- ❸**Construct citizen-led return system** for spreading the achievements such as **promoting user reviews** and **presenting new service opinions** during the **substantiation** process

※ Scheduled to give awards and hold contents to encourage presenting good opinions in each process (tentative)

(Note 4) Key tasks of large-scale projects felt by citizens (tentative)

Key task ❶ Blockchain online voting for resident participation
(National Election Commission, `23~)

□ **(Background)** Applying blockchain in the existing system **(K-Voting)** to **increase reliability and verify the voting results for the online voting process and vote-counting results**

○ In particular, due to the recent revision of laws,* **electronic resident voting has become possible**, and the need for a system to accept **small-scale (party/school)** and **large-scale (city, province) online voting** has emerged

* Enacted revised resident voting laws that allows voting and counting using electronic methods during resident votes (Oct. '22)

□ **(Main contents)** In preparation for online (resident) voting, construct a **large-scale online voting system that ensures secret votes and improves anonymity and verifiability** using blockchain technologies

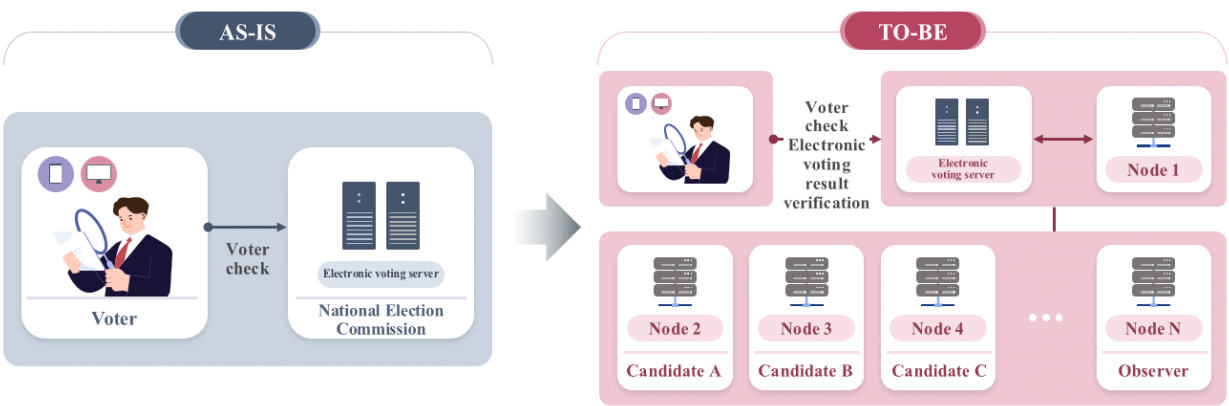
○ **(Expanded infrastructure) In preparation for large-scale online voting** such as resident votes for local governments **(10 million voters)**, **expanding blockchain infrastructure** to **secure performance**

○ **(Introduction of new authentication method)** In cooperation with the Ministry of Interior and Safety, introduced a **method** for **certifying the voter** using blockchain-based **mobile driver's license**

○ **(Strengthened security system) Advance the voting/counting encryption/decryption system** and reinforce the **security system** that ensures the **safe storage and usage of secret information**

<Comparison of past online voting system and blockchain-based online voting system>

Category	Past online voting system	Blockchain-based online voting system
Data saving	√ Vote/count information saved only in the central server	√ Vote/count information saved in the central server and multiple nodes
Trust-based	√ Ensure reliability based on the central trusted institute (National Election Commission)	√ Secure reliability through blockchain that saves vote/count information with the same number of multiple nodes
Verification	√ Voters cannot directly check vote count results	√ Candidates, observers, etc. can verify the vote count results



Key task❷ Configure blockchain-based digital badge

(Ministry of Education, Ministry of Employment and Labor, etc., `23~)

☐ **(Background)** When becoming employed, citizens have to **be issued certificates** (education, licenses, etc.) **at each institute that issues education and qualification certificates to prove their qualification**

○ **A system that simply and comprehensively manages all software education history and qualification information possessed by multiple institutes, allowing users to manage them easily in "badges," was needed**

☐ **(Main contents)** Construct a **platform** that allows saving and certifying the **history information** of public/private SW education institutes in private **digital wallets** as **digital badges***

* Possible to show acquisition of qualifications in the user profile in the metaverse, social media, job websites, etc.

○ (Education institute) Reliable public and private **SW education institute lists are managed** through the platform, and **digital badges** (completion, licenses, etc.) **can be issued conveniently**

○ **(User)** Spur the completion of SW education such as **stimulating the desire to gain more digital badges** and **recommend customized lectures per level to provide** user experiences of developing in different stages

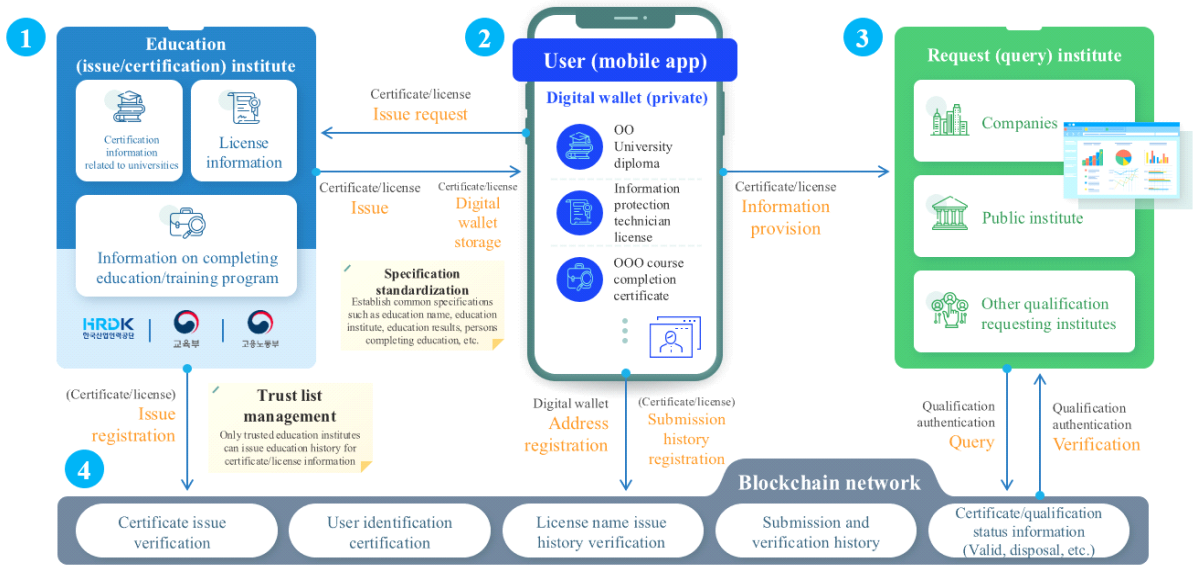
○ **(Requesting institute) Establish a verification system for one-stop verification** using the platform for the user's digital badge ownership and issuance by education institutes

○ **(Platform) Construct a platform and establish standards for badges** to link with existing platforms and have badges issued in private digital wallets

<Blockchain-based digital badge platform construction (tentative)>

Stage 1 (establish plans)	Stage 2 (construction)	Stage 3 (expansion)
Establish digital badge universal standards and trusted educational institute list	Public sector digital badge platform construction	Link with private sector and expand in earnest

[Participating institutes] Government agencies (Ministry of Education, Ministry of Employment and Labor, Ministry of Science and ICT, etc.), educational institutes (universities, lifelong education institutes, etc.), private institutes (specialized educational institutes, etc.)



Key task ❸ Construct official support fund linking and management system (relevant agencies, local governments, `24~)

☐ **(Background) Offering various official support funds** such as welfare and unemployment pay, disaster support funds etc. in order to ensure the **basic livelihoods of citizens** due to difficult situations such as COVID-19 and to support small business owners

○ However, there are **inefficiencies and fraudulent reception issues*** caused by **fragmented data management** among the institutes in charge of the many official support fund projects and between institutes and local governments

* Over the past 2 years, "58 trillion" KRW in COVID-19 subsidies, **insufficient follow-up management for fraudulent reception** (Jun. '22, Munhwa Ilbo)

○ Currently, a **blockchain-based fraudulent reception prevention system is** implemented and used in some welfare payment (asset forming, medical expense, child care expenses, etc.) support projects; in the future, it is necessary to **expand this system to a wide range of official support fund projects**

☐ **(Main contents) Construct a management system** to **prevent fraudulent reception, excessive payment, erroneous payment, etc.** so that more **citizens** can efficiently take advantage of the support benefits without duplications

○ **(Preventing fraudulent reception) Prevent duplicated support, omissions, etc.** by **saving/sharing** official support fund **reception eligibility and history information** in **blockchain** that are being managed by institutes and local governments

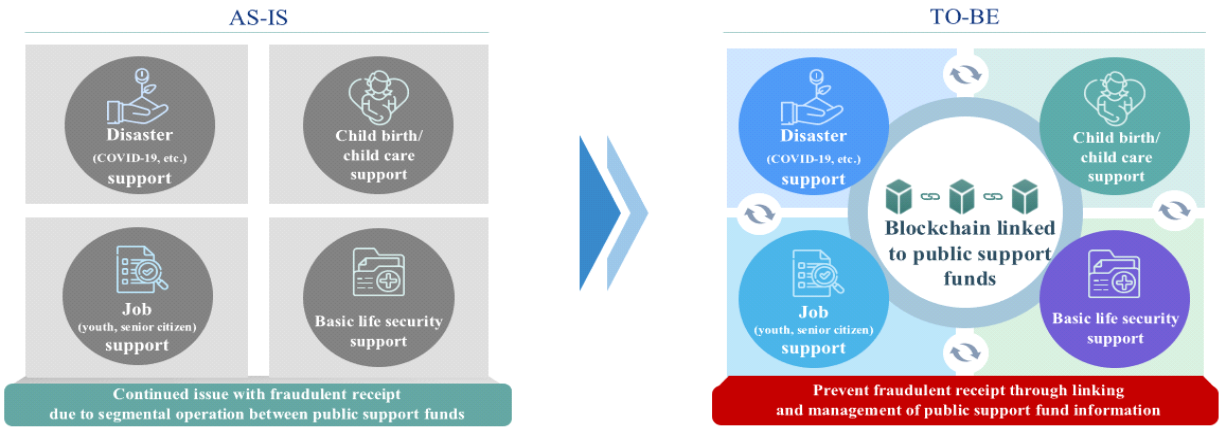
○ **(Statistics and monitoring)** Convenient **operational management support** such as **reception data** (no. of queries, no. of overlapping cases, estimated amount of prevented duplicates, etc.) **statistics and monitoring** of official support funds

☐ **(Promotion schedule)** Based on the '23 operation results of the **`22 blockchain-based fraudulent reception prevention project, additional verifications in `24** will be made to **expand the applicable range to central and local governments** as needed to manage official support fund projects efficiently (`25, tentative)

* Child care support project integrated management platform (Ministry of Health and Welfare, Ministry of Gender Equality and Family, Ministry of Education, `22)

※ Scheduled to pursue project after implementing K-BTF in '25 to construct an integrated system that can be joined by various institutes

<Blockchain-based official support fund linking and management system schematic diagram (example)>



☐ Pursuing pioneering of global blockchain market

◇ **(Status)** Due to domestic **regulations**, blockchain companies are **releasing services targeting overseas markets**, but they are experiencing difficulties due to **hardships in those countries***

* Lack of and collision with local market laws and systems (24.1%), insufficient funds to enter foreign markets (2.19%), insufficient market information (21.4%) (`21 status survey)

▶ **(Direction)** Hold **global blockchain and NFT cooperation forums** and support **marketing and consulting to enter foreign markets** to **provide a bridgehead for entering foreign markets** for outstanding Korean products and services

○ **(Technology cooperation forum) Discuss mutual cooperation plans** for discussing **inter-nation blockchain and NFT** policies and market status, discussions to promote the industry, personnel exchange/joint cooperation projects*, etc.

* Pursuing blockchain-based pilot public services through cooperation between domestic blockchain companies and state agencies of the respective countries and between ICT and SW companies

- Hold **detailed discussions on plans for constructing the ecosystem** for blockchain and NFT industries to enter foreign markets to **come up with detailed cooperation projects between nations** and **promote business exchange in the private sector** joined by global companies

○ **(Global market consulting) Pursue mutual consulting*** such as **customized regulatory response and establishment of market strategies for the respective country** for companies entering overseas blockchain and NFT markets

* Exchange consulting support with Korean government agencies providing support for foreign companies hoping to enter the Korean market and applicable government providing support for Korean companies entering their country

- Pursue consulting support such as **legal systems, prospective services, market entry strategies,** etc. in Korea or applicable country for **companies wishing to enter foreign markets**

○ **(Global marketing) Support overseas marketing** such as **exhibitions, road shows, investment company seminars** (IR), etc. of prominent domestic blockchain, NFT products, and services

- **Support participation in exhibition events* and road shows** in countries for the recruited companies after identifying the industrial fields to be entered through **prior demand surveys**

* Berlin Blockchain Week (Germany), The Global NFT Summit (UK), Blockchain Expo 2022 (UK)

- Domestic selected company matching, hosting of investment company seminars in applicable countries, etc. to support **domestic/foreign blockchain and NFT company cooperation and investments**

2 Establish NFT regulatory innovation road map (`23)

◇ **(Status) Use of NFT is expanding** in various sectors, but due to the **institutional uncertainties** such as legal characteristics of NFT, **companies are having difficulties in pursuing business and forming a safe market**

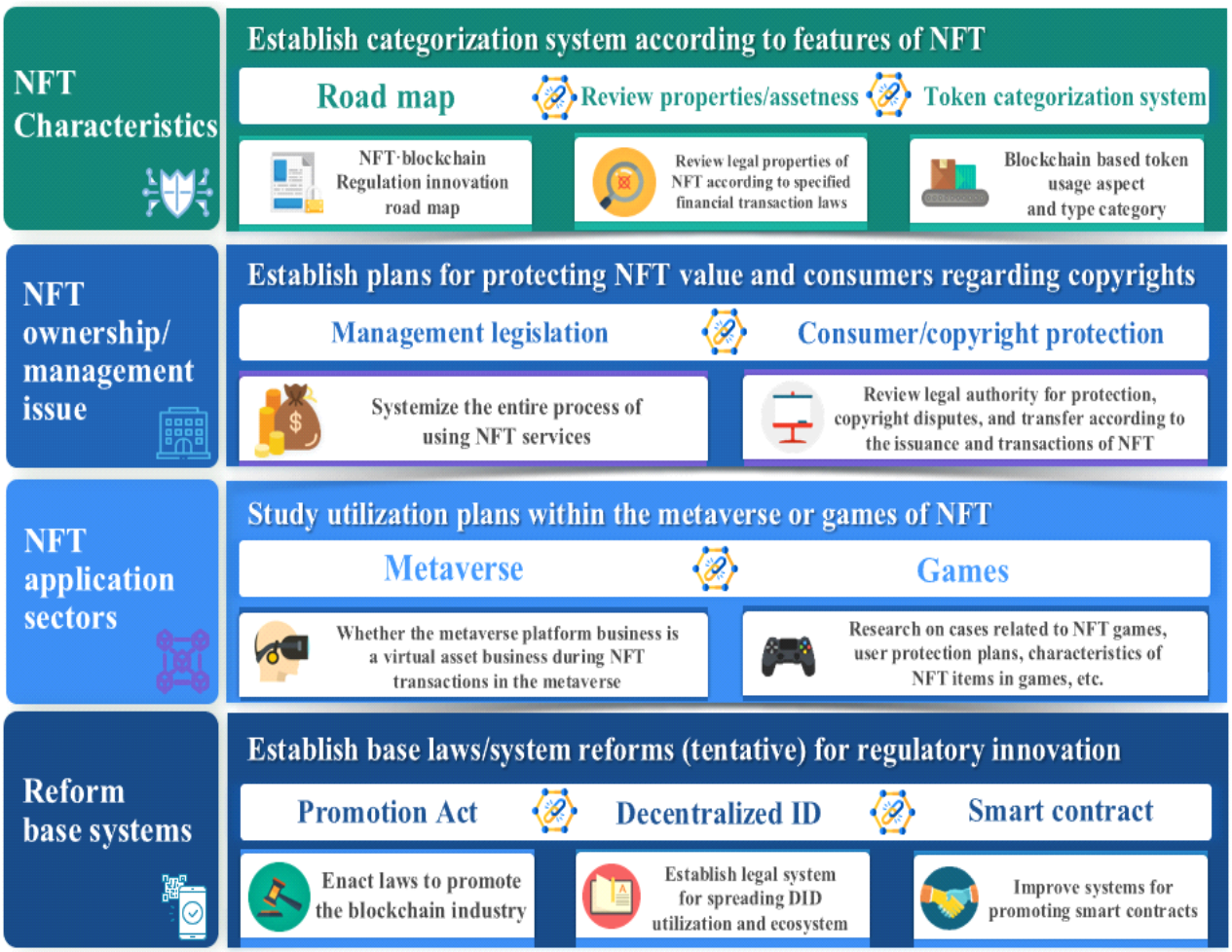
▶ **(Directions)** Establish a **"regulatory innovation road map"** in cooperation with the **Office of Government Policy Coordination and relevant agencies** that oversee the regulatory innovations so that NFT can function based on **institutional stability**

○ **(Overview) Blueprints for improving the system** to support **the safe use of blockchain for NFT and companies to enter the relevant sectors**

○ **(Contents)** Make the **entire process of utilization transparent** by **maintaining laws and systems needed in the market** such as reviewing the legal characteristics of NFT, consumer protection plans, etc.,

- **Address other institutional issues regarding blockchain** such as **spread of application services, DID,** smart contracts, etc. represented by the metaverse and games

<NFT regulation innovation road map (tentative)>



1 NFT's legal characteristics

◇ **(Status)** The **legal characteristics of NFT such as its definition and value as assets, etc. are not yet established** and therefore, it is causing many confusions in pursuing businesses by companies such as speculativeness, taxes, reporting duties, etc. when using games

▶ **(Directions) Clearly and transparently define and provide the possibility of companies engaging in business using tokens** for not only NFTs but also vouchers and STO, etc. by **establishing a classification system for each token**

○ **(Characteristic review)** Pursue **comprehensive research and review** on the NFT's **legal characteristics and whether NFT corresponds to virtual assets**

○ **(Review of classification system, etc.) Pursue the establishment of a regulatory system that meets international standards** by **categorizing blockchain including NFT-based tokens per usage type and category***

* **(Example) Categorize** as **exchange trading-type tokens** as a medium for exchange, **service-type token** as usage rights for products and services, and **securities-type tokens** that correspond to securities according to the Capital Market Act, thereby falling under the laws of the Capital Market Act

2 NFT ownership, management, and concretization and protection of rights

◇ **(Status) Consumers incurring damages** due to **lack of legal grounds that can prove the value of NFTs** (ownership, etc.) for digital assets, **restriction of issuing NFTs by persons who do not hold rights, and other compensation regulations**

※ **Total losses due to crimes related to virtual assets in `21** (7.7 billion USD) **and NFT accounted for 37%**(Chainalysis)

▶ **(Promotion direction)** While **systemizing the entire process** on using NFT services, **come up with plans to protect the copyrights and consumers** to **pursue promoting safe NFT domestic trading markets**

○ **(Management legislation) Legislate** the definition, issuance, transaction, and compensation process of the relevant industries to **resolve the issue of information asymmetry** of NFT users and to **prevent consumer damages**

○ **(Consumer protection)** Establish a **standard contract** (tentative) that clarifies the **duties, indemnification plans, range of rights of participants,** etc. of **NFT purchase, sales, and businesses**

- **Establish a healthy trading environment** by **establishing protection plans and clarifying the range of rights** that **NFT buyers** will gain
- Provide **practical compensation for damages** (tentative) such as subscribing to insurance and mutual aid, etc. to compensate for damages and to **require businesses to be careful in order to strengthen the responsibilities of NFT service businesses**

○ **(Copyright and patent right protection)** Establish plans to **protect the rights of participants such as legal issues when transferring and copyright/patent arguments** according to the issuance and trading of NFTs

- In addition, **analyze the impact of NFT on all intellectual properties** through various associations* and aim at **finding and reviewing various issues**

* **(NFT-IP expert association)** Intellectual Property Office, courts and judiciary systems, etc. (Jan. '22)
(NFT-copyright expert association) Ministry of Culture, Sports and Tourism, industry and academic circles, etc. (May '22)

3 NFT application service settlement

◇ **(Status) Due to the lack of a system for using NFTs in metaverse and games, the position of the metaverse platform is unstable*** and **it is difficult to launch blockchain-related games in Korea**

* Domestic metaverse services are unable to issue NFTs or provide trading services due to virtual asset issues, but it is possible abroad

▶ **(Promotion direction) Review regulatory reforms** for the stable **domestic entry and expansion of NFT application service sectors** including metaverse games

○ **(NFT in the metaverse) Review whether NFT applies as virtual assets, which is the prerequisite for issuing and trading NFTs in the metaverse, and find regulations**

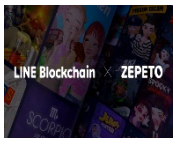
- **Predict the future direction of the metaverse-NFT industry** and **pursue the institutional revision of NFT*** to allow **assertive investments** by companies

* ① Clarify the legal character of NFTs in the metaverse

② Establish guidelines for differentiating the metaverse and games (Ministry of Science and ICT, Ministry of Culture, Sports and Tourism,~`22)

· **(Metaverse-NFT pilot examples)** The metaverse service **Zepeto issued 1,200 images of cherryblossom gardens as NFTs** in a virtual world in Japan

* Distributed and purchased in the Line BITMAX NFT market (currently stopped)



○ **(NFTs in games) Pursue research in various prerequisite tasks and collect social opinions** for utilizing NFTs in games

- Research on overseas blockchain and NFT game examples, game user protection plans, character of NFTs in games, game NFT items, including whether they apply as virtual assets

(Note 5) NFT-related legal and system issues

○ **(Legal characteristics)** The **legal characteristics of NFTs have not yet been established**, so there is **confusion in applying existing systems** such as whether they are speculative games or are subject to taxes and reporting

- NFTs have **various types depending on the form of use***, so they **have the possibility of being included or excluded from the range of virtual assets**

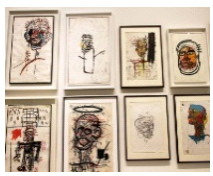
* Collectible, Art, Game, Utility, etc. (nonFungible.com)

① Inclusion as virtual assets (Digital assets)	· NFTs have the potential to be included in virtual assets as it satisfies the general conditions for virtual assets (①electronic token, ②economic value, ③possible to trade)
② Exclusion from virtual assets (Certificate of origin)	· NFTs only act as tokens that certify the ownership relations of contents/assets, thereby taking the position that it is not a virtual asset

○ **(Copyright violation) Possible to violate copyrights in not only the process of issuing NFTs (minting) but also in the process of trading and using**

① Violation of transmission rights	· When a person other than the copyright holder **uploads NFT that minted the works of another person in the marketplace**
② Violation of reproduction rights	· **When a person other than the copyright holder digitalizes offline works** to make an NFT
③ Violation of authorship rights	· **When the name of the author is entered as a person other than the copyright holder**

- **Due to confusion between the concepts of "ownership of works" and "copyrights,"** when **issuing and distributing NFTs** while having only ownership rights, there can be issues with violating copyrights

· **(Case)** Daystrom Company that possessed the works of American artist Basquiat **purchased the work and attempted to produce it as NFT and put it up for auction**, but it was pointed out that **the NFT was produced without the authorization of the foundation as the copyright holder, and that it was a violation of the foundation's copyrights; thus, the auction was canceled**	

3 Reforms to laws and systems related to blockchain (`23~)

◇ **(Status)** There were frequent **collisions with existing regulations in the implementation process** of blockchain services, and because there were no **laws dedicated to blockchain, there were difficulties in making systematic development**

▶ **(Promotion direction)** In addition to full-fledged **legal and system reforms** for each sector related to blockchain, **presented a rough draft** for **discovering detailed plans for resolving disputes and to promote development**

○ **(Promotion Act)** Pursuing the **enactment of the "**(tentative title) **Blockchain Industry Promotion Act"** to **support the systematic promotion of the blockchain industry** such as technological development, standardization, special exceptions, etc.

- After establishing regulatory innovation road maps and **including the relevant contents**, **secure the effectiveness of the system*** through collection of on-site opinions by the relevant agencies and industries, etc. and by conducting research

* **(Example)** The personal information protection commission recognized that **if it is significantly difficult to delete** personal information permanently due to technical features, taking measures to make recovery impossible by **making it anonymous information** would be acceptable as a **destruction method, and established the basis for using anonymous information for services related to blockchain** (pre-announcement of revision of the Enforcement Decree of the Personal Information Protection Act, Feb. `22)

○ **(Decentralized identification) Pursue legislation** for the **evaluation and certification system** to **secure the safety and reliability of** DID services and for the **interoperability of DIDs**

- **Research rules regulations** for **granting the effect of identity check** in evaluated and accepted DID, and **prepare for trust anchor system** ***institutionalization to secure interoperability**

* **Enhance national convenience** allowing use of various sectors with a single DID without any inconveniences of having to join multiple DIDs by securing interoperability between DIDs through the trust anchor

○ **(Smart contract)** Revise laws and systems so that the "smart contract" can be realized in the existing legal system provided for **protecting consumers**

- Research **plans for reforming systems to protect smart contract consumers*** considering the development of technologies related to smart contracts, scope of users, transaction risks, etc.

* **(Example)** Change of order cancellation through the immediacy of entering/executing contracts, excluding subscription withdrawal requirements and notification responsibilities, requiring the mandatory configuration of cancel/change functions to smart contract businesses, etc.

2. Provide standards and development tools for developing public services

04 Construct blockchain trust framework (K-BTF)
05 Support finding and proliferation of K-BTF-based innovation services

1 Construct blockchain trust framework (K-BTF)

○ **(Concept) Efficiently develop and operate** blockchain-based public services and provide tools and environment that support easy **interoperability** when needed

- With the **expansion of public services** for citizens using ICT technologies, the need for **strengthening transparency and reliability** is rising for **data saving and utilization processes**
- The past method had limitations as it **depended on specific institutes or systems for preventing data forgery/alterations and safe processing,** and **using blockchains** was suggested as an alternative

○ **(Status) In order to enhance the safety and efficiency of public service, the government pursued pilot/substantiation projects on implementing blockchain in services for each agency/institute**

- For each project, **different blockchain platforms** were implemented to gain knowhow on the **construction and operation of decentralized services**,
- But because **interoperability is impossible between blockchain platforms,** it is difficult to **find linked services**, and **there are concerns of reduced efficiency and overlapping investments** when developing similar services

○ **(Improvements) Based on private-sector technologies**, established **minimum universal standards for allowing data linking and efficient public service development** and the **development tool** "K-BTF (**K**orea -**B**lockchain **T**rust **F**ramework)"

- Shorten the blockchain service development period and **provide services that can be felt by citizens** through **flexible data linking** while simultaneously **promoting the growth of blockchain companies**

▶ **Prepare for the age of Web 3 that requires data interoperability between blockchains through K-BTF to aim for promoting the domestic blockchain industry**

☐ Stage-by-stage K-BTF construction key contents

▶ Considering the **interoperability technology utilization** between blockchains and the **core technology development completion period** that is essential for interoperability, **construction of K-BTF will pursued by dividing into 2 stages** (v1, v2)

○ **(K-BTF v1)** Pursue the **construction and support of K-BTF universal standards and network support** for public blockchain **"service interoperability"** (~'24)

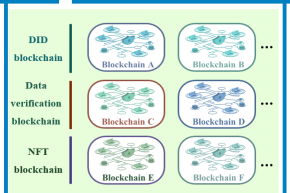
※ Current public blockchain services have **data saved in ledgers for linking**, so it is necessary to **configure interoperability on blockchain services (non-blockchain)** in K-BTF stage 1

- **(Establish universal standards)** Establish **minimal conditions for the interoperability of public services** such as blockchain mandatory functions and security, service linking standards, etc.

- **(Securing network resources) Partially edit*** the private sector's **existing blockchain platform to be appropriate for the public sector** to secure **K-BTF network resources**

* But must **apply the K-BTF universal standards** to edit consensus methods and security conditions, etc. to a **minimum** (soft fork)

Note Plans for using blockchain network resources of public institutes (tentative)



- Considering the features of public-sector blockchain and service utilization, compose a **blockchain network pool divided by sector** such as DID, data verification, NFT, etc.
- Method in which public institutes do not construct blockchains separately but instead **use networks included in the resource pool and pay usage fees to companies in the private sector**

- **(Provision of development/operating environment)** Provide K-BTF **development and operation tools*** and **resource management functions**** so that institutes can more easily implement blockchain services

* Provide **interface** (API: Application Programming Interface) to **operate the core functions of blockchain conveniently** such as decentralized ledger management and drafting smart contracts

** Blockchain access account/authority management, smart contract distribution, ledger monitoring, application of governance per institute, etc.

○ **(K-BTF v2) Pursue the advancement of K-BFTF** based on **blockchain technologies under development** for **improving public blockchain and interoperability* between different blockchains** (~'27)

* Linking for transmitting and exchanging data saved in blockchain, mutual execution of smart contracts, etc.

- **(Blockchain improvement)** Among the technologies developed through past blockchain R&D projects*, preemptively apply **data processing technologies for responding to Web 3** in K-BTF

* R&D project for advancing core blockchain technologies such as high-performance consensus of blockchain, high volume data saving and analysis, smart contract security, identity management and protection technologies, etc. (`21~`25, see pg. 31)

- **(Securing interoperability) Support the implementation of interoperability technologies and linking function** for **safe data exchange/processing between different blockchains** on K-BTF

※ Pursuing **"technological development for interoperability between blockchains"** as a task of the Ministry of Science and ICT's "blockchain industry advancement technological development project" (`22~`25, see pg. 34)

<Example of using blockchain interoperability (example)>

- **(NFT)** Provide infrastructure to trade various contents more freely by issuing NFTs regardless of blockchain type
  ※ Currently, **NFT issued by A chain can only be traded and possessed with A chain's wallet**
- **(Metaverse)** Use a "trust bridge" that connects the market economy in different metaverse worlds being operated with different methods
  ※ Currently, certain digital assets (virtual space, buildings) and items can **only be used in single metaverse platforms**

- **(Service Update) Pursue supporting easy update for the post-interoperability support of public blockchain services in operation**

☐ Promotion system and schedule

○ **(Promotion system) Composed the 「Blockchain Initiative** (policy association) centering on **Private companies, academe, and government agencies** to pursue **K-BTF planning** (`22~)

- **Private-sector companies** utilize their expertise to play a **leadership role such as proposing universal standards, developing development and operation tools, providing network resources, etc.**,
- **The government acts as a facilitator by establishing policies related to the user of public services, supporting associations, and providing linking plans for existing public systems***

* Public web services, etc. that apply electronic government standard frameworks (eGovFrame)

○ **(Schedule)** After completing K-BTF v1 in '24, **begin stage-by-stage pursuit for K-BTF v2 from '25**

K-BTF v1 (`23~`24)	K-BTF v2 (`25~`27)
- Compose blockchain initiative - Conduct pre-research for establish K-BTF - Establish K-BTF informationization strategy plans (ISP) - Develop universal standards and development and operation environment - Implement private sector blockchain network resources - Secure interoperability between blockchain services	- Test application of public blockchain services by the government ※ Reorganize existing blockchain pilot and proliferation project system - Develop core/convergence blockchain technologies - Provide private sector blockchain platform and resource expansion - Advance essential core universal services of K-BTF - Implement interoperability solution between blockchain platforms

(Note 6) Need for securing interoperability

□ **(Interoperability concept)** Regulations and technologies needed for **sending and processing information** between blockchain platforms or from outside to inside the blockchain

○ **(Between different blockchains)** Linking for **sending and exchanging** data/assets saved in the blockchain platform and **mutual execution of smart contracts**

○ **(Between external system and blockchain)** Linking to send and utilize safely the **data generated from an outside system that does not use blockchain to the blockchain**

※ **(Example)** Provide blockchain platform to connect blockchain smart contract with outside data (company, insurance, etc.), payment, API, etc. (Chainlink, May '22)

□ **(Need) Relieve user inconveniences** that occur due to broken services between the blockchain and outside system and promote the emergence of **convergence services**

○ **(Service user)** As data can be transmitted **without being subordinate to a specific platform**, it is possible to **use** various blockchain services freely

○ **(Service developer)** It is possible to **link easily with other platforms**, thereby allowing the inflow of many users by developing innovative convergence services

※ In particular, the need for a **trust anchor** to secure **interoperability between identification services** currently operating with different methods such as DID or public keys is rising

□ **(Status of applying interoperability)** Overseas public blockchain infrastructure provides interoperability functions as **core functions,** and there is active discussion in international standardization organizations

○ **(Overseas public infrastructure)** The European EBSI is planning to support interoperability by including in the **project's key principles** and China's BSN **completed implementation/testing** of interoperability solutions (Oct. '20)

○ **(Standardization status)** ISO **newly opened a working group** ('20) for interoperability, and ITU is carrying out **standardization** related to over 3 interoperability led by China

Note **Utilization of blockchain interoperability in the private sector market**

Polkadot
COSMOS
UNISWAP

· Currently, **most blockchain interoperability technologies** being implemented/developed in the private sector market are limited to **exchange/transmission of virtual assets (coins)**

- In order to connect different blockchains, **3rd blockchains are used** or **bridges** (programs connecting blockchains) are set to exchange assets or change and manage related statuses (i.e., Polkadot, Cosmos, Orbit Bridge, etc.)

2 Support finding and spreading innovation services based on K-BTF (`23~)

◇ **(Status)** There are **limitations in expanding services** due to **single-time policy support**, so in order to prepare for the age of Web 3, there is growing **demand for a universal foundational environment based on interoperability**

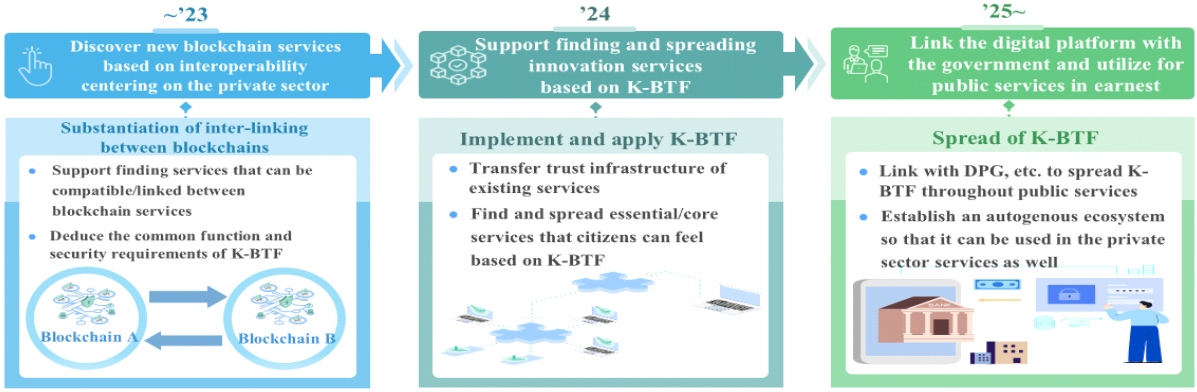
▶ **(Promotion direction) Continuous operation and growth of blockchain public services** through K-BTF can be ensured, and **supporting finding and spreading "essential and core" services that can be applied throughout society**

□ Establish linked service, finding and spreading the support system for implementing K-BTF

○ **(Overview)** Stage-by-stage revision of blockchain pilot and expansion project (`22 budget 21.3 billion KRW, `18~) **for the full implementation of K-BTF in the government's public service sector**

- In addition to the stage-by-stage **discovery and spreading of new services using K-BTF**, focus on **spreading services with high ripple effects** based on **interoperability** where the private and public sectors cooperate

<Blockchain service discovery and spreading support system for implementation of K-BTF (tentative)>



□ Support finding and spreading innovation services based on K-BTF ('25~)

○ **(Full implementation of K-BTF) Apply K-BTF** in all services carried out in the blockchain support project (public sector, public-private linked) for **development and operation**

- ❶**Support transfer of existing services to K-BTF** and ❷focus on **finding and spreading essential and core services felt by citizens** using K-BTF by restructuring the project

※ Pursue the development of universal and specialized services parallel with the construction of a K-BTF universal framework

- **Transparently share and manage information** of the public and private sectors **based on K-BTF** to establish the framework for providing **integrated and safe digital innovation services**

3. Develop and verify core technologies for advancing industries

06 Blockchain core/convergence technology development
07 Localized blockchain technology verification base
08 Company-customized working-level core personnel fostering

1 Development of blockchain core/integrated technologies

1 Development of core technologies that overcome the limitations of existing blockchain (~'25)

◇ **(Status)** Though technologies have improved through continuous R&D investments, it is necessary to **strengthen customized technologies to respond to changes in the global market**

▶ **(Promotion direction)** Reflect the **trends of the blockchain market** through large-scale pre-feasibility R&D projects (~'25, total budget approximately 85 billion KRW), etc. and **advance the foundational technologies** to allow utilization in any field

❶ **(High-performance consensus technology) Develop technologies** for securing **stable performance of commercial service levels** even if the **number of participants increase** in order to **maintain decentralization**

- **(Status) Blockchain-based services have difficulties in converting** due to issues such as **low transmission speed*** compared to existing services, **increased fees, processing delays, etc.**

  * (Bitcoin) Processing volume 7TPS, processing time 60 minutes (based on 6 confirm), 10,000 participating nodes (VISA and MasterCard) Processing volume 24,000 TPS, processing time app. 3 seconds, about 1 million terminals

  ※ As of now, it is difficult to achieve the three advantages of Bitcoin such as scalability, decentralization, and security

- **(Improvement) Secure consensus technology** that maintains **decentralization, which is the goal of implementing blockchain**, while simultaneously ensuring **large-scale data processing and high-speed finality**

◆ **Expected effects of "high-performance consensus technology"**

○ **(Large-scale service) When applying this technology in blockchain-based services based on use by large-scale users, costs ▼ · speed ▲**

  * Can rapidly, fairly, and transparently process even when there are many users such as year-end tax adjustments for all citizens, popular concerts, and ticketing for public transportation around major holidays

○ **(Web 3)** Ensures **prompt data processing and accuracy between a large number of participants in the large-scale decentralized web environment needed in Web 3** through high-performance consensus technologies

○ **(Decentralized finance)** One of the biggest issues with decentralized finance (DeFi) is the **processing delay issue;** through the **high-performance consensus technology,* however, it can be resolved, thereby** allowing **real-time transactions of many users**

  * (Example) Ethereum is planning to switch to Ethereum 2.0 with high-performance consensus technologies to solve the issue with speed and costs

❷ **(Smart contract)** Technology that **enhances reliability** by detecting dangerous situations by **automatically creating codes,** analyzing **vulnerabilities** and verifying execution results

- **(Status)** Difficult for users to identify **contract terms,** uses **open source codes** in smart contracts; thus making it **prone to hackers abusing the common vulnerabilities**

※ 21,281 vulnerabilities from 22,493 smart contracts operating on the Ethereum platform were discovered (`21)

- **(Improvements)** Improved security issues that can occur due to the nature of smart contracts that are difficult to delete and recover for **the safe use** of even non-experts who do not know coding

◆ **Expected effects of "smart contract security"**

○ **(Safe investments) Improve the reliability of investment agreements** to contribute to the **spread of crowd funding** through an autonomous organization (DAO)

○ **(Web 3)** Determines to whom, for what purpose, and how data possessed by an individual will be used in the decentralized web environment, can construct **a system for receiving compensation fairly and transparently**

○ **(Metaverse)** The construction of a **token economy*** that is based on **safe smart contract technologies** offer **compensation for creators** and promotes the **circulation of the virtual economy where more creations are generated and distributed**

* Economic ecosystem that creates profits by **providing services based on "tokens"** issued in the blockchain within the **virtual world** or compensates participants

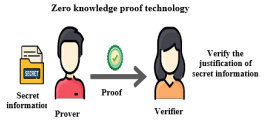
❸ **(Identity management and protection) Privacy protection technology** based on **reliable management platform** and **encryption/zero knowledge proof*** that ensures interoperability and scalability

* Zero-knowledge proof: Encryption system wherein individuals do not disclose secret information, can certify true/false of the corresponding information for the verifier

- **(Status)** Transaction and contract details between parties are provided **without being encrypted**, making it difficult to maintain confidentiality, and it is inconvenient for users as identification **services are not compatible**

- **(Improvement)** In the personal identification and management process, the **self-sovereignty** of the user is strengthened; thus making improvements to the **personal privacy exposure issue** that can occur during utilization

◆ Expected effects of "identity management and protection technologies"



○ **(Secret voting)** Possible to secure the anonymity of voters to anyone including central data managers, thereby making it possible to make online voting secret

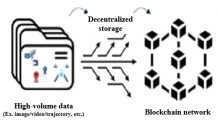
○ **(Credit evaluation)** Credit information companies can **evaluate credit without collecting personal credit information** from financial institutes; thus making it possible to **guarantee privacy and prevent hacking**

○ **(Metaverse)** Using the identity management and protection technology, when **identifying avatars in the virtual world** and connecting to the real world, the **privacy of both entities (real/virtual) can be protected simultaneously**

❹ **(Data saving and analysis)** Technology that **strengthens utilization of data services** by **managing high volumes of data** based on blockchain

- **(Status)** Due to the **limitations of saving low-speed/low- volume blockchain data, use a separate offchain storage area** when using high volumes of data
- **(Improvements)** Enhance **data capacity that can be processed through large-scale node management and high-volume data dispersion saving**, and carry out **quality analysis and management** using index

◆ Expected effects of "data saving and analysis technology"

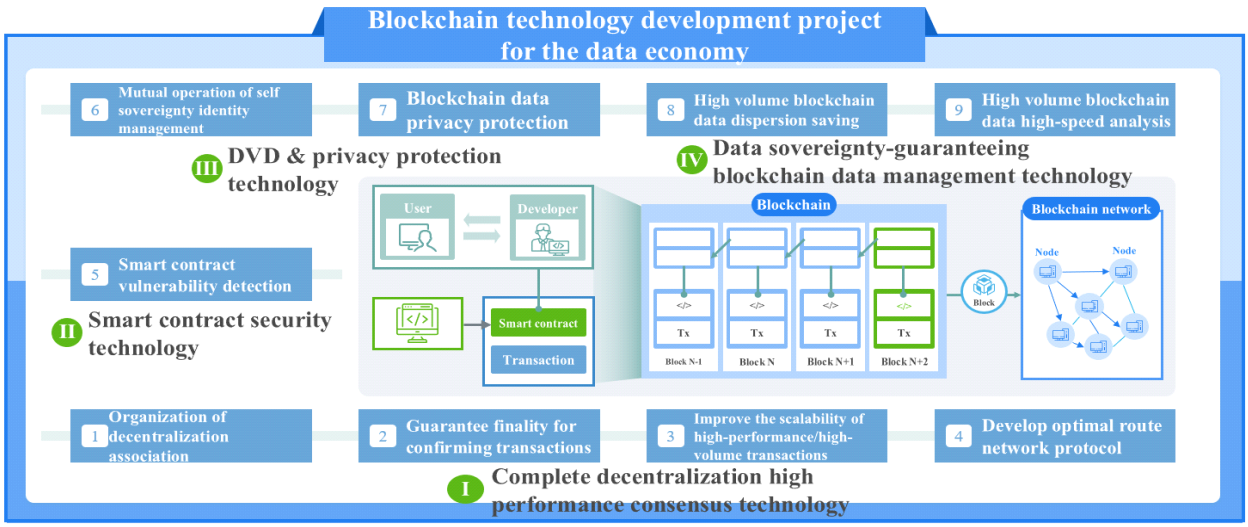


○ **(Web 3)** Guarantees ownership of personal data, can make selective data authorization management and access control possible; thus **realizing the self-initiated control of data**

○ **(NFT)** Through **access control of the original works of NFT and dispersed saving, it is possible to claim NTF ownership safely without worries of deleting the original data or forgery/alterations**

※ Currently, due to data saving limitation issues of most NFTs, original digital works are not included

<Blockchain development summary for the data economy>



2 Blockchain convergence technology development being pursued to find new industries (`22~)

◇ **(Status) In existing industry sectors,** most **blockchains are being used in limited fields** such as DB sharing, forgery/alteration prevention, etc. with the **goal of strengthening security**

▶ **(Promotion direction) Converge** blockchain technologies with **leading technologies** (AI, IoT, etc.) of the fourth industrial revolution and **integrate in various industries** to **promote a paradigm shift of the existing industry and to find new industries**

※ **"Blockchain industry advancement technological development" project** (new in `22, 3 billion KRW)

○ **(ICT convergence)** In order to **supplement weaknesses** such as **power consumption, communication delays**, etc. as the features of blockchain, **pursuing advancement** by **integrating the strengths of other ICT technologies** (`22~)

- In addition to the development of **lightweight, low-power** technologies through **IoT conversion**, **advancement of smart contract judgments** through **AI convergence**, and other **blockchain technology improvements,**
- **Look to expand services through two-directional data linking between blockchain↔non-blockchain environments*** and by developing technologies for **interoperability between different platforms**

* As a linking technology that brings data outside of the blockchain to inside the blockchain, **ensures the prevention of data forgery/alteration in the linking process and guarantees the reliability of the linked data**

○ **(Industry conversion)** Develop **technologies that can secure digital reliability** in the age of Web 3 and the metaverse **that creates value with economic activities in the virtual society** (`23~)

- **Implement advanced blockchain technologies in the platform** through technological convergence **to provide the basis for commercialization* such as linking fragmented work process, etc.**

* Blockchain mobility industry, contents distribution industry, financial data service industry, public disasters, safety, etc.

- Pursue the development of **blockchain application technologies to provide reliable infrastructure within the metaverse and NFT technologies that can prove ownership of digital assets** (`24~)

* Blockchain-based metaverse interoperability technology, improvement of NFT storage area instability, etc.

◆ **Expected effects of "ICT/industry convergence technology"**

○ **(Metaverse) Construct a digital trust-based virtual economy** that **supports transparent transactions** between individuals and **proves personal assets** in the virtual world

○ **(Find new services)** Reality-virtual **integrated identity management service, multiple blockchain composition support service** within individual platforms, reality-virtual **integrated data distribution, etc.**

3 Establishment of "blockchain technology road map" to predict future demand (`23~)

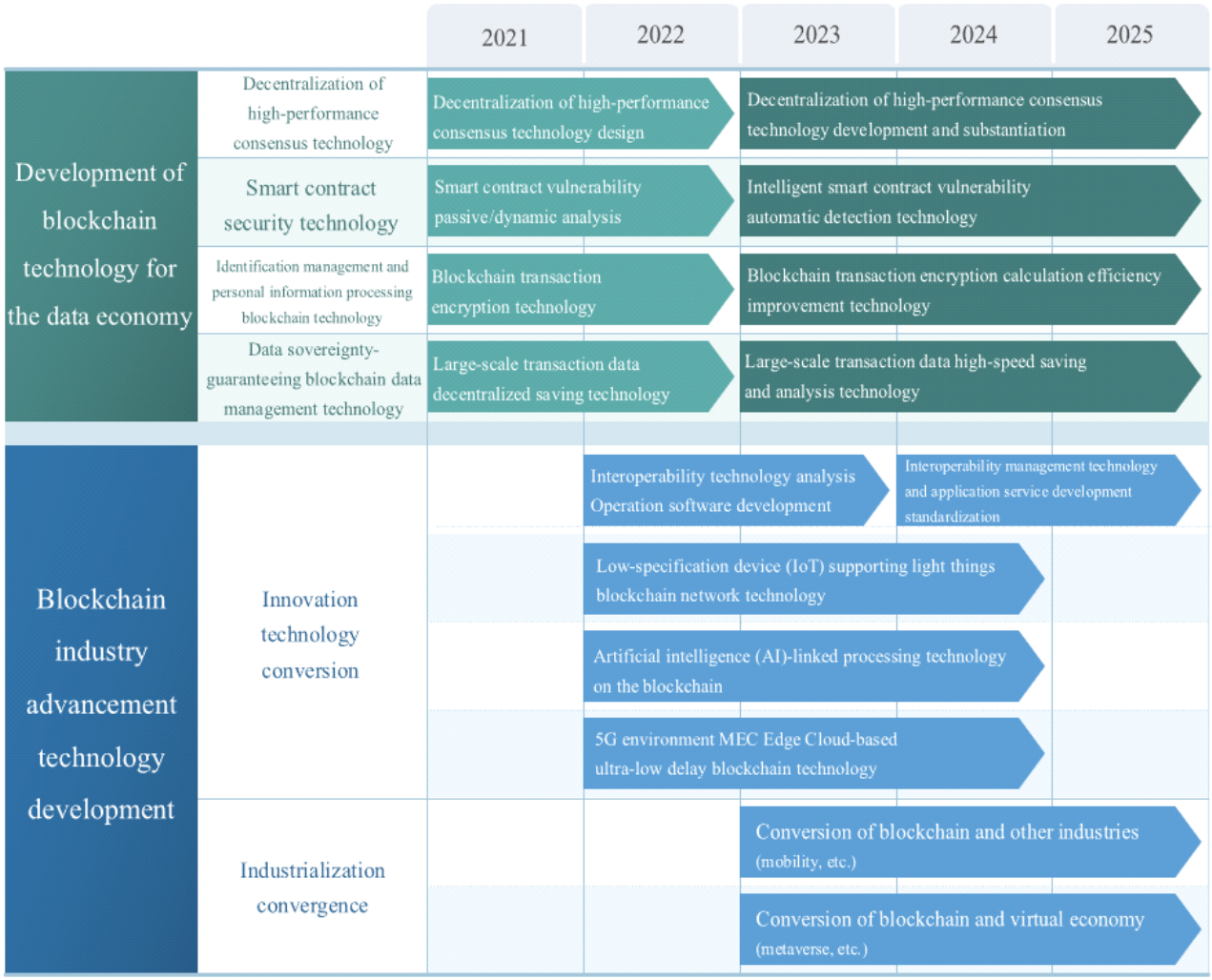
○ In addition to domestic and foreign **latest technology and market trend surveys related to blockchain***, analyze various kinds of environmental competitiveness to **establish** a road map that **predicts the future**

* Convert from Proof of Work (PoW) that requires excessive energy consumption to Proof of Stake (PoS), add Layer 2 (speed and usability) to Layer 1 (security and decentralization), converge new ICT technologies (AI, IoT, cloud, etc.), etc.

※ Begin research from '24 to be synchronized with the end of the '25 pre-feasibility R&D project (blockchain technology development for the data economy)

- Deduce R&D issues and candidate technologies through **future technological development predictions** to **establish a foundation for developing capabilities** that can **respond promptly to future environmental changes**
- **Set the direction of R&D in the blockchain sector** that will gradually expand through multiple agencies and institutes and perform **government guideline** functions for **reviewing duplicity and actual effects**

<Summary of former R&D projects in the blockchain technology road map>



2 Construct basis for local-centered blockchain technology verification technologies (`22~)

◇ **(Status)** As most of the blockchain-related **Korean companies and technology verification infrastructure are located in the Seoul area*** there are **concerns of imbalance in technology and service supply**

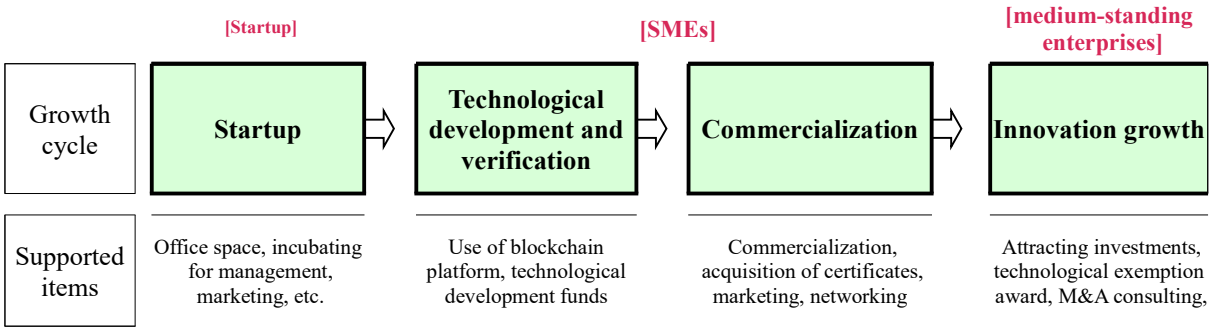
* Of the 328 blockchain suppliers, 265 companies (about 80%) are located in Seoul and Gyeonggi-do (`21 blockchain industry survey)

▶ **(Promotion direction) "Blockchain technology innovation centers"** were set up in key regions to **provide the foundation for technological verification in each region, looking to find services linked with region-specified industries**

○ **(Technology Innovation Center) Established infrastructure** that can provide **comprehensive support including startup, growth, technological and service development, and verification for local blockchain technology companies**

※ Starting with one center in '22, plans to construct 3 centers by '24 (tentative, constructing in Busan in `22)

<General support system diagram of the technology innovation center (tentative)>



- **(Startup)** Support for **office space** and incubating such as management and marketing to help blockchain **startups launch and grow by linking with locally specialized industries**

- **(Technological development and verification) Support technological development and use of blockchain platforms** so that SMEs and startups can easily develop and verify blockchain technologies

- **(Commercialization) Collaboration support** such as business-**customized commercialization** including product and service **commercialization** and domestic and foreign **certification acquisition***, **marketing,** etc. and **networking with conglomerates** that use blockchain

* Telecommunications Technology Association blockchain performance verification, domestic and foreign patents, trademark application and registration, etc.

- **(Innovation growth) Provide a foothold for growth** through **investment attraction consulting, demo day, technology exception award consulting M&A support***, etc. through an expert institute

* Diagnose and support M&As through calculating corporate value based on technological value assessments, corporate analysis, legal, taxes, accounting, etc.

○ **(Establish verification system) Systemize review of platform, service performance, function, and security** to **strengthen competitiveness of blockchain company services**

- **(Public sector)** Establish **implementation standards** (standard suitability/security) of K-BTF-based platforms and provide a **testing environment**

- **(Private sector)** Pursue the **development of blockchain service trust level evaluation model and systemization of verification**

3 Foster practical/core blockchain technology personnel customized to companies (`24~)

◇ **(Status) Personnel fostering and work assignment preparation procedures** are being offered to foster the blockchain industry, but **expertise at levels required on-site*** **have not been acquired**

* Blockchain personnel requirement levels are **master's and doctorate's (23%), working-level personnel (58.3)**, entry-level (18.7%) (`21 survey)

▶ **(Promotion direction)** Pursuing the **participation of users in curriculum design and expanding working-level projects** to **convert** the **personnel fostering method** from being centered on suppliers (colleges/government) to **users** (companies)

1 Pursue the expansion of industry-academe cooperation reflecting the demands of industrial sites

○ **(Company-university) Establish the "blockchain alliance major" program linked with departments related to blockchain** at universities to secure expertise (Blockchain **Master Campus**)

※ Incubate 200 people annually at 4 universities (200 people per school, 50 per grade, 1,000 over 5 years)

- Pursue the **fostering of working-level blockchain experts** centering on demand through **industry-academe cooperation** such as operating blockchain **practice projects, internship programs, etc.**

○ **(Company-educational institute) Establish on-site education** where **blockchain companies develop their own working-level curriculum** and participate as **lecturers** (Blockchain **Union School**)

※ Blockchain companies directly foster experts needed in their field **to minimize supply and demand gaps in education and professional sites** (100 people per year)

2 Expanding research centers and locally specialized education to foster top-level human resources

○ **(Expand the center) Pursue the expansion of the ITRC Research Center*** and **expand** the scope of research from blockchain foundational technologies to the **industrial domain- specializing sectors** (finance, energy, etc.)

* 5 universities in total in '21 → **continuously expanding to a total of 7 colleges by '24 (tentative)**

○ **(Fostering local talents)** Pursue education for **fostering human resources needed for the convergence of locally specialized industries** with blockchain through **"blockchain locally specialized education bases*"**

* Construct and operate blockchain education hubs (ICT Innovation Square) linked with 5 regional industries such as the capital area (Seoul), southeast (Busan), northeast (Pohang), Honam (Pohang), and Chungcheong (Daejeon)

Ⅵ. Promotion System and Expected Effects

☐ Overview of promotion system

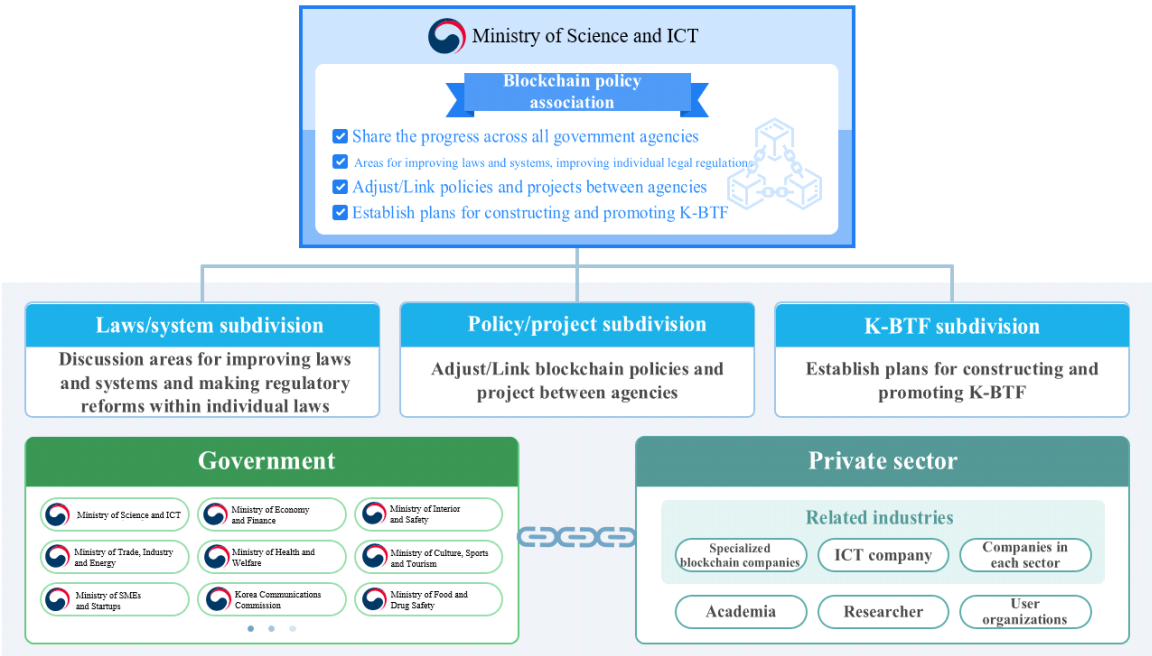
○ Compose and operate the **joint government agency 「blockchain policy association」** to discuss key issues on promoting the blockchain industry, **settling of the K-BTF, and regulatory innovations**

☐ Composition (tentative)

○ The policy association shall be composed of **central and local government public employees**, public institutes, domestic and foreign blockchain platform service **supply companies and using companies**,

- Three subdivisions of **❶law and systems, ❷policy, projects, and ❸K-BTF** will be installed under the policy association and **each subdivision will discuss their respective issues**

<Blockchain policy association composition (tentative)>



☐ Roles and functions

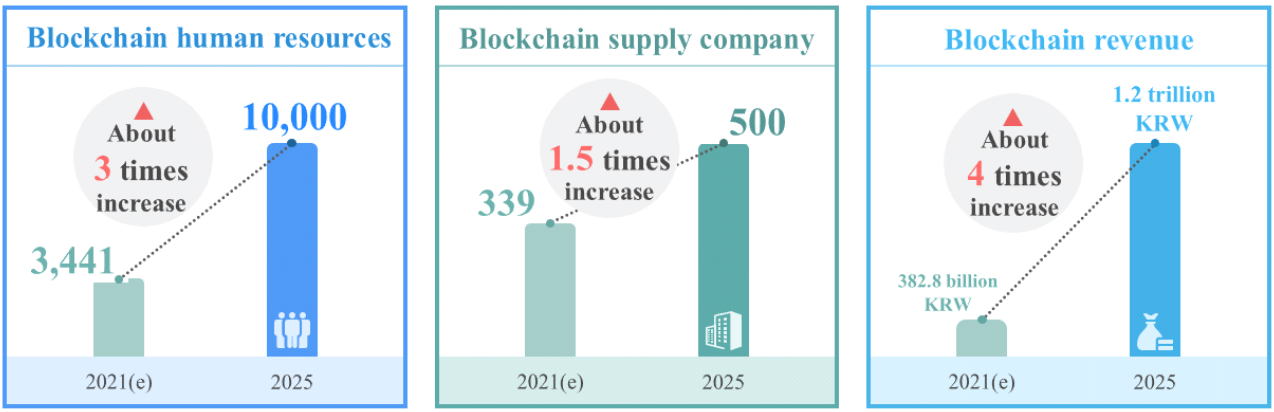
○ Coordinate and discuss matters requiring agreement between agencies related to blockchain

○ Discuss direction of reforming laws, systems and regulations to promote blockchain technologies and industries

○ Provide detailed plans for using and expanding K-BTF

☐ Expected effects of strategy

<Expected increase of blockchain personnel, companies and revenue>



○ **[Industry fostering] Expand blockchain services and accelerate growth of new industries**

- Use the blockchain trust framework as the **basis for concentrating national technological capacities and securing large-size services** to **raise awareness of and experience in blockchain among citizens**

- **Contribute to fostering new industries based on blockchain and providing the foothold for corporate growth through strengthened life-cycle policy support** and **public-sector demand** from the implementation to proliferation of services

○ **[Trust proliferation] Secure new cash crop for the age of Web 3 and make regulations transparent**

- **Support corporate growth to find innovation services of blockchain that will play a key role in the age of Web 3**

- **Construct the foundation for Korean companies to enter new industries by providing predictability based on regulatory innovation**

○ **[Establishing the basis] Secure core technologies and personnel for technological innovation**

- **Secure sustainable key blockchain technologies** and preemptively integrate with future convergence technologies **to prepare flexibly against rapidly changing technologies**

- **Foster experts and working-level personnel** needed by the industry to **respond actively to the quickly growing human resource demand of industries** and **promote innovation in the private sector**

Ⅶ. Promotion Schedule and Budget (Tentative)

(National funding, 100 million KRW)

Promotion tasks		`22	`23 (Government proposal)	Total
1. Find large-scale projects that can be felt by citizens and innovate laws and systems				
① **Find large-scale projects that can be felt by citizens** (Apply leading blockchain technologies, foster specialized companies, strengthen technology and security competitiveness)		290.8	318.6	610.4
② **Establish NFT regulatory innovation road map**		1.3	3	4.3
③ **Revise blockchain-related laws and systems**				
2. Provide standards and development tools for developing public services				
④ **Construct blockchain trust framework (K-BTF)**		-	1 (Research service)	1 (Pursue in `24)
⑤ **Support finding and spreading innovation services based on K-BTF** ※Include in budget for supporting the discovery of large-scale projects that can be felt by citizens		-	-	-
3. Develop and verify core technologies for advancing industries				
⑥ **Development of blockchain core/integrated technologies** (Develop blockchain technologies for the data economy, develop technologies for advancing the blockchain industry)	High-performance consensus technology	75.2	75.2	150.4
	Smart contract security technology	16.8	18.4	35.2
	Identification management and personal information processing technology	54	48	102
	Data storage and analysis technology	40	32	72
	Development of convergence technology	30	40	70
⑦ **Construct basis for blockchain technology verification (Technology Innovation Support Center)**		25.1	35.1	60.2
⑧ **Foster blockchain technology personnel**		-	-	- (Pursue in `24)
Total		**533.2**	**571.3**	**1,104.5**