To: Trade Finance Division, Trade and Economic cooperation Bureau,
Ministry of Economy, Trade and Industry

FY2021 International Economic Research Project for Establishing an Integrated Domestic and International Economic Growth Strategy
（Research on the Trade Sector Digitalization）

Report Summary

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Table of contents

1. Background of the Research and Outline of Implementation

Background of the Research

1. The Need for Public-Private Partnerships for Trade Field Digitalization

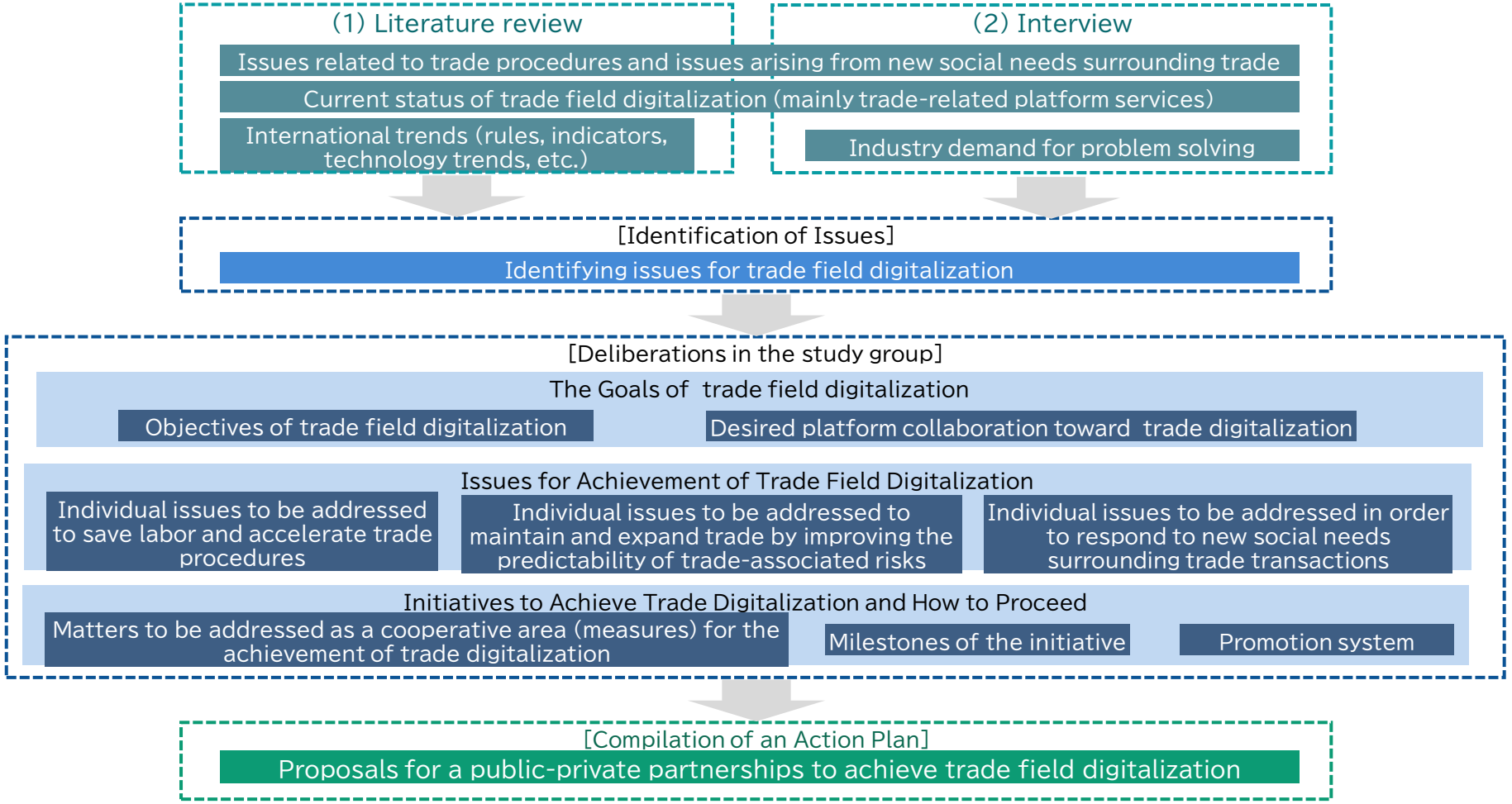
- In the trade field, international standardization of electronic information exchange has long been tackled, but the launch of a "trade platform" that provides information exchange services mainly between private companies has been active internationally since 2018, and trade digitalization has been attracting more attention in recent years than ever before. In Japan, in addition to NACCS(Nippon Automated Cargo and Port Consolidated System), which has been in operation for many years as a major trade platform, Cyberport and other private sector trade platforms have been launched since around 2020.
- While the digitalization of trade field is progressing, many of the trade platforms that have begun to form globally have their own interface specifications and do not coordinate information with each other. Thus, the cost burden of implementing collaboration functions between internal systems in the private companies and each platform is becoming an issue for users. Potential users of trade platforms are not only concerned about the cost-effectiveness of such platforms, but also about the policy aspects of trade digitalization, as it is difficult to foresee with the policy future depending on competitive market trends.
- Against this background, international standardization led by major international organizations is being promoted in some areas in order to resolve the problems. In Japan, it is considered necessary for the public and private sectors to cooperate in studying the future of trade platforms.

2. Expanding the scope of industries and businesses for which information is required in trade transactions.

- Covid-19 pandemic has caused a great deal of confusion in international logistics due to a shortage of containers and congestion at ports, which has also contributed to high international prices of commodities. In addition, the frequent occurrence of abnormal weather due to climate change in recent years has added to the confusion in international logistics. Under these circumstances, it is becoming more and more important for businesses involved in trade to collect global logistics-related information, which is necessary to foresee these risks and take prompt actions.
- In addition, there has been in recent years a growing trend to strengthen economic security in various countries and a growing interest in common values such as the environment and human rights in international economic activities, which has led to the rapid application of new import/export regulations such as border carbon taxes and human rights-related regulations in various countries and regions. As a result of these regulations, since the information required in trade transactions covers a wide variety of industries and operations across the entire global supply chain, from procurement and manufacturing to consumption and disposal, there is a concern that the burden of collecting and presenting this information will increase in the future. On the other hand, addressing these common values is linked to the enhancement of corporate value, so it should be actively addressed from the perspective of ESG investment.
- In this way, the industries and businesses for which information is required in trade transactions are greatly expanding from the conventional trade procedures, and in the future, it will be necessary to establish a new system to efficiently collect and present the necessary information from these industries and businesses.

Outline of the Research

Based on the issues and hypotheses identified in literature review and interviews with trade experts and practitioners, a study group consisting of experts, trade practitioners (shippers, logistics companies, banks, insurance companies), trade platform providers identified the “objectives of trade field digitalization” and a “vision of trade field digitalization. Then, an action plan was formulated for achievement of trade digitalization through the discussion in the study group.



2. The Goal of Trade Field Digitalization

Objectives of Trade digitalization

The following 3 objectives were set for the trade field digitalization, based on the results of organizing the issues for trade field and its digitalization,

[Objective 1] Achieving labor saving and accelerating trade procedures	(1) Efficient collection and communication of information required to be submitted in trade transactions and procedures	In trade field, the labor-saving and speeding up of procedures has been an issue that has been tackled for a long time, due to the complexity of communicating information to many countries, regions, industries, and people involved in business, and the importance of shortening lead time in logistics. In Japan, the operation of the NACCS has made progress in saving labor and speeding up administrative procedures, such as reducing the time required for customs clearance of ocean cargo imports from the 168.2 hours required in 1989 to 61.9 hours required in 2000. Meanwhile, in private sector procedures that require international information exchange, international standards for data exchange have been adopted in some cases, and in recent years, many platform services for exchanging trade information have been provided. However, it has been pointed out that these services do not contribute sufficiently to improving efficiency due to their limited target tasks and inconsistent coordination specifications. In view of these facts, efficient collection and dissemination of information are the most important issues in trade digitalization.
	(2) Labor saving in paperwork by collating information related to trade transactions, etc.	In trade transactions, information is exchanged among various operations in the sales channel, financial channel, distribution channel. In order to manage these operations in a consistent manner, it is essential to have a mechanism to relate different lot units in those systems. However, this mechanism has not been developed even by international standards. The achievement of this mechanism is expected to realize RPA(Robotic Process Automation), IPA(Intelligent Process Automation), etc., such as the automation of statement cancellation and the automatic execution of customs clearance procedures based on cargo status information, thereby significantly reducing the amount of paperwork.

Objectives of Trade digitalization

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[Objective 2] Expanding trade transactions by improving the predictability of trade-associated risks	(1) Risk aversion in trade logistics	As supply chains become increasingly globalized, the importance of avoiding risks associated with trade is increasing, especially for shippers in the manufacturing industry. In recent years, supply chain management has become more diversified and complex, and the impact of these factors has become more serious, such as the need for economic security and the increasing severity of natural disasters. Therefore, risk management has become increasingly important for all businesses involved in trade. In order to manage these risks, avoid them in advance, or recover from them quickly, it is essential to improve the predictability of risks associated with trade.
	(2) Risk aversion in the global supply chain	From the perspective of the global supply chain, which encompasses everything from material procurement to manufacturing, sales, consumption, and disposal, it is necessary to collect and analyze even more multifaceted information on country risk, company risk, product and service risk, and natural disaster risk related to the location of factories when developing business in a country. Therefore, it is desirable to establish a system to efficiently collect and provide these various types of information from various resources.
[Objective 3] Responding to new social needs surrounding trade transactions		As the framework for trade liberalization negotiations is shifting from bilateral FTAs (Free Trade Agreements) and EPAs (Economic Partnership Agreements) to regional and comprehensive trade agreements, it is becoming increasingly important for Japan to enjoy the economic benefits of these agreements by effectively utilizing them in order to enhance the international competitiveness of its products and services. At the same time, new import and export regulations are rapidly being applied in various countries and regions in response to the recent active moves to strengthen economic security in those countries and the growing interest in common values such as the environment and human rights in international economic activities. Under these circumstances, the information required to be provided in trade transactions covers a wide variety of industries and operations across the entire global supply chain, from procurement and manufacturing to consumption and disposal, and there is a need for a system to efficiently collect and present this information while ensuring its reliability.

Informational Coordination in Trade Field Digitalization①

The main target of this research is on trade platform services, which have become the mainstream in recent years. And it includes the overall picture of what should be done in trade digitalization to improve the interoperability of these services by using common collaboration tools (data standard specifications, data governance, etc.).

Current status

When business partners use different platform services (“PF”), the company is forced to use multiple PF to exchange data with business partners, bearing the utilization fees according to the number of PF used.

Future vision (ideal state)

By using a trade digitalization collaboration tool (standard specifications, common rules, etc.), the company can link with all PF and trading partner systems by using a minimum number of PF.

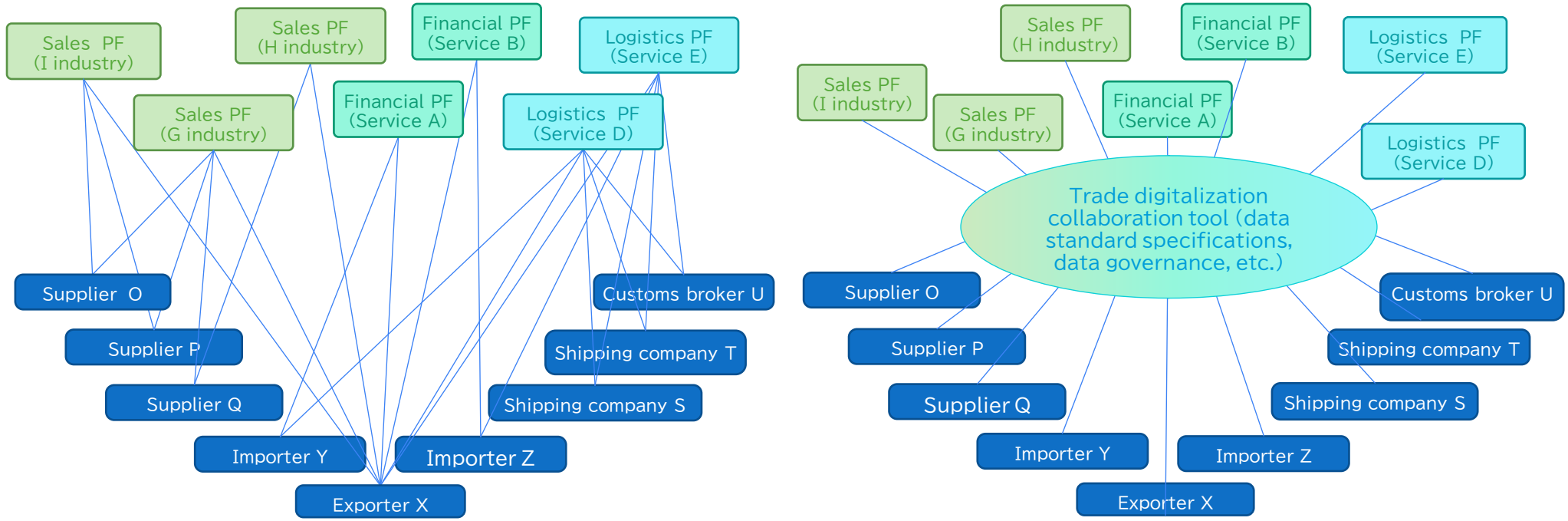
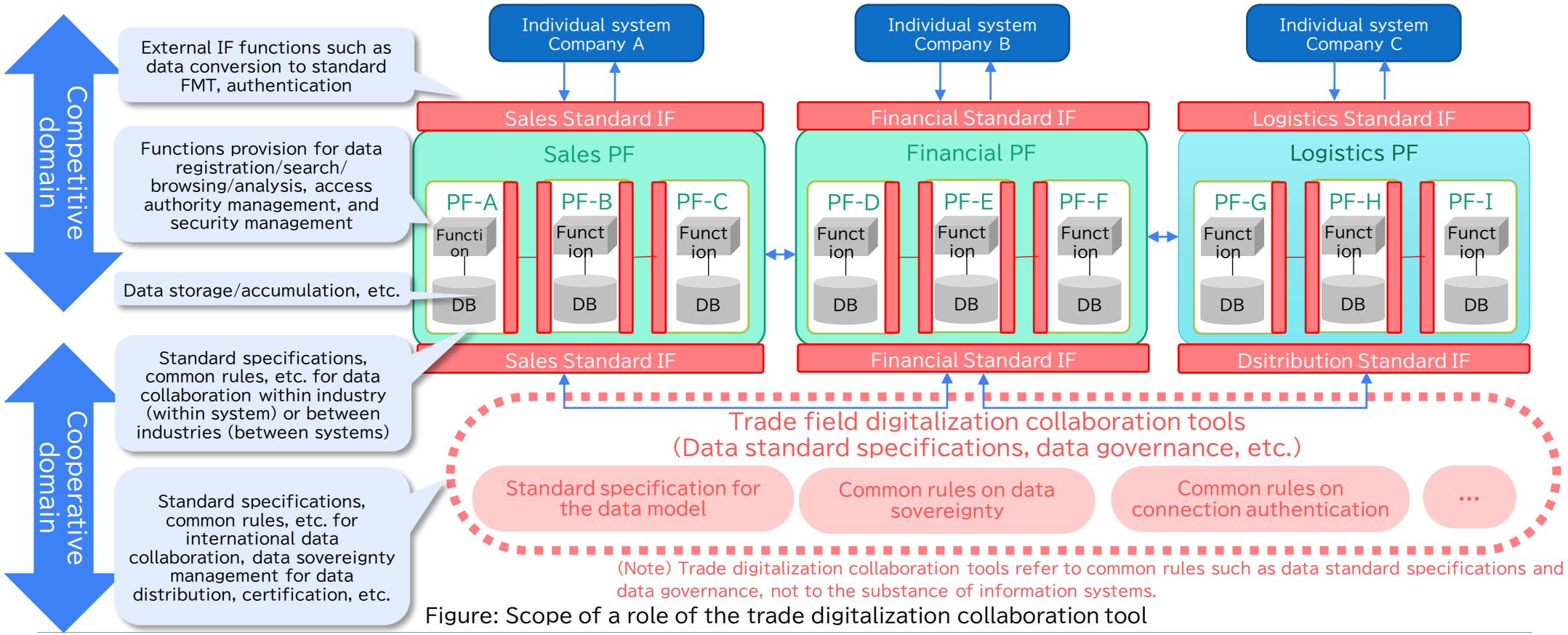


Figure: Overall picture of the ideal state of trade digitalization

Informational Coordination in Trade Field Digitalization②

The competitive domain and the cooperative domain should be separated for the coordination in trade field, and that the cooperative domain should promote commonality, collaboration, and sharing.

- **Competitive domain: the business model of each PF, including the scope of service provision operations, implementation functions, data handled, and utilization fees.**
- **Cooperative domain: Standard specifications, common rules, etc. for external collaboration of data that is the target of data collaboration and data distribution.**
  - Each PF or individual company system can be linked to multiple destinations with one external IF.



(Note) Trade digitalization collaboration tools refer to common rules such as data standard specifications and data governance, not to the substance of information systems.

Figure: Scope of a role of the trade digitalization collaboration tool

Informational Coordination in Trade Field Digitalization③

”Data Model Registry” and a ”Data utilization Registry“ are envisioned as a core initiative of the Trade Field Digitalization Collaboration Tool. The former is expected to manage and provide data models for the trade field, and the latter is expected to provide APIs(Application Programing Interfaces) for use by services such as Trade PF. These registries will contain international and industry standard specifications for information exchange, aiming to improve the convenience of implementation in each PF and contribute to the dissemination of standard specifications. It is expected that the scope of the information will be expanded to include the entire supply chain in the future.

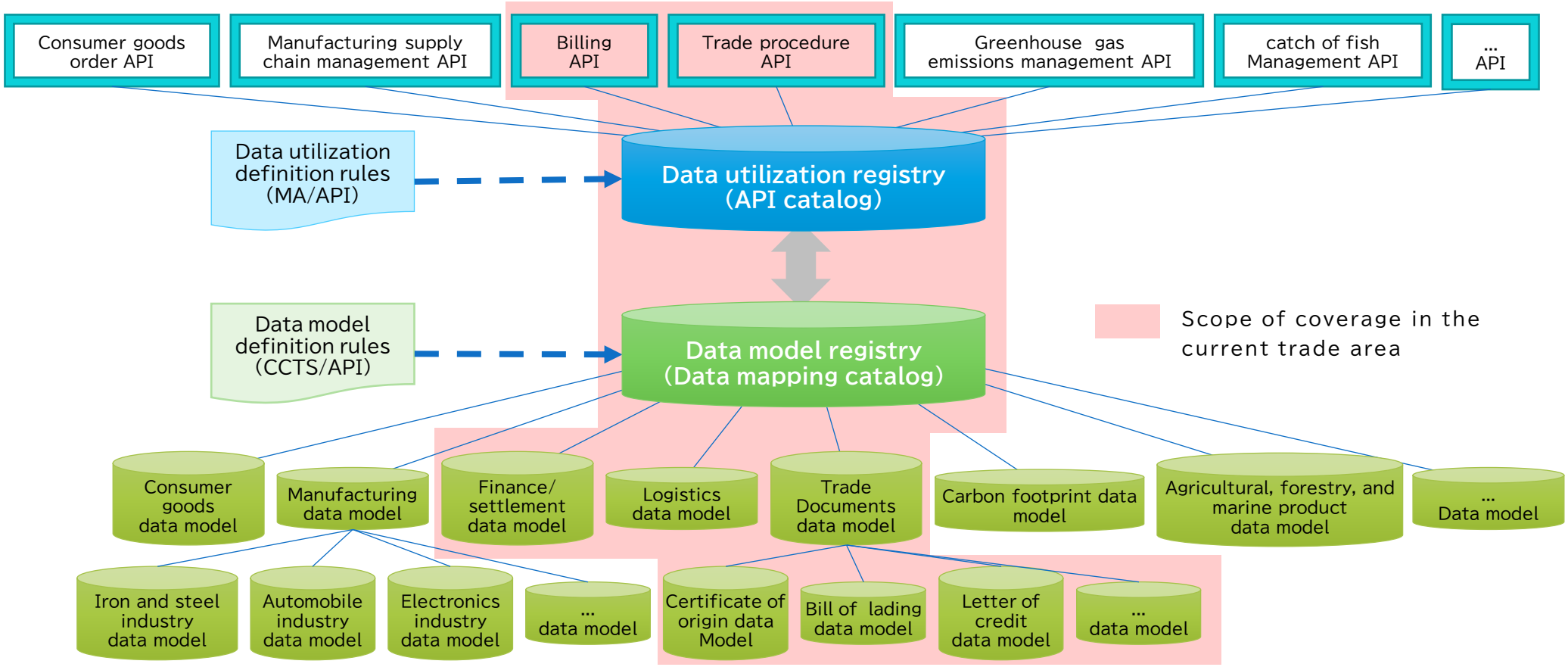
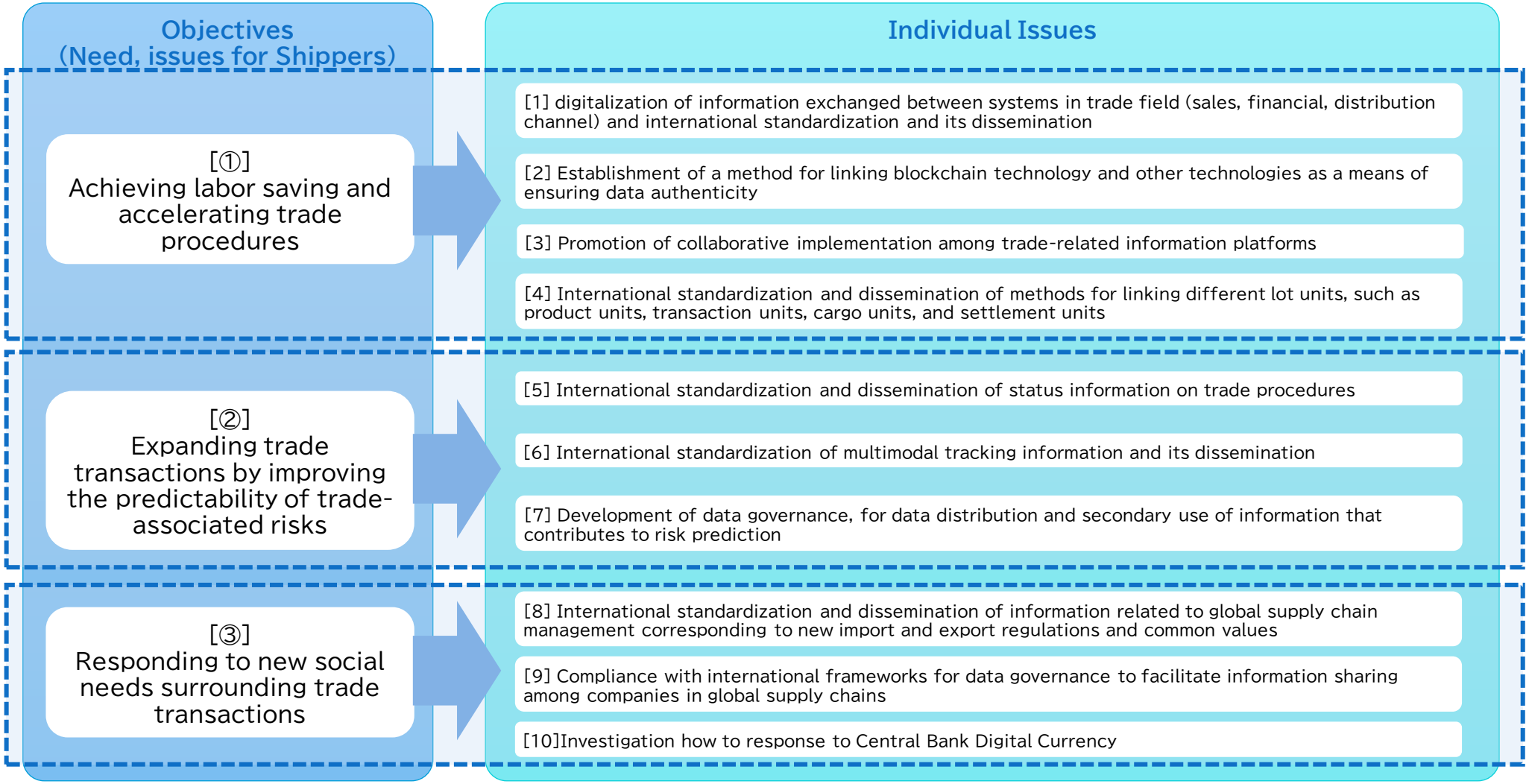


Figure: Scope of information handled by the Trade Digitalization Collaboration Tool

3. Issues for Achievement of Trade Field Digitalization

Individual Issues for Achievement of Trade Digitalization

Through the literature review, interviews with shippers and the discussion in the study group, the individual issues for the digitalization of trade field are identified in line with the objectives.



Individual Issues for Achievement of Trade Field Digitalization

The following is an overview of individual issues for trade digitalization.

[Individual issue 1] digitalization of information exchanged between systems in trade field (sales, financial, and logistics channel) and international standardization and its dissemination	For almost all trade operations, there are existing international standard specifications for the exchange of information between companies. In addition, international standardization for digitalization of documents that require originality is being promoted against the background of the use of blockchain and other technologies to ensure authenticity. In order to improve international data coordination for trade field, Japan needs to disseminate and implement these international standard specifications for digitalization of trade documents.
[Individual issue 2] Establishment of a method for linking blockchain technology and other technologies as a means of ensuring data authenticity	As for the digitalization of documents that require originality, the International Chamber of Commerce (ICC) issued the Uniform Rules on Digital Trade Transactions (URDTT) in 2021, which defines the rules applicable to each party involved in digital trade transactions as the process of using electronic records to prove the occurrence of the underlying sale, purchase, and payment obligations for goods or services. URDTT is intended to be a set of rules for the entire digital architecture, including artificial intelligence, natural language processing, machine learning, data analytics, smart contracts, smart objects, and the Internet of Things, in addition to blockchain technology. It is also necessary to study the technical specifications for coordination between different blockchain technologies and to make proposals for international standards.
[Individual issue 3] Promotion of collaborative implementation among trade-related information platforms	As a result, many trade-related businesses are forced to use multiple platforms in order to carry out a series of trade procedures. In particular, the cost and effort involved in linking each of these platforms with their own systems is becoming a significant issue. Therefore, it is expected that efforts to support the implementation of collaboration between the major domestic public and private trade platforms and the company's own system by trade-related businesses from the perspective of cost and other factors will help spread the implementation of collaboration at an early stage. In addition, private trade platforms are expected to play a role as a hub in the collaboration between overseas trade platforms and domestic NACCS and Cyberport. This is expected to contribute to the further promotion of (1) Digital First, (2) One-Stop, and (3) Once-Only, which are the three principles set forth in the "Action Plan for IT in Administrative Procedures and Private Sector Transactions.

Individual Issues for Achievement of Trade Field Digitalization

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[Individual issue 4] International standardization and dissemination of methods for linking different lot units, such as product units, transaction units, cargo units, and settlement units	In order to map information across fields, industries, and operations, it is necessary to link different lot units, such as product units, transaction units, cargo units, and settlement units, etc. The method of linking these units has not yet been studied by international organizations such as UN/CEFACT. Therefore, it is expected to conduct studies to establish a method, and to make proposals to UN/CEFACT for standardization. In addition, standardization will make it possible to automate the linking of different lot units, which is expected to lead to the implementation of smart contracts that automatically execute a series of operations by using this in conjunction with blockchain technology.
[Individual issue 5] International standardization and dissemination of status information on trade procedures	For status information on trade procedures, DCSA established standard specifications in 2020 for digitalization of tracking and tracing information for marine shipping (hereinafter referred to as ”tracking and tracing information” or ”T/T”). Japan needs to promote the implementation of specifications.
[Individual issue 6] International standardization of multimodal tracking information and its dissemination	For multimodal tracking information, including non-maritime, UN/CEFACT already developed a ”Standard for the digitalization of Multimodal Transport Data Sharing” in 2021. The EU has already accepted the UN/CEFACT Multimodal Reference Data Model (MMT RDM) as a common global infrastructure for the exchange of these data, as part of the regulation on electronic freight transport information exchange, which was adopted in 2020. Japan is required to promote the implementation of this model in Japan as well.
[Individual issue 7] Development of data governance, etc. for data distribution and secondary use of information that contributes to risk prediction	Due to the diversification and complexity of considerations in supply chain management, such as the need for economic security and the increasing severity of natural disasters, the resources of information for risk management are diverse. In addition, it is necessary to collect information in real time. In order to collect information from these resources quickly and efficiently, and to process and analyze it in a way that is suitable for use in risk management, it is necessary to develop a system for data distribution, data governance for secondary use, and the like. In addition, the government is expected to promote the use of public information as information used for risk prediction. In the past, the collection of information that contributes to risk prediction was often done manually from a wide range of resources, and this tended to result in high costs. The development of an environment that enables the utilization of public information and big data is expected to contribute to reducing the cost of data utilization.

Individual Issues for Achievement of Trade Field Digitalization

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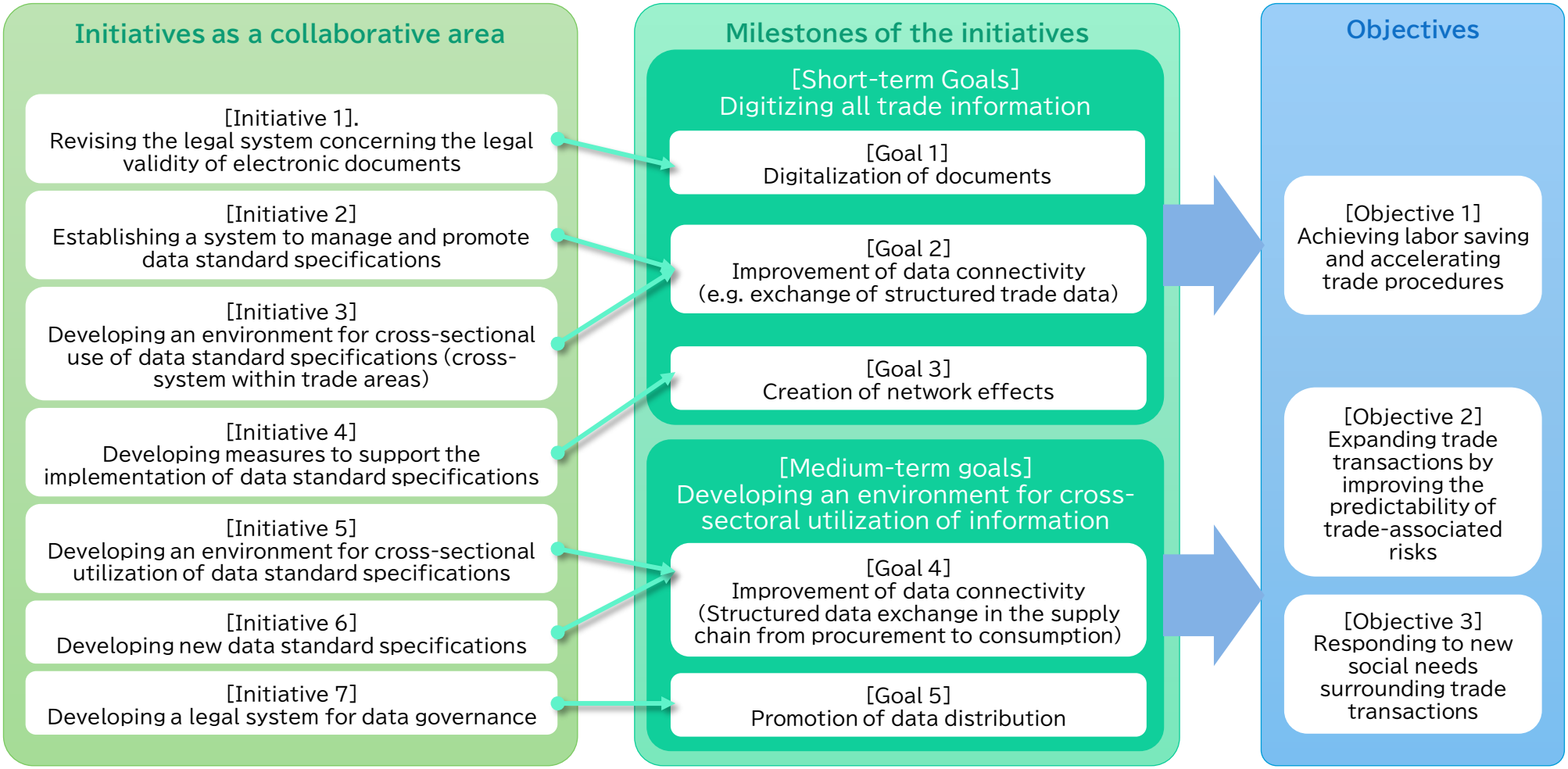
[Individual issue 8] International standardization and dissemination of information related to global supply chain management corresponding to new import and export regulations and common values	In recent years, there have been moves to strengthen economic security and a growing interest in common values such as the environment and human rights in international economic activities. In addition, efforts related to the SDGs(Sustainable Development Goals) and ESG(Environment, Social, Governance) are becoming increasingly important from the perspective of corporate and product evaluation. In order to respond to new import and export regulations, which are being implemented mainly in Europe, the U.S. and other countries, it will be necessary to improve the coordination of information across related fields and industries in the supply chain. The information that needs to be managed in these responses includes data on greenhouse gas emissions throughout the life cycle of the products to be traded, in addition to data on human rights issues such as the labor environment in manufacturing plants, including those of suppliers. These initiatives are also becoming increasingly important from the perspective of corporate financing.
[Individual issue 9] Compliance with international frameworks for data governance to facilitate information sharing among companies in global supply chains	Japan's "DATA-EX" initiative (Digital Agency) and Europe's "GAIA-X" initiative have defined common policy rules and architecture for interoperability and interconnection of data and platforms across industries and fields. In the future, it will be necessary to promote cross-industry and cross-sector data utilization, especially in order to comply with new import and export regulations. In addition to standardization based on data exchange, it is also necessary to comply with international frameworks for data governance, including data sharing and authentication when linking platforms.
[Individual issue 10] Responses to Central Bank Digital Currency	With regard to the settlement of trade transactions, the digitalization of documents such as LCs is currently underway, mainly on the trade platforms of the money flow system. However, SWIFT is still used for international transfer of money, and the use of digital currency is expected to be one of the means to realize digitalization of settlement, including international remittances. As a simple means of payment without banking intermediaries, digital currencies have advantages in terms of financial inclusion. Digital currencies are also expected to play an important role in expanding trade with developing countries. Central Bank Digital Currencies(CBDCs) also need to be closely monitored, considering issues such as currency sovereignty, which is also related to economic security.

4. Initiatives to Achieve Trade Digitalization and How to Proceed

Initiatives and Milestones to Achieve Trade Digitalization

Based on the individual issues for the trade digitalization, this chapter proposes initiatives that should be addressed for cross-sectional and cross-industry coordination between the public and private sectors. As milestones for these initiatives, the report suggests "digitalization of all trade-related information" as a short-term goal and "development of an environment for utilization of information across sectors" as a medium-term goal.



Proposed Initiatives for Achievement of Trade digitalization

[Short-term Objectives] The following initiatives are aimed at realizing the digitalization of all information in the trade field.

[Initiative 1]. Revising the legal system concerning the legal validity of electronic documents	When digitizing documents (B/L, L/C, C/O, etc.) that require the handling of originals in trade procedures, it is necessary to develop a legal system to ensure the legal validity of these electronic documents. In particular, in the digitalization of B/Ls, which are securities, it is necessary for both trading countries to develop domestic laws regarding the handling of eBLs (digitalized B/Ls). Then, it is necessary for the countries concerned to conclude a treaty. Many major developed countries have already established domestic laws. In Japan, we are in the process of starting related studies from 2021, the development of the legal system is urgent. In addition, the ICC has developed a common international framework for eLCs and eCOs (non-preferential certificates of origin). It is hoped that the public and private sectors will work together to swiftly respond to the legal and regulatory changes that will be required for the digitalization of other documents as well.
[Initiative 2] Establishing a system to manage and promote data standard specifications	Many data standard specifications related to trade (sales, financial, distribution) have already been established or are in the process of being established, by international organizations. It is necessary to focus on activities to promote compliance with these international standard specifications. There is a wide range of trade-related operations. Efforts for international standardization of these operations are carried out by several international organizations. Standards related to standard specifications are also developed and managed by some organizations. Therefore, when trade-related businesses want to link data in compliance with international standards, they need to collect these decentralized standards. For this reason, it is necessary to create a ”List of International Standards” that consolidates these standards and make it available to domestic businesses. It is considered reasonable for each organization that serves as a domestic contact point to take the initiative in collecting these standards in cooperation with each international organization. It is desirable to set up an organization that should be responsible for coordinating these domestic organizations in order to consolidate the work. In addition to the trade area, it is desirable to expand the target to non-trade areas in the supply chain.

Proposed Initiatives for Achievement of Trade digitalization

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[Initiative 3] Developing an environment for cross-sectional use of data standard specifications (cross-system within trade areas)	In order to implement an interface for data linkage across systems within the trade field or across fields and industries including non-trade fields, it is essential to obtain information on the data model of the linkage partner. As a collaboration tool for this purpose, it is necessary to develop a ”registry” that corresponds to the third layer (common vocabulary infrastructure, API development and publication, data catalog, metadata, etc.) of the ”Comprehensive Data Strategy Architecture” (Digital Agency). This registry should consist of a ”data model registry” and a ”data utilization registry. The ”data model registry” should be comprehensive and include data models for trade and other related fields and industries in the supply chain. It should also include a ”data mapping catalog” that maps data items with the same meaning across different fields. On the other hand, the “data utilization registry” should contain a catalog of APIs that describe the data model in an expression that can be recognized by software (generally using a specific programming language). Note that the operation of this registry is in a non-competitive area, and thus it is difficult to establish a business model from the perspective of profitability. It also requires continuous cooperation from multiple industries. For these reasons, it is hoped that the government takes the lead in setting up these registries and that the public and private sectors works together for a certain period of time afterwards with the support of the government.
[Initiative 4] Developing measures to support the implementation of data standard specifications	Many overseas trade platforms have improved their interoperability by linking APIs that comply with international standard specifications. Meanwhile, Japan’s trade platforms are lagging behind in terms of linkage, and it is urgent to take actions to address this issue from the perspective of strengthening international competitiveness. For this reason, it is desirable to provide support, such as subsidies for implementation costs of external linkage interfaces that comply with data standard specifications, for the following five linkage targets. (a) External linkage in the internal systems of trade-related businesses (shippers, logistics companies, etc.); (b) Mutual linkage between domestic private trade platforms and overseas trade platforms; (c) Mutual linkage to NACCS and Cyberport through connection to private trade platforms; (d) Interconnection between private trade platforms and various platform services other than those related to supply chain trade; (e) Mutual linkage between core services for SMEs and private trade platforms.

Proposed Initiatives for Achievement of Trade digitalization

[Mid-term Objectives] The following initiatives are aimed at developing an environment for cress-sectional utilization of information:

[Initiative 5] Developing an environment for cross-sectional utilization of data standard specifications	In order to respond to the new social needs surrounding trade transactions, it is necessary to implement interfaces for cross-sectoral and cross-industry data linkage, not only within the trade sector, but also for the entire supply chain, including non-trade sectors. For this reason, the “data model registry” and the “data utilization registry” need to comprehensively include data models not only from the trade sector but also from other related sectors and industries in the supply chain. It is desirable to promote the mutual use of data across sectors and industries by utilizing a ”data mapping catalog ” that maps synonymous data items among different sectors, etc.
[Initiative 6] Developing new data standard specifications	In information mapping across operations, it is necessary to link different lot units, such as product units, transaction units, cargo units, and settlement units. The method of linking these units has not yet been studied even by international organizations. Therefore, it is required to conduct surveys and research on establishing such a method and to make proposals to the UN/CEFACT for standardization. In the development of standard specifications, experts in the IT field and the standards field tend to lead the discussions in the conventional conference bodies, including UN/CEFACT. In view of this situation, it is important to encourage trade practitioners to actively participate in the development of more practical standard specifications. It is also desirable for the public and private sectors to work together from the stage of proposal to international standardization organizations, etc., so that Japanese private companies can actively propose other standard specifications to be newly developed in the future. In proposing new standard specifications internationally, it is effective to show concrete use cases and actual implementation results. For this purpose, it is desirable for the public and private sectors to work together, including PoC using fields in Japan or in East Asia and ASEAN countries that have experience in cooperation with Japan’s trade platforms.
[Initiative 7] Developing a legal system for data governance	In order to promote the distribution and secondary use of data utilization, it is essential to develop ”data governance” that defines rules to control the scope and authority of data. In Japan, the Comprehensive Data Strategy intends to include ”distribution infrastructure” and ”trust infrastructure” as part of ”DATA-EX”. In addition, the relevant ministries and agencies will collaborate to study the rules for handling data in order to promote the distribution of private sector data by the end of FY2021. It is necessary to follow these rules in the trade sector as well. At the same time, it is an urgent issue to respond to the new import and export regulations that are being implemented mainly in Europe, the United States, and other countries. In line with this, it is necessary to coordinate with major overseas coordination infrastructures such as GAIA-X, a European data distribution platform, as soon as possible. It is also desirable to confirm the technical specifications necessary for the implementation of the coordination and to request that the specifications be reflected in DATA-EX through efforts such as connection demonstrations with these major overseas coordination infrastructures.

Milestones of Initiatives

In promoting initiatives ① through ⑥, the short-term goal for 2-3 years is “digitalization of all information in the trade sector”, and the medium-term goal for 4-6 years is “development of an environment for cross-sectoral utilization of information”. By achieving these goals, the following effects are expected: