FY2022 International Economic Research Project for Establishing an Integrated Domestic and International Economic Growth Strategy (Examination of tools for cooperation in the field of trade digitalization, etc.)

Report Summary

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1. Background and Purpose of the Research and Overview of Implementation

Background of the research

- **Growing international interest in international standard specifications in the trade field and increased international standardization activities**

  - Although international standard specifications for EDI in the international trade field have been developed for a long time, the global digitalization rate of trade documents is still less than 1%, and it is estimated that 36 types of documents are exchanged on 240 paper media in a typical trade transaction. In this context, platform services for the digitalization of trade documents have been actively launched, partly due to the recent development of digital technologies such as blockchain. Since then, in order to further enjoy the benefits of digitalization, the linkage between these platforms and users, as well as between platforms, has been promoted. However, the burden of dealing with the linkage interface based on the proprietary specifications of each system has been growing. This situation has led to a growing international interest in the international standardization of interface specifications for coordination.

- **Increased burden in implementing data linkage functions due to the proliferation of trade-related platforms**

  - On the other hand, the interfaces for linking of Japan's trade-related platforms, both government-provided services such as NACCS and Cyber Port and other private-sector services, do not conform to international standard specifications. Following the launch of Cyber Port's service in FY2021, the "Study Group on the Digitalization of Trade Sector" in FY2021 pointed out that the burden of implementing linkage between trade-related businesses' internal systems and multiple trade-related platforms due to the different interface specifications for data linkage is a major issue in the trade sector. The "Study Group on Digitalization in the Trade Sector" in FY2021 pointed out this as a major issue in the trade sector. In addition, it is expected that Japanese trading companies will be required to link their internal systems with the global trade-related platforms used by their business partners in the future.

- Urgent need to comply with international standards in efforts to improve data linkage for trade digitalization
  - Japan's trade-related business operators are required to link data with their own systems and these domestic and foreign trade-related platforms, etc., and work to save labor and strengthen international competitiveness through digitalization and DX of trade operations.
  - In order to implement data linkage at a lower cost and further enhance the effects of digitalization of trade documents, it is imperative to keep pace with overseas trends and work on "compliance with international standards" that contribute to improved data linkage.

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Purpose of the Research

● **Among the short-term goals set forth in the "Action Plan" for FY2021, this research aims to "improve data linkage" and to realize the "development of a cross-sectional usage environment for data standard specifications" and the "establishment of a management and dissemination promotion system" as measures to achieve these goals.**

<**Purpose of this research**>
Implementating measures and achieving the goals

Matters to be addressed as a collaborative area (Measures, etc.)	Milestones in our efforts
	Short-term goals **Digitalize all information in the trade field**
[Measure 1] Revise laws and regulations pertaining to the legal validity of electronic documents	[Goal 1] Digitalize documents
[Measure 2] Establish a system to manage and promote the spread of data standard specifications	[Goal 2] Improve data linkage (e.g., exchange of structured data in the trade field)
[Measure 3] Develop a cross-sectional use environment for data standard specifications (across systems within the trade field)	
[Measure 4] Develop a measure to support implementation of data standard specifications	[Goal 3] Create network effects
[Measure 5] Develop a cross-sectional use environment for data standard specifications (across fields)	**Medium-term goals** **Establish an environment for the utilization of information across fields**
Measure 6 Develop new data standard specifications	[Goal 4] Improve data linkage (Exchange of structured data in the supply chain from procurement to consumption)
Measure 7 Establish a legal system for data governance	[Goal 5] Promote data distribution

● In trade field where many industries are involved, there is a need for neutral leadership and support from the government.

● This should be achieved as soon as possible in light of international trends.
● Effective and ripple effects are expected.

■ goals of this research

Measures and goals to be addressed in a collaborative area under the "Action Plan" (FY2021)

Details of the Research

● This research examined the practicality of "international standard" data specifications, which are considered useful for improving the linkage of trade data, and examined the ideal system for promoting the use of such data, as well as future measures to promote the digitalization of trade data.

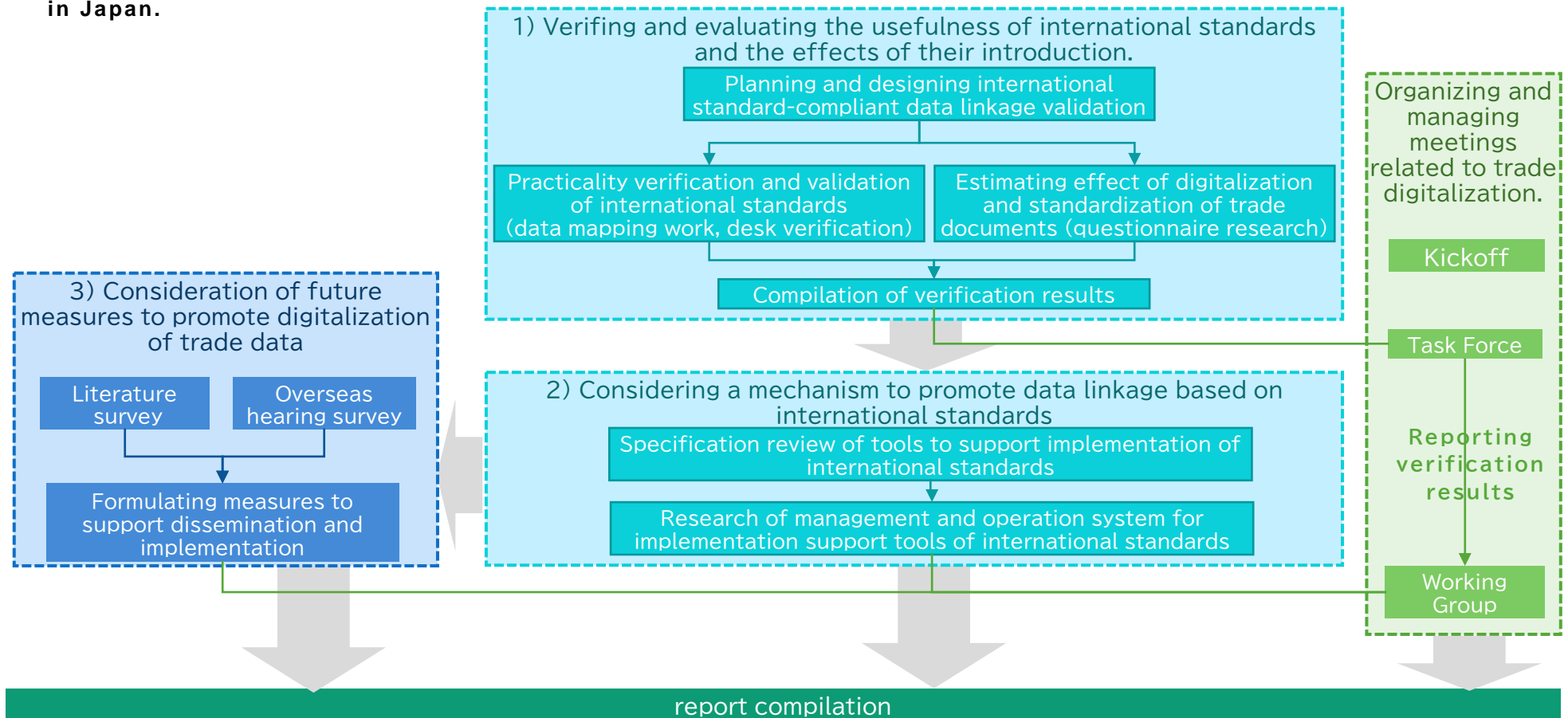| Matters to be addressed in this research	Outline of Implementation	Results
1) Verifying and evaluating the usefulness and effectiveness of the introduction of international standards	● We confirmed that we can perform data conversion between actual business and international standards for major trade documents (L/C and four related documents). ● We estimated the actual operational benefits of digitizing trade documents using a data linkage interface complies with international standards.	See "2. Verification and Evaluation of International Standards for Usefulness and Effectiveness of Introduction"
2) Mechanism to promote data linkage based on international standards (tools, rules, organization, etc.)	● The public and private sectors discussed and compiled a framework for promoting data linkage based on international standards such as trade documents (definition of semantics of data items; tools such as portal sites (registries) for disclosing relevant information; managing and operating organizations; continuous review meetings, etc.)	See "3. Research on Mechanisms (Tools, Rules, Organizations, etc.) to Promote Data Linkage Based on International Standards"
3) Considering future measures to promote digitalization of trade data, etc.	● In addition to the international standardization of data, we also discussed technical specifications, legal systems, rules, etc. related to mutual authentication and data sharing when linking data with overseas countries, and considered measures to promote the digitalization of trade data in Japan in the future.	See "4. Research on Future Measures for Promoting Digitalization of Trade Data"

Research Method

- In this research, Task Force (TF) was established to conduct a desk review of the practicality of international standards, using trade documents from actual operations. Based on the issues identified in the review, the TF discussed specifications for implementation support tools for international standards and examined the management and operation systems.

- In addition, a literature survey and an interview survey were conducted on trends related to data regulations, standards, and utilization overseas, as well as measures to support dissemination and implementation toward digitalization and standardization. Then Working Group (WG) discussed future policy proposals for Japan.

- The WG and TF were composed of academics, trade practitioners (Consignor, logistics companies, banks, insurance companies, etc.), and trade platform service providers, including three major domestic banks and seven trading companies in Japan.

1) Verifing and evaluating the usefulness of international standards and the effects of their introduction.

Planning and designing international standard-compliant data linkage validation

Practicality verification and validation of international standards (data mapping work, desk verification)

Estimating effect of digitalization and standardization of trade documents (questionnaire research)

Compilation of verification results

Organizing and managing meetings related to trade digitalization.

Kickoff

Task Force

Reporting verification results

3) Consideration of future measures to promote digitalization of trade data

Literature survey

Overseas hearing survey

Formulating measures to support dissemination and implementation

2) Considering a mechanism to promote data linkage based on international standards

Specification review of tools to support implementation of international standards

Research of management and operation system for implementation support tools of international standards

Working Group

report compilation

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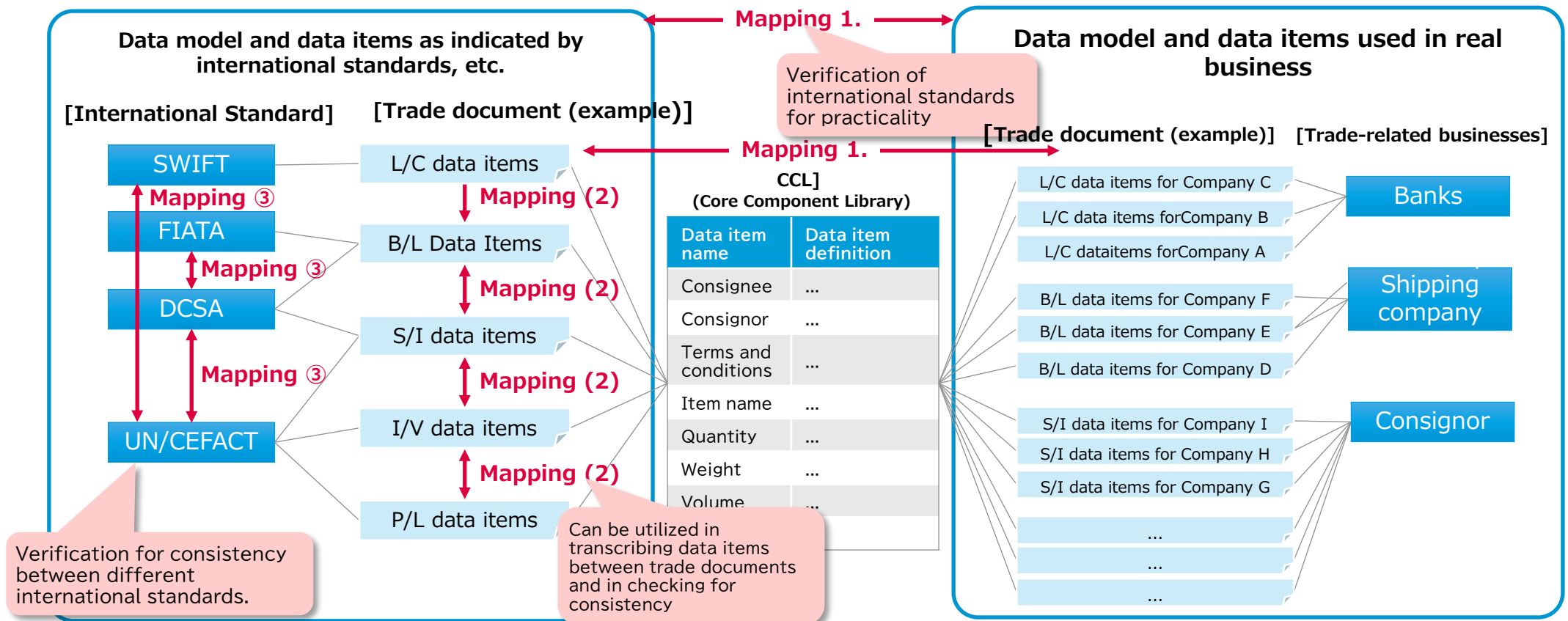# 2. Verification and Evaluation of International Standards for Usefulness and Effectiveness of Introduction

2-1. Verification of International Standards for Practicality and Usefulness

- In or to verify international standards for their practicality and usefulness for trade documentation, we checked the consistency and linkage of data items from the following three perspectives (this process is called "mapping").
  - Mapping goal 1: "Data items indicated by international standards, etc." and "Data models and data items of each company used in actual business" in the same trade document.
  - Mapping goal 2: Data items between different trade documents
  - Mapping goal 3: Data items between different international standards in the same trade document
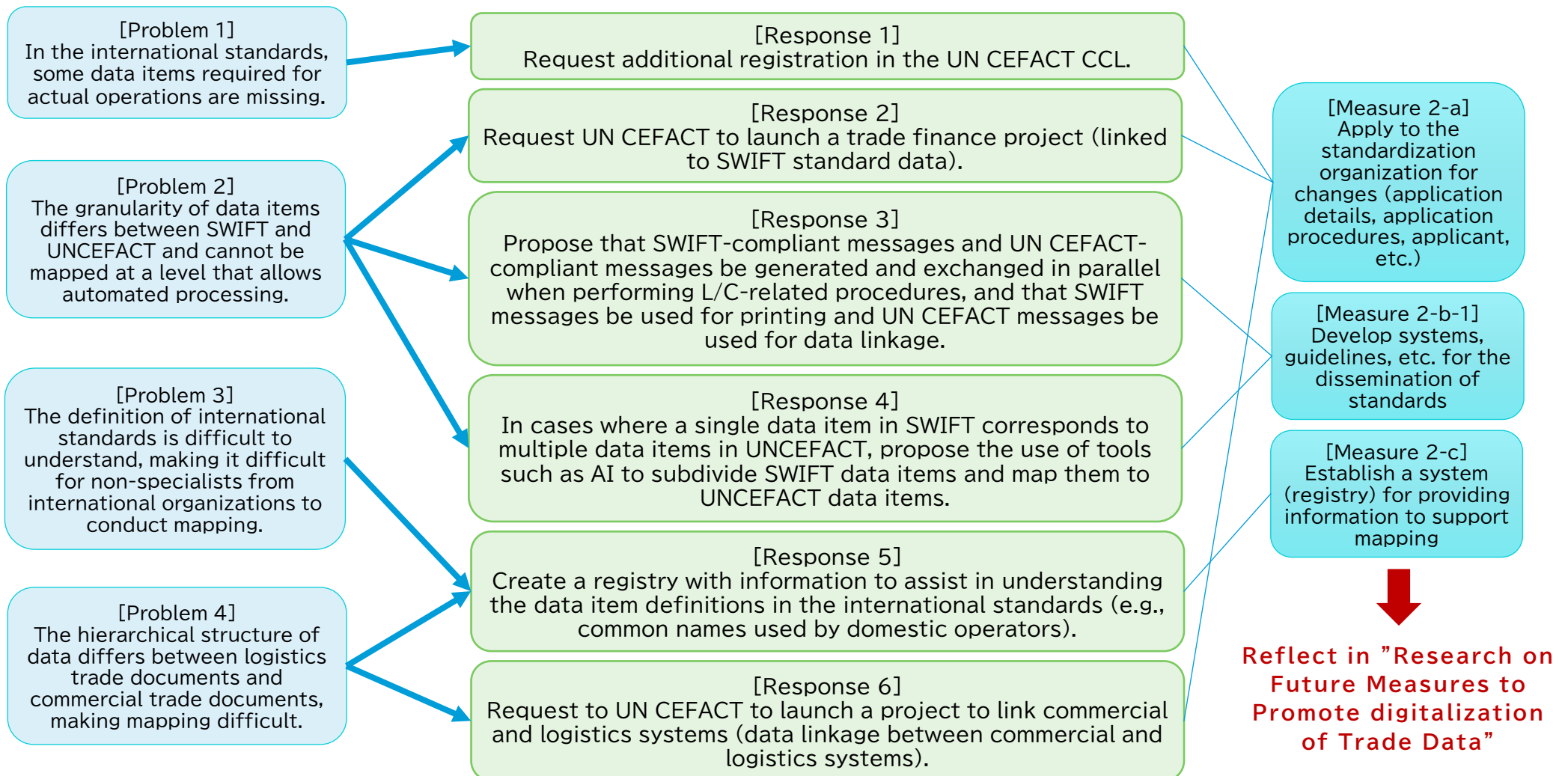
2-1. Verification of International Standards for Practicality and Usefulness

● The problems identified by mapping and the proposed policies and measures to address them are as follows.
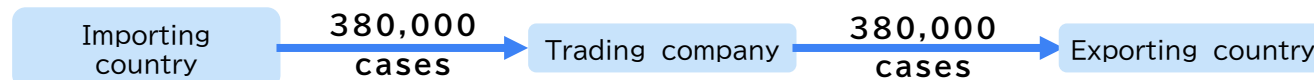
[Problems identified by mapping]   **[Response]**   **[Measure]**

[Problem 1]
In the international standards, some data items required for actual operations are missing.

[Problem 2]
The granularity of data items differs between SWIFT and UNCEFACT and cannot be mapped at a level that allows automated processing.

[Problem 3]
The definition of international standards is difficult to understand, making it difficult for non-specialists from international organizations to conduct mapping.

[Problem 4]
The hierarchical structure of data differs between logistics trade documents and commercial trade documents, making mapping difficult.

[Response 1]
Request additional registration in the UN CEFACT CCL.

[Response 2]
Request UN CEFACT to launch a trade finance project (linked to SWIFT standard data).

[Response 3]
Propose that SWIFT-compliant messages and UN CEFACT-compliant messages be generated and exchanged in parallel when performing L/C-related procedures, and that SWIFT messages be used for printing and UN CEFACT messages be used for data linkage.

[Response 4]
In cases where a single data item in SWIFT corresponds to multiple data items in UNCEFACT, propose the use of tools such as AI to subdivide SWIFT data items and map them to UNCEFACT data items.

[Response 5]
Create a registry with information to assist in understanding the data item definitions in the international standards (e.g., common names used by domestic operators).

[Response 6]
Request to UN CEFACT to launch a project to link commercial and logistics systems (data linkage between commercial and logistics systems).

[Measure 2-a]
Apply to the standardization organization for changes (application details, application procedures, applicant, etc.)

[Measure 2-b-1]
Develop systems, guidelines, etc. for the dissemination of standards

[Measure 2-c]
Establish a system (registry) for providing information to support mapping

Reflect in "Research on Future Measures to Promote digitalization of Trade Data"

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2-2. Verification of International Standards for Effectiveness of Introduction

● **Since the digitalization and standardization of trade documents can be effective only if more trade-related companies are involved in the process, this research was conducted to clarify the effects of the introduction of such a system in order to promote such efforts.**

(Note: Quantitative effects depend on the workload of each company.)

1. Number of transactions (annual)

| Importing country | → 380,000 cases → | Trading company | → 380,000 cases → | Exporting country |

<Reference>

Currently, 95% of LC (Letters of Credit) are hand-delivered and 70% of BLs (Bills of Lading) are mailed.

2. Number of client companies (annual)

Financial institutions ← 12 companies

Consignor ← 7600 companies → Trading company ← 4 services → PF services, etc.

Logistics provider ← 400 companies

<Reference>

used in transactions.
Of these, one or two linked systems are developing a connection IF.

3. Reduction in manual labor due to computerization (annual)

Time reduction effect	Abt. 70,000 hrs.
Cost savings	Abt. 200 million yen

<Prerequisites, etc.>
● Estimate based on the results for research on paper and electronic work time for major trade documents (LC (Letter of Credit), SI (Shipping Instruction), IV (Invoice), PL (Packing List), CO (Certificate of Origin), insurance policy).
● Cases in which the means of communication in document delivery is currently a system (structured data) are excluded from the reduction goal.
● Assumes CO issuance is 10% of total transactions.
● Personnel costs are assumed to be the average dispatch fee for all jobs (3,025 yen/person) based on the results of the fiscal 2021 Worker Dispatching Business Report compilation (Ministry of Health, Labour and Welfare).

4. Reduction of IF implementation cost for coordination by standardization

Linked IF implementation cost per connection	Abt. 2 million yen
When working with 100 business partners	Abt. 200 million yen
When linked to 5 PF services	Abt. 10 million yen

(Note) Assumed collaboration partners are PF services and business partners (financial institutions, consignors, logistics companies, etc.).

3. Research on Mechanisms (Tools, Rules, Organizations, etc.) to Promote Data Linkage Based on International Standards

Research on Mechanisms (Tools, Rules, Organizations, etc.) to Promote Data Linkage Based on International Standards

- Based on the issues identified in "Verification and Evaluation of International Standards for Usefulness and Effectiveness of Introduction," the public and private sectors discussed a system to promote data linkage based on international standards for trade documents, etc., and its management and operation system, and compiled them into the following measures:

Measure Figures in [ ] are IDs for "4. Research on Future Measures for Promoting digitalization of Trade Data".	Summary	Expected effects
[Measure 2-b-1] Develop guidelines, etc. for the introduction of digital trade documentation compliant with international standards	• Develop and publish guidelines (guidelines and indicators) for the introduction of digital trade documentation compliant with international standards. • Prepare and distribute an international standard implementation manual (tentative) for trade-related businesses (consignors, shipping companies, forwarders, PFer, IT vendors, etc.).	• The publication of the guidelines will impose a certain degree of enforcement in the promotion of digitalization and standardization of trade documents and promote their widespread use. • The implementation manuals can be used to efficiently advance the implementation process of digitalization and standardization of trade documents in user companies.
[Measure 2-c] Establish a mechanism (registry) to provide support information for mapping to international standard data items	• As one of the mechanisms to provide information on definitions of international standard data items, which is necessary for trade-related companies to map data items in their internal systems to international standard data items (mapping between data items necessary for data conversion), a registry will be established to centrally store and provide information on definitions of meanings and concepts of data items in trade documents (metadata).	• When exchanging trade documents between trading parties, a common understanding of the definition of the meaning and concept of the data item and its expression format, etc. can be shared among the trading parties, thereby improving data linkage. • By centralizing information sources, it will be easier to obtain the above information. • By making the definition of data items more detailed (eliminating ambiguity), it is easier to have them processed automatically without human intervention.

4. Research on Future Measures for Promoting Digitalization of Trade Data

4-1. Research on Measures Taken in Other Countries for Trade Digitalization

- In order to use as a reference for the consideration of future policy proposals for trade digitalization in Japan, we conducted a study for examples of such policies in Singapore, Europe, and other countries that are actively working on the digitalization of trade documents ahead of other countries were investigated. (See ⇒ 4-2.)

- The examples of measures from the research results are categorized into the following a. through f. from the viewpoint of approach methods and organized by objective (1) through (3) of this project.

【Exporting country

【Importing country

| f. Promoting use (mandatory) | f. Promoting use (mandatory) |

Example: Mandating private initiatives

| e. Promoting use (voluntary) | e. Promoting use (voluntary) |

Example: Providing incentives for private initiatives

| d. Improving the use environment (hard infrastructure) | Coordination | d. Improving the use environment (hard infrastructure) |

Example: Building common infrastructure PF service

| c. Improving the use environment(soft infrastructure) | Harmony | c. Improving the use environment (soft infrastructure |

Example: Developing relevant related to the use environment

| b. Unifying rules (domestic) | Harmony / Harmony / Harmony | b. Unifying rules (domestic) |

Example: Developing national legislation in compliance with international rules
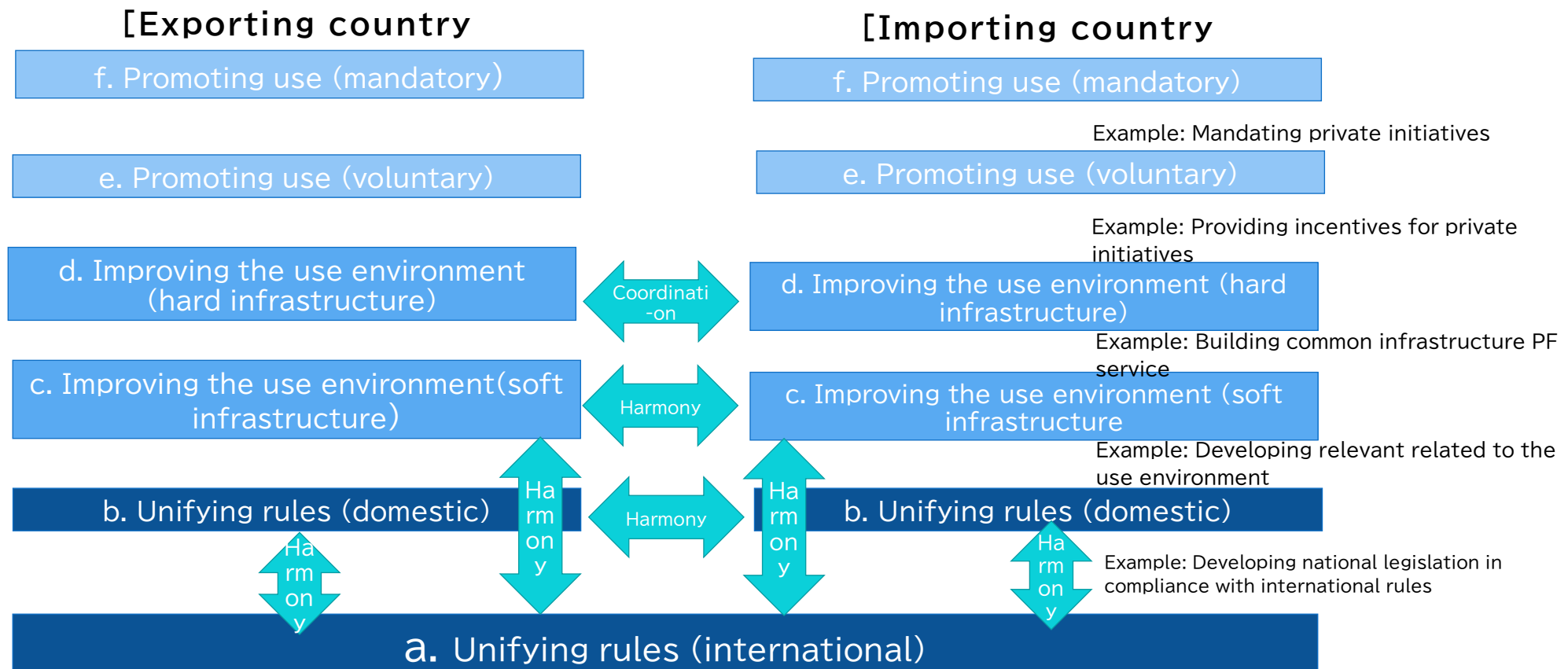
Harmony

a. Unifying rules (international)

Figure: System of Measures to Promote Trade Digitalization

E.g., MLETR, toolkit, etc.

4-1. Research on Measures Taken in Other Countries for Trade Digitalization
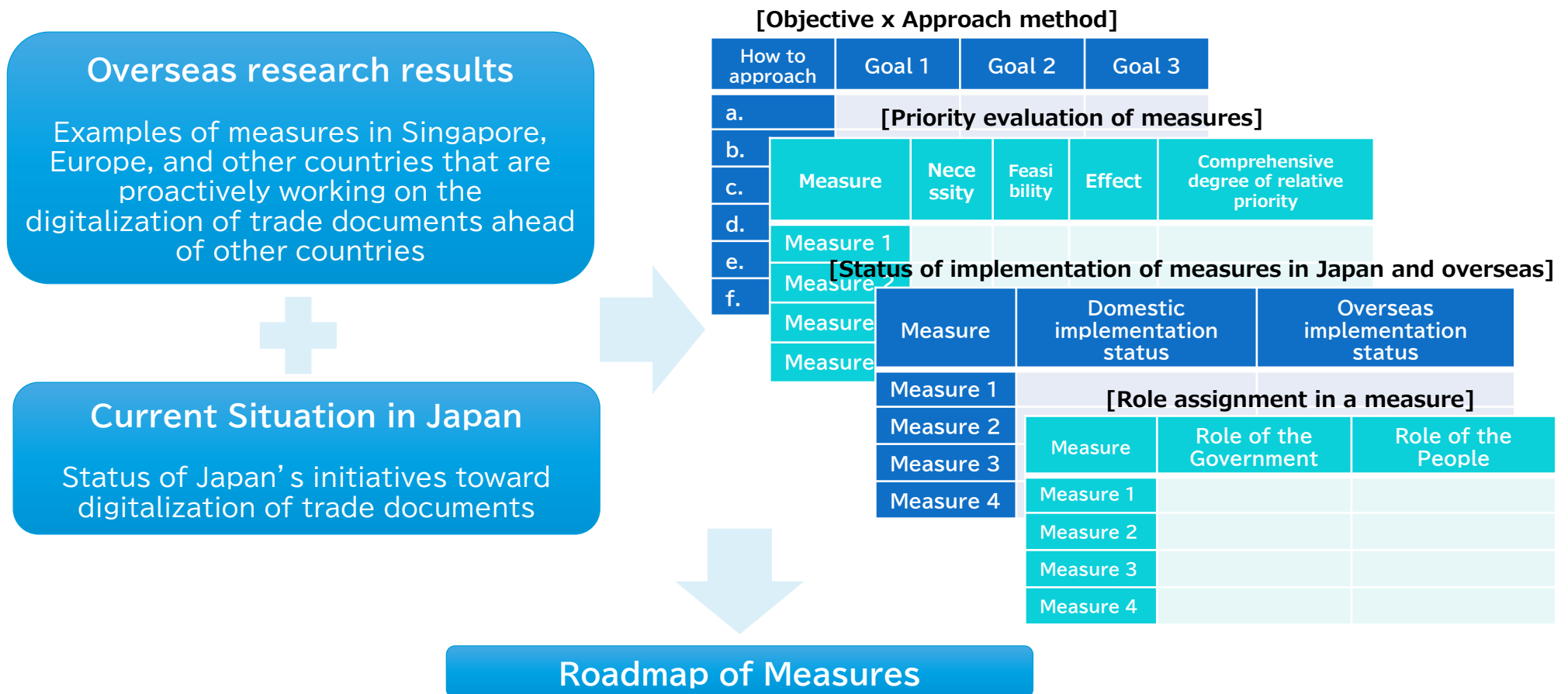
Table: Examples of Measures Taken in Other Countries for Trade Digitalization

	[Goal 1] Digitalize documents	[Goal 2] Improve data linkage	[Goal 3] Generate network effects
a. Unification of rules (Overseas)	• [International Organization] Establish UNCITRAL Model Law on Electronic Transferable Records (MLETR) [ICC]. • [Public] Sign a Digital Economy Agreement (DEA) with major trading partners [UK] [SG].	• International organizations] Create international standards for trade documentation [ICC, WTO].	• [International organization] Disseminate the Toolkit to other countries [ICC]. **[Legend]** [SG] and unmarked: Singapore [FR]: France [UK]: United Kingdom
b. Unification of rules (Domestic)	• [Public] Establish MLETR compliant laws (to cover all negotiable trade documents) [UK] [SG] [Other countries].	• [Public] Systematic digitalization strategy considering international collaboration [EU & U.S.A] [SG]. • [Public] [Private] Establish a private sector to propose a national strategy for trade digitalization [UK] [FR]. • [Public] [Private] Feedback from testing and piloting in the development of a legal framework	
c. Improvement of the use environment (Soft infrastructure)	• [Public] Establish a related legal system (e.g., Electronic Bookkeeping Act, Electronic Signature Act, etc.) • [Private] Disseminate LEI codes (to contribute to signless) *In Singapore in particular, the government is actively involved in the development of a hardware usage environment.*	• [Public] [Private] Adopt neutral, vendor-independent technology • [Public] [Private] Disseminate international standard codes (LEI code, LO code, etc.) for identification of companies and cargo • [Public] [Private] Create API specifications based on use cases.	• [Public] [Private] Develop an environment where platforms can work together while competing with each other. • [Public] [Private] Bilateral pilot projects for Peppol compliant e-I/V, remittance, etc. • [Public] Promote the used of WCO Trade Tools, eCO and eATA Carnet [FR] • [Public]Implement support for currency management, container tracking, trade document digitalization, and connectors to ensure interoperability between PFs [FR].
d. Improvement of the use environment (Hard infrastructure)	• [Public] Develop trade data distribution infrastructure that ensures reliability (authentication, originality of documents, etc.)	• [Public] Use of structured data in trade-related PFs • [Public] Develop a trade data distribution infrastructure to ensure interoperability • [Public] Development of adapter to connect internal ERP system and infrastructure • [Private] Provision of data conversion services by IT vendors	• [Public] Develop neutral infrastructure that encourages value creation in the ecosystem *There is also a lot of support for voluntary efforts by the private sector, such as pilot projects and human resource development such as training.*
e. Promotion of use (Voluntary)	• Pilot project for eBL using international standards • [Public] [Private] Dialogue with the private sector when discussing DEA and DEPA	• [Public] [Private] Pilot project for LEI code • [Public] [Private] Encourage domestic companies to obtain APEC Cross Border Privacy Rules certification. • [Public] [Private] Implement training for the introduction of digital trade documentation compliant with international standards [FR] [SG].	• [Public] [Private] Develop use cases having high benefits • [Public] [Private] Capacity building (human resource development, including the provision of comprehensive training to private companies) [SG] [FR] • [Public] Grant a subsidy for API connections
f. Promotion of use (Mandatory)	• [Public] Mandate the use of Peppol-compliant electronic invoices [FR].	• [Public] Promote a transition to digital invoices compliant with the Peppol international standard [EU] [SG]	• Mandate the use of Peppol-compliant electronic invoices [FR]

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4-2. Future Measures for Trade Digitalization in Japan

- The list of future measures was compiled with reference to examples of measures in Singapore, Europe, and other countries that are actively working on digitalization of trade documents ahead of others, as well as based on the status of efforts in Japan.

- The listed measures were organized in terms of "approach," "domestic and international implementation status," "priority assessment," and "division of roles". Based on the "domestic and international implementation status" and "priority assessment," a roadmap has been formulated to incorporate these measures.

Overseas research results

Examples of measures in Singapore, Europe, and other countries that are proactively working on the digitalization of trade documents ahead of other countries

Current Situation in Japan

Status of Japan's initiatives toward digitalization of trade documents

[Objective x Approach method]

How to approach	Goal 1	Goal 2	Goal 3
a.			
b.			
c.			
d.			
e.			
f.			

[Priority evaluation of measures]

Measure	Necessity	Feasibility	Effect	Comprehensive degree of relative priority
Measure 1				
Measure 2				
Measure				
Measure				

[Status of implementation of measures in Japan and overseas]

Measure	Domestic implementation status	Overseas implementation status
Measure 1		
Measure 2		
Measure 3		
Measure 4		

[Role assignment in a measure]

Measure	Role of the Government	Role of the People
Measure 1		
Measure 2		
Measure 3		
Measure 4		

Roadmap of Measures

4-2. Future Measures for Trade Digitalization in Japan

Table: Future Measures for Trade Digitalization in Japan

	[Goal 1] **Digitalize documents**	**[Goal 2]** **Improve data linkage**	**[Goal 3]** **Generate network effects**
a. Unifying rules (International)	• Measure 1-a : Promote interoperability of digital trade documents with trading partners	• Measure 2-a : Apply to international standardization organizations for international standardization for changes for international standardization in line with actual business operations and for international standardization that can be used across business operations	
b. Unifying rules (Domestic)	• Measure 1-b : Develop national legislation in response to the UNCITRAL Model Law on Electronic Transferable Records (MLETR)	• Measure 2-b-1 : Develop guidelines, etc. for the introduction of digital trade documents compliant with international standards • Measure 2-b-2 : Pilot projects to verify the practicality of guidelines, etc. • Measure 2-b-3 : Systematic digitalization strategy considering international collaboration • Measure 2-b-4 : Establish a private sector for proposing a national strategy for trade digitalization	• Measure 3-b : Develop legal systems, guidelines, etc. for compliance with international standards for trade documentation
c. Improving use environment (Soft infrastructure)	• Measure 1-c : Develop other related legal systems (e.g., electronic bookkeeping law; electronic signature law)	• Measure 2-c : Develop a mechanism (registry) to provide support information for mapping to international standard data items	• Measure 3-c-1 : Promote utilization of existing digital data, etc. related to trade documents • Measure 3-c-2 : Support start-up companies in offering innovative solutions to practical needs in trade operations
d. Improving use environment (Hard infrastructure)	• Measure 1-d : Develop a trade data distribution infrastructure to ensure reliability (authentication, originality of documents, etc.)	• Measure 2-d : Develop a trade data distribution infrastructure to ensure interoperability	• Measure 3-d : Develop a neutral trade data distribution infrastructure that promotes value creation in the ecosystem
e. Promoting use (Voluntary)	• Measure 1-e-1 : Establish a forum for consultation with the private sector to discuss the interoperability of digital trade documents with trading partners • Measure 1-e-2 : eBL pilot project	• Measure 2-e : Implement training for the introduction of digital trade documents compliant with international standards	• Measure 3-e-1 : Promote support for private operators in implementing IFs for linkage with neutral infrastructure • Measure 3-e-4 : Implement training on international standardization of trade documents • Measure 3-e-5 : Conduct a demonstration experiment for verifying the usefulness of digital trade documents in compliance with international standards
f. Promoting use (Mandatory)		• Measure 2-f : Develop a regulation on international standard compliance for trade documentation	

4-3. Roadmap of Future Measures for Trade Digitalization

	Year 2023	2024-25	From 2026
[Goal 1] Digitalize documents	Measure 1-b Develop national legislation in response to the UNCITRAL Model Law on Electronic Transferable Records (MLETR)		
		Measure 1-a Promote interoperability of digital trade documents with trading partners	
	Measure 1-e-1 Establish a forum for consultation with the private sector to discuss the interoperability of digital trade documents with		
		Measure 1-e-2 eBL pilot project	
		Measure 1-d Develop a trade data distribution infrastructure to ensure reliability (authentication, originality of documents,	
[Goal 2] Improve data linkage	Measure 2-a Apply for changes to international standardization organizations for international standardization in line with actual business operations and for international standardization that can be used across business operations		
	Measure 2-b-1 Develop guidelines, etc. for the introduction of digital trade documents compliant with international standards	Measure 2-e Implement training for the introduction of digital trade documents compliant with international standards	
		Measure 2-b-2 Pilot projects to verify the practicality of guidelines, etc.	
	Measure 2-b-3 Systematic digitalization strategy considering international collaboration		
	Measure 2-b-4 Establish a private sector to propose a national strategy for trade digitalization		
	Measure 2-c Establish a mechanism (registry) to provide support information for mapping to international standard data items		
	Measure 3-b Develop a legal systems, guideline a trade data distribution infrastructure to ensure interoperability international standards for trade documentation		
[Goal 3] Generate network effects		Measure 3-e-4 Implement training for international standardization of trade documents	
	Measure 3-e-5 Conduct demonstration experiment for verifying the usefulness of digital trade documents in compliance with international standards		
	Measure 3-e-1 Promote support measures for private operators implementing IF for collaboration among neutral infrastructure, platform services, and internal systems		
	Measure 3-d Develop a neutral trade data distribution infrastructure that promotes value creation in the ecosystem		
	Measure 3-c-1 Promote the use of existing digital data, etc. related to trade documents		
	Measure 3-c-2 Support start-up companies in offering innovative solutions to practical needs in trade operations		

＊"Measure 2-f Regulation of International Standard Compliance of Trade Documents" will be considered after determining the necessity of the measure based on the status of its diffusion.

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