

Advancing cross-border paperless trade of the Republic of Korea:

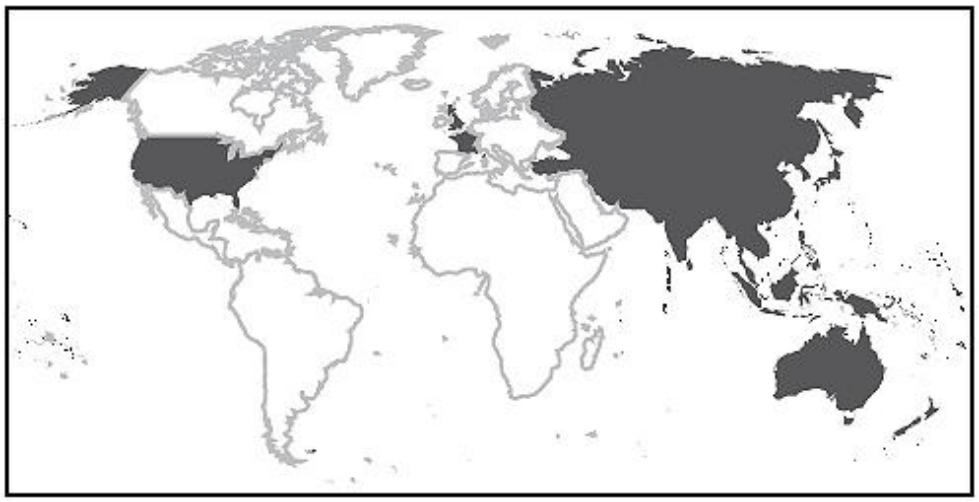
Reviewing Selected Documents and Exploring Pilot Projects

ESCAP

Advanced draft version for comments.

The Economic and Social Commission for Asia and the Pacific (ESCAP) is the most inclusive intergovernmental platform in the Asia-Pacific region. The Commission promotes cooperation among its 53 member States and 9 associate members in pursuit of solutions to sustainable development challenges. ESCAP is one of the five regional commissions of the United Nations.

The ESCAP secretariat supports inclusive, resilient and sustainable development in the region by generating action-oriented knowledge, and by providing technical assistance and capacity building services in support of national development objectives, regional agreements and the implementation of the 2030 Agenda for Sustainable Development.



Copyright © United Nations 2024

All rights reserved

Disclaimers:

The designation employed and the presentation of the material in the Report do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The United Nations bears no responsibility for the availability or functionality of URLs.

Opinion, figures and estimates set forth in this publication are the responsibility of the authors and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations. Any errors are the responsibility of the authors. Mention of firm names and commercial products does not imply the endorsement of the United Nations.

The report has been issued without formal editing.

Advancing Cross-Border Paperless of the Republic of Korea: Reviewing Selected Documents and Exploring Pilot Projects

United Nations Publications

Trade and Investment Division

ESCAP

Bangkok, Thailand

Copyright © United Nations 2024

All rights reserved

.

Acknowledgement

To support the implementation of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific, the ESCAP's Subregional Office for East and North-East Asia and Trade, Investment and Innovation Division jointly prepared this report. Hong Gyue Park, Associate Professor, Chungnam National University, The Republic of Korea, collected data and drafted the report. Tengfei Wang, Economic Affairs Officers and Ma. Fideles S. Sadicon, Sustainable Development Officer, ESCAP, guided the study and reviewed and revised the report. Julian Latimer Clarke substantially contributed to discussion of the report. Kayan Lee provided research analysis of the information during her internship at ESCAP. Yoshihiko Fujita provides logistical support.

The preliminary study results were shared at the meeting titled “Cross-border paperless trade: lessons from China, Mongolia and Republic of Korea” held in a hybrid manner on 5 October 2023. Furthermore, the draft report was shared at the ad-hoc session of the Standing Committee of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific held on 23-24 January 2024. Insightful expertise from the participants and constructive feedback are gratefully acknowledged.

The following experts shared their insights and reviewed the documents: XXX

The study is supported by a project titled "Enhancing Capacity of East and North-East Asian Countries for Regional Connectivity through Trade and Transport Facilitation". Generous support from the Government of the The Republic of Korea is gratefully acknowledged.

Executive summary

Many Asian and Pacific countries have been actively implementing trade facilitation measures, as reported by the UN global survey. However, the same study also shows that the cross-border paperless trade has been least implemented.

The entry into force of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (CPTA) shows that countries in the region are committed to collaborating to advance cross-border paperless trade. As of December 2023, 12 countries have acceded to CPTA.

The Republic of Korea acceded to CPTA in November 2022. This document reviews the important documents, including e-C/O, e-Phyto, and animal product certificates, that the Republic of Korea has exchanged electronically with other countries. The Republic of Korea initiated e-C/O exchanges primarily with China in 2016, followed by Indonesia in 2019 and Viet Nam in 2023. In 2021, the Republic of Korea successfully implemented e-Phyto with the United States, expanding to New Zealand in 2022. Currently, the Republic of Korea engages in electronic exchanges of e-Phyto with 12 countries, including Australia, Israel, Sri Lanka, Guatemala, Panama, Jordan, Uganda, Tunisia, Madagascar, Cameroon, Fiji, and Samoa. Since 2022, the Republic of Korea has electronically exchanged animal quarantine certificates with New Zealand, focusing on specific items, namely frozen meat, casings, venison, non-edible animal by-products, processed dairy products, and non-edible milk and milk products. While electronic animal quarantine certificates are in the early stages compared to e-C/O or e-Phyto, they exhibit significant growth potential, particularly for countries with substantial livestock import and export volumes.

This report identifies the following trade-related documents that advance cross-border paperless trade that the government of the Republic of Korea may consider. The selection of documents for potential pilot projects must adhere to specific criteria and standards. This process involves evaluating the potential cargo movement and the scope for development by establishing a document exchange system. Notably, the Republic of Korea has predominantly utilized governmental agency-issued documents for paperless trade. These documents serve as a foundation for intergovernmental exchanges and ensure clear lines of responsibility in case of issues. In contrast, private organizations' documents require additional negotiations, making them less prevalent internationally. Identified governmental agency-issued documents with potential for exchange include the fumigation certificate, health certificate, organic certificate, certificate of environmental radioactivity level, and CITES certificate.

Additionally, a compelling business case should drive the selection of documents. Despite the benefits of cross-border paperless trade, its implementation requires significant investment and maintenance. Therefore, the benefits must outweigh the associated costs.

This report proposes the Republic of Korea's potential directions for further work on cross-border paperless trade, emphasizing specific pilot projects. Firstly, expanding electronic Certificates of Origin (e-C/O) and electronic Phytosanitary Certificates (ePhyto) to additional trading partners is recommended. The Republic of Korea has established electronic exchanges with China, Indonesia,

and Viet Nam, but continuous expansion is necessary, particularly with major trading partners like the United States.

To integrate with the ASEAN electronic system, the Republic of Korea should engage in bilateral efforts with each country while working towards revising the ASEAN-Republic of Korea Free Trade Agreement for multilateral exchanges. Actively participating in the International Plant Protection Convention's (IPPC) ePhyto system and engaging with countries involved in the IPPC's ePhyto exchange will position the Republic of Korea as a leader in electronic trade.

Apart from e-C/O and ePhyto, health certificates are essential, especially in trade with China, ASEAN, and many Muslim countries. With the Republic of Korea issuing a substantial number of health certificates, transitioning to electronic formats is beneficial for efficient global exchange, particularly with established trading partners.

Organic certificates, issued by the Ministry of Agriculture, Food, and Rural Affairs, are crucial for the Republic of Korea due to significant imports of organic food products. While discussions for document exchange should primarily involve major agricultural exporters like the United States, limitations exist due to the limited number of target countries.

The Republic of Korea and other countries in the region may consider introducing measures to adopt the digital certificates of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This move could significantly prevent the illegal trafficking of endangered wildlife, even though the data transmission volume is relatively low.

This report also discusses the possible financial support from the Republic of Korea and points out that such support should aim for a win-win outcome. The Republic of Korea's transition from an aid recipient to a donor country positions it to share development experience and offer Official Development Assistance (ODA) to developing nations, contributing significantly to the establishment of paperless trade. In 2022, Korea's grant aid amounted to $910 million in Asia, $181 million in the Americas, and $563 million in Africa. The Korean Customs Administration supports training and modernization in developing countries, allocating $4.2 million for Tajikistan in 2021. UNIPASS system export to 14 countries and customs advisory programs in 39 nations have elevated Korea's customs standards globally. The cost analysis of establishing EODES in China, Indonesia, and Viet Nam underscores the need for financial support, especially in the Asia-Pacific region. Securing funds for pilot tests and system development can enhance collaboration with countries like Cambodia and Lao People's Democratic Republic, aligning with the ASEAN-ROK Cooperation Fund. Government support, securing budgets in advance, and information sharing on available financial resources are crucial for successful collaboration with financially challenged developing nations.

This report is exploratory, and all discussions and recommendations in the report are subject to further debate. The document should be treated as a living document that will be regularly updated with further critical analysis.

Table of Contents

Acknowledgement 1

Executive summary 2

Abbreviations 5

I. Introduction 1

II. Reviewing Selected Documents On Cross-Border Paperless Trade 3

II.1 Certificate of Origin (C/O) 3

II.2 E-Phyto 13

II.2.1. The International Plant Protection Convention (IPPC) Solution 13

II.2.2 E-Phyto Implementation by the Republic of Korea 13

II.3 Certificate on Animal Products for Paperless Trade 15

III. Way forward in advancing cross-border paperless trade 19

III. 1. Advancing implementation of e-C/O, e-Phyto and electronic animal quarantine certificate 19

III.1.1 e-C/O 19

III.1.2 e-Phyto 20

III.1.3 Electronic animal quarantine certificate 20

III. 2 Exploring other trade-related documents 22

III.2.1 Health certificate 24

III.2.2 Organic certificate 25

III.2.3 CITES document 25

III.3 Financial support for cooperations 26

Abbreviations

AEO	Authorised Economic Operator
APQA	Animal and Plant Quarantine Agency
ASW	ASEAN Single Window
C/O	Certificate of Origin
CEPA	Comprehensive Economic Partnership Agreement
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPTA	Framework Agreement on Facilitation of Cross-Border Paperless Trade in Asia and the Pacific
e-C/O	e-Certificate of Origin
e-Phyto	electronic Phytosanitary Certificate
eBMS	ebXML Message Service
ECDSA	Elliptic Curve Digital Signature Algorithm
EODES	Electronic Origin Data Exchange System
FTA	Free Trade Agreement
GeNS	General e-Phyto National System
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
KCS	Republic of Korea Customs Service
KTNET	Republic of Korea Trade Network
MOU	Memoranda of Understanding
MQ	Message Queuing
MRAs	Mutual Recognition Agreements
NIPA	National IT Industry Promotion Agency
ODA	Official Development Assistance
SOAP	Simple Object Access Protocol
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNICC	UN International Computing Center
UNIPASS	Unified Customs Clearance Platform
WCO	World Customs Organization
WTO	World Trade Organization

I. Introduction

Many countries in Asia and the Pacific have been actively implementing trade facilitation measures, as reported by the UN global survey[1]. However, the same survey also shows that the cross-border paperless trade has been least implemented.

The entry into force of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (CPTA) shows that countries in the region are committed to collaborating to advance cross-border paperless trade. As of December 2023, 12 countries have acceded to CPTA[2].

The Republic of Korea acceded to CPTA in November 2022. This document reviews the critical documents that the Republic of Korea has exchanged electronically with other countries.

- The Republic of Korea began exchanging e-C/O primarily with China in 2016, followed by Indonesia in 2019 and Viet Nam in 2023.
- In 2021, the Republic of Korea successfully implemented e-Phyto with the United States, followed by New Zealand in 2022. The Republic of Korea has been conducting electronic exchanges of e-Phyto with 12 countries, including Australia, Israel, Sri Lanka, Guatemala, Panama, Jordan, Uganda, Tunisia, Madagascar, Cameroon, Fiji, and Samoa.
- Since 2022, the Republic of Korea has electronically exchanged animal quarantine certificates with New Zealand. Overall, electronic animal quarantine certificates are still limited and in the early stages compared to e-C/O or e-Phyto. However, electronic animal quarantine certificates have considerable growth potential, especially for countries with significant volumes of livestock import and export.

This document also proposes the further work on advancing cross-border paperless trade between the Republic of Korea and its trading partners. First, the Republic of Korea may consider expanding e-C/O, e-Phyto and animal quarantine certificate to other countries; Second, the Republic of Korea may consider initiating the work on electronic exchange of

[1] https://www.untfsurvey.org/

[2] https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=X-20&chapter=10&clang=_en

other trade-related documents such as health certificates, organic certificates and the digital certificates of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

II. Reviewing Selected Documents On Cross-Border Paperless Trade

II.1 Certificate of Origin (C/O)

The Electronic Origin Data Exchange System (hereafter EODES) is a system for electronically exchanging Certificate of Origin (hereafter C/O) to receive preferential tariff benefits under FTA and eliminate the need for paper C/O during customs clearance. The Republic of Korea has concluded FTAs with 59 countries as of Jan 1, 2023[3]. However, the traditional method of delivering the C/O through international mail for submission to importing country customs poses various challenges. To address these issues, the Republic of Korea has pursued the establishment of an EODES for real-time electronic transmission of C/O information (Table 1). This initiative aims to adapt to the expanding FTAs, increasing trade volume, and the shift towards paperless trade.

Table 1. EODES in the Republic of Korea

Category	EODES in the Republic of Korea
Legal basis in the Republic of Korea	Customs Act Article 240.6, Enforcement Decree of the Customs Act Article 245 and Article 41, Act on Special Cases Of The Customs Act For The Implementation Of Free Trade Agreements Article 33
Establishment	Based on the individual negotiations with partner countries
In operation	China and Indonesia
Technology	eBMS, MQ, Blockchain
Exchange document	e-C/O
Scope of the service	Between participating parties only

Source: Obtained from the Republic of Korea Institute of Origin Information[4]

The operational process of EODES involves exporters applying for electronic C/O, which are transmitted to the export country's customs authority. The import country's customs authority reviews the C/O electronically and determines eligibility for preferential tariffs. Importers are exempted from submitting original paper C/O during import declarations, saving postage and logistics expenses. The Republic of Korea Customs Service (hereafter KCS) operates a system that allows export companies to transmit C/O and track cargo clearance status at the importing country in real-time through the internet

[3] KCS webpage, accessed at 14 Nov 2023, available at: https://www.customs.go.kr/ftaportalkor/cm/cntnts/cntntsView.do?mi=3310&cntntsId=986

[4] Republic of Korea Institute of Origin Information, (2017), Analysis of the Current Operation of Inter-country Origin Data Exchange Systems and Study on Future Development Strategies, Final Report, Republic of Korea Institute of Origin Information. (In Korean)

and mobile devices. Users can check for transmission errors and verify the cargo clearance status by entering the issuance number and reference code of the C/O.

II.1.1. EODES implementation in the Republic of Korea with China and Indonesia

Strategic cooperation agreements were established with China and Indonesia in 2014 and 2020 to construct and implement EODES. The number of EODES data exchanges between the Republic of Korea and China, Indonesia is explained in Table 2.

Table 2. Number of EODES Data Exchange from Oct 1, 2020, to Sep 30, 2021

Item	Cases
Data receipt from China to the Republic of Korea	1,599,432
Data delivery from the Republic of Korea to China	281,094
Data receipt from Indonesia to the Republic of Korea	46,723
Data delivery from the Republic of Korea to Indonesia	58,815

Source: Obtained from collected data and interviews with officials from KCS

As of May 2022, Vietnam and India agreed with the Republic of Korea to develop an Electronic Origin Data Exchange System (EODES). The inaugural exchange of electronic Certificates of Origin (e-C/O) between Viet Nam and the Republic of Korea launched on July 15, 2023[5]. Dialogues and initiatives to construct EODES are also progressing with nations such as Thailand and the Philippines. Refer to Table 3 for a summary of active endeavours to implement EODES or establish e-C/O arrangements with other countries. Discussions and proposals for EODES construction are also underway with countries such as Thailand and the Philippines.

[5] KCS webpage, accessed on 28 August 2023, available at: https://www.customs.go.kr/ftaportalkor/na/ntt/selectNttInfo.do?mi=3556&bbsId=1483&nttSn=10084255 (In Korean)

Table 3. Ongoing Efforts to Build EODES or e-C/O with Other Countries

Partner Country	Legal, Technical, and Other Issues	Specific Arrangement
Viet Nam	Regarding the latest advancements in paperless trade involving the Republic of Korea and Viet Nam, the official exchange of e-C/O commenced on July 15, 2023. There is no legal basis for the electronic exchange of C/O between the Republic of Korea and Vietnam, but the MOU is the practical foundation for the collaboration. Viet Nam follows the successful cooperation between the Republic of Korea and Indonesia.	MOU
Singapore	The Republic of Korea and Singapore FTA and the Republic of Korea-Singapore Digital Partnership Agreement have agreements on the exemption of paper-based C/O in several provisions. Two countries agree that tracking E-C/O, not the EODES system, will be applied between the Republic of Korea and Singapore because the exchange of C/O occurs sporadically between the two countries.	Republic of Korea-Singapore Digital Partnership Agreement
Thailand	There is no legal support for the implementation of the paperless exchange of C/O in the Republic of Korea-ASEAN FTA, Republic of Korea is currently working on having a MOU as an alternative foundation for the agreement like Indonesia and Viet Nam. However, the progress has been slow.	N/A
Philippines	A meeting started on August 11, 2017, but there has been no significant progress since the meeting and proposal letter exchanged in 2019.	N/A

Source: Obtained from interviews with customs officers in the Republic of Korea

Promotion of Electronic Origin Data Exchange Systems (EODES) within ASEAN nations encounters legal complications, necessitating the establishment of a robust legal infrastructure to ensure seamless implementation and regulation. Present Free Trade Agreements (FTAs) fail to support EODES substantially, often hindering its effectiveness. Specifically, despite its importance, the Republic of Korea-ASEAN FTA omits EODES-related provisions. It continues to mandate the submission of physical Certificates of Origin (C/O), which is inconsistent with the digital nature of EODES.

While revising the Republic of Korea-ASEAN FTA is critical to integrating EODES effectively, this necessity for amendment is also likely applicable in other member states. While Memoranda of Understanding (MOUs) have partly settled the legal groundwork for EODES between the Republic of Korea and Viet Nam, as well as the Republic of Korea and

Indonesia, a more comprehensive legal framework is imperative to ensure the unimpeded expansion of EODES amongst other ASEAN members.

II. 2. Legal Basis for EODES

The Republic of Korea has successfully established and operates the EODES with China, Indonesia, and Viet Nam, supported by legal provisions. The strategic cooperation agreement between the customs authorities of the Republic of Korea and China was amended in July 2014 to mention efforts towards EODES establishment explicitly. Furthermore, the Republic of Korea-China FTA, effective from December 2015, included a provision allowing the exemption of submitting the original C/O when exchanging electronic C/Os, providing a legal basis for EODES in the FTA. In the Republic of Korea, there is a legal framework for exchanging origin information between countries under Article 33 of the Special Act on FTAs[6]The KCS has incorporated provisions for the exchange of electronic origin information and the exemption of submitting the original C/O in its guidelines on FTA-related matters, further solidifying the legal support for the operation of EODES. The process of establishing legal grounds between the Republic of Korea and China for the operation of EODES is explained as follows.

Article 2, Paragraph 1 of the strategic cooperation agreement between the customs authorities of Republic of Korea and China (July 3, 2014): Cooperation on the exchange of customs data for preferential tariff treatment (Attachment, Paragraph 3) and explicit mention of efforts to establish an electronic data exchange system. Article 3.27 of the Republic of Korea-China FTA Agreement (effective on December 20, 2015) is shown below.

"Arrangement between the Korea Customs Service of the Republic of Korea and the General Administration of Customs of the People's Republic of China on Strategic Cooperation", both Parties endeavor to develop an Electronic Origin Data Exchange System before the implementation of this Agreement to ensure the effective and efficient implementation of this Chapter in a manner jointly determined by the Parties.

[6] Webpage on national legal provisions, accessed on: 18, Nov 2023, available at: https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EC%9E%90%EC%9C%A0%EB%AC%B4%EC%97%AD%ED%98%91%EC%A0%95(FTA)%EA%B4%80%EC%84%B8%EB%B2%95

It specifies the development efforts for the electronic origin information exchange system in accordance with the "Strategic Cooperation Agreement between the Republic of Korea Customs Service and the General Administration of Customs of the People's Republic of China".

Article 3.17, Section 1. (c) of the Republic of Korea-China FTA Agreement (effective on December 20, 2015) states as follows.

If all the information of a Certificate of Origin is exchanged between the customs authority of each Party through Article 3.27 (Electronic Origin Data Exchange System), the customs authority of each Party may not require the importer to submit the Certificate of Origin on importation. Nevertheless, the customs authority of each Party reserves the right to require the importer to submit the Certificate of Origin, when it deems necessary. This footnote shall be without prejudice to any other requirements under this Chapter.

The legal foundations in the Republic of Korea allow the exemption of submitting the original C/O when exchanging electronic origin information. In the case of the Republic of Korea-China EODES, an Arrangement on Strategic Cooperation was agreed upon in 2015, specifically addressing the exchange of data and C/O for the FTA between the two countries. This agreement facilitates the exchange of electronic C/O within national borders.

Regarding Republic of Korea-Indonesia EODES, there were initially no legal provisions for EODES operation in the Republic of Korea-ASEAN FTA Agreement. However, through the Republic of Korea-Indonesia EODES Implementation Cooperation Agreement signed in April 2019, Indonesia supported EODES operation through its domestic financial regulations, while the Republic of Korea supported it through the Special Act on FTAs and guidelines issued by the KCS. Subsequently, the Comprehensive Economic Partnership Agreement (CEPA) between the Republic of Korea and Indonesia, signed on December 18, 2020, included provisions introducing the legal basis for EODES. The CEPA has been in effect since January 1, 2023. The process of reaching agreements and complementing domestic laws regarding the footnote of article 3. 16 for the Republic of Korea-Indonesia EODES is as follows.

If all the information of a Certificate of Origin is exchanged between the customs authority of each Party in accordance with Article 3.25, the customs authority of each Party may not require the importer to submit the Certificate of Origin on importation. Nevertheless, the customs authority of each Party reserves the right to require the importer to submit the Certificate of Origin, when it deems necessary. This footnote shall be without prejudice to any other requirements under this Chapter.

Also, article 3. 25 states: *The Parties may develop an electronic system for origin information exchange to ensure the effective and efficient implementation of this Chapter.*

II. 3. Technical Application of EODES

Table 4 shows the commonly used forms of interconnection technologies and security technologies.

Table 4. Application of Technologies of the KCS

Category	Specific technology application	
Types of technology	· eBMS (ebXML Message Service) 2.0 · MQ (Message Queuing) · Blockchain	
Network	Public Network & Vpn (IPSec)	
Channel security	SSL/HTTPS(HTTP with TLS 1.1)	
Data model	based on WCO DM 3.4	
Authentication	X.509 v3 PK	
Electronic signature	ebMS or MQ	XML Signature
	Blockchain	ECDSA (Elliptic Curve Digital Signature Algorithm)
Encryption	ebMS or MQ	XML Encryption SHA-256, 2048-bit RSA Key, AES-256
	Blockchain	Data Encryption SHA-256, AES-256
SOAP signature	WSS (WS-Security) v1.1	

Source: Obtained from an internal report published by the Republic of Korea Institute of Origin Information (2020)

Interconnection technologies for electronic data exchange can be classified into Message Queue (MQ), web service (SOAP-based and Restful-based), and blockchain. Security technologies can be categorized into network security (Transport Layer Security and IPsec VPN), message-level security (encryption, digital signatures, and certificates), and key exchange methods (symmetric key and Public Key Infrastructure). The choice of these technologies is determined through negotiations based on the technical

circumstances of each country. The Republic of Korea Customs Service considers MQ, web service, and blockchain as viable interconnection technologies. Regarding security technologies, the specific methods are decided through negotiations with partner countries, considering suitability and acceptance. EODES has been established with China and Indonesia using different interconnection methods. China led the development using the MQ method, while the Republic of Korea proposed a SOAP-based web service for Indonesia. Referring to technical aspects related to system integration is crucial. The Korean-Indonesia EODES is operating smoothly and can be applied to other countries. Establishing an efficient development process based on Republic of Korea's EODES implementation experiences is necessary after reaching agreements with ASEAN countries. Flexibly focusing on establishing EODES with Thailand, the Philippines, and Malaysia, which have already implemented or plan to implement EODES, is important. Then, the target country should be expanded to all countries in the UNESCAP.

II. 4. Further Collaboration of the EODES Collaboration with other countries

Following the successful launch of paperless trading for electronic Certificates of Origin (e-C/O) with China, Indonesia, and Viet Nam, Republic of Korea is proactively engaging in the development of the Electronic Origin Data Exchange System (EODES). This endeavor involves bilateral negotiations with various nations or collective entities within ASEAN. Despite these efforts, there have been setbacks in advancing the framework with additional countries.

During these negotiations, key issues have surfaced, particularly concerning the order in which EODES partnerships should be forged. These conversations have highlighted the benefits of initially focusing on countries where Certificates of Origin (C/O) are distributed by official government bodies. As detailed in Table 5, the issuance of C/O can be managed by either government agencies or by exporters and manufacturers independently. Given that Republic of Korea's implementation of paperless trading has thus far been confined to documents ratified by government authorities, it makes strategic sense for the country to prioritize the establishment of EODES with these governments.

Table 5. Partner Country for Korean FTAs, Issuer of C/O, and their UNESCAP Membership

Country	Issuance of C/O	AEO MRA	UNESCAP Membership
Chile	Exporters	AEO MRA	No
Singapore	Governmental Agencies	AEO MRA	UNESCAP Member
EFTA	Exporters/Manufacturer	No	No
ASEAN	Governmental Agencies	AEO MRA	No
India	Governmental Agencies	AEO MRA	UNESCAP Member
EU	Exporters Approved exporters over 6,000€	No	No
Peru	Exporters/Manufacturer	No	No
USA	Exporters/Manufacturer/Importer	AEO MRA	UNESCAP Member
Turkey	Exporters	AEO MRA	UNESCAP Member
Australia	Exporters, Governmental Agencies	AEO MRA	UNESCAP Member
Canada	Exporters/Manufacturer	AEO MRA	No
China	Governmental Agencies	AEO MRA	UNESCAP Member
Viet Nam	Governmental Agencies	AEO MRA (soon)	UNESCAP Member
New Zealand	Exporters/Manufacturer	AEO MRA	UNESCAP Member
Colombia	Exporters/Manufacturer	No	No
Central America	Exporters/Manufacturer	No	No
United Kingdom	Exporters Approved Exporters over 6,000€	No	No
RCEP	Governmental agencies, Exporter/Manufacturer (in progress)	No	No
Cambodia	Governmental Agencies Approved Exporters	No	UNESCAP Member
Israel	Governmental Agencies Approved Exporters, Exporters less than 1,000US$	AEO MRA	No
Indonesia	Governmental Agencies, Approved Exporters (in progress)	AEO MRA	UNESCAP Member

Source: Author's analysis of the data obtained from the KCS (2023)

By starting with pilot projects, the Republic of Korea may adopt a phased approach which allows the Republic of Korea to incrementally build a robust, interoperable EODES

network across trade partners, ensuring stronger compliance and a systematic expansion of electronic trade documentation.

The AEO (Authorized Economic Operator) system is an initiative established by customs authorities to simplify clearance procedures for export companies that meet certain predefined criteria. Entities eligible for AEO status include manufacturers, exporters, importers, carriers, ports, airports, and warehouse operators, among others. When countries enter into AEO Mutual Recognition Agreements (MRAs), they mutually recognize and extend the benefits provided to domestically certified AEOs to those in partner countries. This streamlines customs procedures and facilitates smoother international trade at borders. As of December 2021, the Republic of Korea had established AEO MRAs with 19 countries.[7], making it one of the most proactive nations in fostering customs cooperation on a global scale. As shown in Table 5, the Republic of Korea has signed AEO MRAs with countries such as Singapore, India, Viet Nam, New Zealand, and Indonesia. This indicates that among the UNESCAP member countries, those already engaged in electronic trade with Republic of Korea have also entered AEO MRAs. This suggests that the cooperative systems of customs authorities are well-established and that there is a sufficient level of budget, commitment from the authorities, and institutional framework in place for promoting bilateral trade facilitation.

As for the legal foundation, the pursuit of EODES with partner countries is facing a legal basis issue that hampers its smooth implementation. The current FTA agreements, such as the Republic of Korea-ASEAN FTA, lack provisions for EODES, requiring paper-based C/O submission as multilateral implementation of paperless trade. There is a need to revise the Republic of Korea-ASEAN FTA to establish a legal basis for EODES. This revision would include provisions allowing both parties to establish and operate EODES and exempting the submission of C/O when origin information is received through EODES. Lessons from other FTAs, such as the Republic of Korea-China FTA and the Republic of Korea-Indonesia CEPA, provide guidance for specific provisions on EODES operation and exemption of C/O submission. The establishment of EODES and its legal basis should be considered separately, with the development pursued individually or collectively with partner countries. The Republic of Korea-Indonesia Comprehensive Economic Partnership Agreement serves as a model with its specific regulations on EODES operation. During

[7] Current status of AEO certification, KAA webpage, accessed on 23 October 2023, available at: https://aeo.or.kr/sub/sub02_05.php

discussions on EODES with partner countries, it is crucial to provide convincing arguments and emphasize the effectiveness of establishing a legal basis through MOUs, with the intention to subsequently amend or conclude agreements to address any temporary legal gaps. To establish an EODES between countries, agreements on data exchange, utilization, and feedback processes are crucial. The exchange of data and workflow processes should be agreed upon, considering the involvement of multiple institutions in each country. Specific details, such as data collection, transmission, security, and message exchange, need to be determined through mutual agreement, taking into account each country's processes and technological conditions.

To implement EODES between the Republic of Korea and partner countries, technical specifications, electronic exchange platforms, and integration approaches need to be examined. The possibility of implementing a query-based e-C/O system, similar to Singapore, should be considered for countries with limited benefits from EODES. Discussions and agreements on technical matters, including data exchange items, business processes, interconnection technologies, security technologies, and development processes, are necessary to establish a national data exchange system. Analyzing feasible technologies for data exchange and system interconnection is crucial for technical agreements. Integrating the EODES system with the ASEAN Single Window (ASW) is favourable for exchanging original information between ASEAN countries and the the Republic of Korea. Understanding the systemic significance and applying basic technical and security measures are important when developing a plan for integrating EODES with ASEAN countries. Adopting ASEAN standards for data exchange processes and security measures, if feasible, can facilitate the development of systems for transmitting the Korean-ASEAN FTA C/O.

Collective discussions involving all countries or supporting discussions on EODES establishment among UNESCAP member countries can assist in the establishment of EODES between the Republic of Korea and partner countries. Considering the forum, purpose, and relationship with ongoing individual discussions is crucial for collective discussions. While it may be ideal for partner countries to establish EODES and align their domestic legal systems, the feasibility depends on consensus-building and understanding of each country's conditions. Encouraging agreements on EODES establishment, technical support, and effective implementation can hold significance. Maintaining harmony and alignment between collective and individual discussions is essential. Collective discussions require more time for consensus-building and managing relationships between member

countries. Individual discussions with key trading partners like Thailand, the Philippines, and Malaysia should continue without conflicting with collective discussions.

II.2 E-Phyto

II.2.1. The International Plant Protection Convention (IPPC) Solution

The International Plant Protection Convention (hereafter IPPC) includes a standardized phytosanitary certificate used worldwide. Initially, these certificates were handwritten on paper but are now printed with security features like special paper, seals, and barcodes to prevent forgery. However, paper certificates still pose risks such as forgery and loss. To address these issues, some countries have implemented electronic phytosanitary certificates that are transmitted directly to the importing country's authority. However, compatibility and standardization between countries' electronic communication methods pose challenges. To enable wider usage, the IPPC has adopted a standardized electronic certificate format known as "e-Phyto" and is developing a global hub for exchanging electronic phytosanitary certificates. They have created a web-based generic national system for countries without their own electronic certificate issuance systems called "GeNS". Several countries, including Republic of Korea, are participating in using the prototype of the global hub. In summary, the UNICC manages computing systems for UN agencies, while the IPPC is working on standardizing and implementing electronic phytosanitary certificates to improve security and efficiency in international trade.

II.2.2 E-Phyto Implementation by the Republic of Korea

The Republic of Korea has initiated electronic certification processes with the United States, beginning in 2020, and New Zealand, starting in 2021. The certification process encompasses all traded agricultural products between these nations. In 2021, there were 9,366 outgoing e-Phyto transactions and 41,450 incoming transactions with the United States, while in 2022, there were 130 outgoing transactions and 1,049 incoming transactions with New Zealand. Through this system, the necessity for traditional paper-based phytosanitary certificates is eliminated. Exporters and importers can simply provide an e-Phyto number when applying for customs clearance, thereby streamlining the entire process and significantly reducing the time and documentation previously required.

Also, the Animal and Plant Quarantine Agency (APQA) in Republic of Korea announced that it has expanded the implementation of e-Phyto with twelve countries, including Australia (effective from July 4, 2023) and Israel, Sri Lanka, Guatemala, Panama, Jordan, Uganda, Tunisia, Madagascar, Cameroon, Fiji, and Samoa (effective from July 31, 2023). In particular, the introduction of e-Phyto for Australia, one of the major export countries for Korean agricultural products such as pears and mushrooms, is expected to reduce carbon emissions by eliminating the need to issue over 4,000 paper phytosanitary certificates annually (2.88g per certificate) and facilitate the smooth customs clearance of Korean agricultural products[8]. This means that for agricultural product imports and exports, it will be possible to clear customs by submitting only the e-Phyto certificate number without the need for a paper phytosanitary certificate.

Table 6. Exchange of e-Phyto with Republic of Korea

Partner Country	Legal and Technical Issues	Specific Arrangement and Data Exchange
USA	Global multilateral exchange of e-Phyto is led by the IPPC. Countries with national systems join the hub. Joining the e-Phyto Solution is the first step to start exchanging e-Phyto with contracting parties of the IPPC. Standardized format using XML is based on the ISPM12 proposed by the IPPC, and e-Phyto is exchanged among different countries through the central hub server made by the IPPC. This approach is defined in the International Standards for Phytosanitary Measures (ISPM) No. 12. As a part of the IPPC's framework with 184 contracting parties, including Republic of Korea, the e-Phyto method does not necessitate separate bilateral Memoranda of	In 2021, Republic of Korea sent e-Phytos to the US on mushrooms, cactus products, and etc., and received e-Phytos from the US on wheat, corn, and etc. Republic of Korea is the only Asian country to start the e-Phyto with the US and New Zealand, and has confirmed its stability and efficiency.
New Zealand		In 2022, there were 130 outgoing and 1,049 incoming transactions between Republic of Korea and New Zealand. The electronic Phytosanitary Certificate (e-Phyto) operates as a multilateral exchange method overseen by the IPPC.
Australia		In 2023, the Korean government launched a pilot test, with official operation commencing on 4th of July. The adoption of e-Phyto for Australia, a significant market for Korean agricultural goods like pears and mushrooms, is anticipated to reduce carbon emissions by eliminating the requirement to issue more than 4,000 paper phytosanitary certificates annually (equivalent to 2.88g per certificate). Additionally, this transition is expected to streamline customs clearance procedures for Korean agricultural exports.

[8] Official webpage of Animal and Plant Quarantine Agency of Korean government, accessed o n21, Nov, 2023, available at: https://www.qia.go.kr/english/html/indexqiaEngNoticeWebAction.do?clear=1

	Understanding (MOUs) between countries.	
Israel	Israel and the countries below in this table all utilize GeNS system in the IPPC Solution.	Israel utilizes GeNS system, and exclusively implements e-Phyto for specific items, while the remaining 10 nations employ e-Phyto for all imported and exported agricultural products. Republic of Korean agricultural goods exported to Israel undergo e-Phyto procedures for all categories. However, agricultural products imported from Israel to Republic of Korea are subject to e-Phyto procedures only for six specific items: citrus fruits, seeds, almonds, cut flowers, herbs, and dried dates and palm leaves. 11 countries below all joined the e-Phyto exchange with Republic of Korea at the same time effective from July 31, 2023. This is possible because of the e-Phyto Solution that integrates national systems and GeNS. It makes so much faster and easier for countries to join in terms of technological issues.
Sri Lanka		Sri Lanka also utlizes GeNS system. The introduction of e-Phyto will help prevent issues such as forgery and loss of paper phytosanitary certificates in advance, thereby ensuring quarantine safety for plant imports to Republic of Korea. The same applies to the rest of the countries especially in Africa, South America, and islands in the Pacific below.
Guatemala		Guatemala utlizes GeNS system.
Panama		Panama utlizes GeNS system.
Jordan		Jordan utlizes GeNS system.
Uganda		Uganda utlizes GeNS system.
Tunisia		Tunisia utlizes GeNS system.
Madagascar		Madagascar utlizes GeNS system.
Cameroon		Cameroon utlizes GeNS system.
Fiji		Fiji utlizes GeNS system.
Samoa		Samoa utlizes GeNS system.

Source: Interviews with officers in the Korean government and data collection

II.3 Certificate on Animal Products for Paperless Trade

The Animal and Plant Quarantine Agency in Republic of Korea has been conducting a pilot operation of electronic quarantine certificates since the proposal for such certificates

was made by New Zealand in 2012. From 2017 to 2022, through validation and testing, they have confirmed the safety of the systems between Republic of Korea and New Zealand. Moreover, by integrating the systems of both countries, they have made the information from received New Zealand quarantine certificates easily accessible to users, maximizing convenience for citizens. Both countries recognize the benefits and necessity of paperless trading through the utilization of electronic quarantine certificates. As of October 2022, the livestock trade between Republic of Korea and New Zealand amounts to about 300 million US dollars. The introduction of electronic quarantine certificates is expected to contribute to carbon neutrality (saving approximately 4,500 sheets of paper annually) and reduce international postal time and costs. The distinction between e-Phyto and electronic certificates for animal products lies in their exchange mechanisms. While e-Phyto is shared through a multilateral platform developed by the IPPC, certificates for animal products require bilateral exchanges that rely on individual negotiations and agreements. It is accurate to state that the complete implementation of certificates for animal products involves traversing several procedural stages similar to e-C/O.

For the documentation on animal products, From December 1, 2022 (based on the quarantine application date), electronically transmitted quarantine certificates in the form of electronic documents received through a communication network from the New Zealand government agency are recognized. The types of products and information that are exchanged are frozen meat and meat products of bovine origin, 2) Casings, 3) Venison, 4) Non-edible animal by-products, 5) Processed dairy products, 6) Milk and milk products (non-edible), a total of six product categories. As for the format, only electronic quarantine certificates (for six product categories) from New Zealand are received, and the related format is agreed upon with the exporting country based on the import sanitary requirements for each product. Currently, the form is set as private in Republic of Korea at the request of the New Zealand government.

Electronic information between Republic of Korea and New Zealand is being received and sent. However, New Zealand currently cannot receive electronic information from quarantine certificates issued by Republic of Korea. As of 2023, two countries are trying to receive electronic information of quarantine certificates from Republic of Korea in New Zealand.

As for the legal basis for exchanging electronic documents on animal products, there must be provisions on its effectiveness and application between multiple countries. Electronic documents on animal products are exchanged based on the "Act of the Prevention of Contagious Animal Diseases Article 34" in Republic of Korea. It is explicitly stated that if an electronic document in the form of a quarantine certificate, transmitted through a communication network from a government agency of the exporting country recognized by the head of the animal quarantine agency, is stored in the main computer of the animal quarantine agency, there is no need to attach a quarantine certificate. Also, for New Zealand, "Section 4: Interpretation" and "Section 62: Form and Content of Official Assurance" section include provisions on exchange of electronic exchange of documents in "Animal Products Act 1999 No. 93(as at 02 March 2018), Public Act Contents – New Zealand Legistlation". A clear legal basis for the exchange of electronic quarantine certificates between the two countries has been established. As a result, the exchange of electronic quarantine certificates has become possible without the need for additional measures such as MOUs or agreements. This forms a crucial foundation for the actual exchange of documents between Republic of Korea and New Zealand. If such a legal basis did not exist, it would have been advisable to establish at least a minimal foundation through an MOU and then attempt the exchange while also working towards revising in the long term to establish a legal framework between the two countries.

As for the exchange method, the Republic of Korea only receives electronic quarantine certificates (six items) from New Zealand. The related format is a format agreed upon with the exporting country based on the import sanitary conditions for each item, and it is received in the form of XML electronic documents through the SOAP (Simple Object Access Protocol) method, which directly connects the systems between countries via the internet (HTTP, HTTPS). SOAP is a communication protocol for exchanging XML-based computer data over the internet, while XML is an extensible markup language used to structure web documents.

Table 7. Legal and Technical Issues of Certificate on Animal Products

Partner Country	Legal and Technical Issues	Specific Arrangement and Data Exchange
New Zealand	Republic of Korea is receiving inter-governmental systems and electronic documents directly connected through the internet using the SOAP method, in the form of XML electronic documents	For animal products, Republic of Korea is receiving information from New Zealand on six items only since the country has no receiving platform. New Zealand should work on building mutual information sharing system with Republic of Korea soon.

III. Way forward in advancing cross-border paperless trade

III. 1. Advancing implementation of e-C/O, e-Phyto and electronic animal quarantine certificate

III.1.1 e-C/O

Republic of Korea has established electronic exchanges with three countries to date: China, Indonesia, and Viet Nam in the ASEAN group. In the future, it is useful for Republic of Korea to expand these exchanges continuously, especially with countries such as the United States, which is the second-largest trading partner for Republic of Korea as of 2022.

The Republic of Korea may aim to integrate with the electronic system of ASEAN to exchange e-C/O. To achieve this, it is necessary to maintain individual efforts to exchange documents with each country while simultaneously working towards revising the ASEAN-Republic of Korea FTA for multilateral exchange. Examining the regulations currently proposed in agreements such as the Republic of Korea-China FTA, RCEP, and CEPA can provide a foundation for connecting with ASEAN. The fact that Viet Nam and Indonesia have successfully implemented EODES with the Republic of Korea and are currently in operation is quite encouraging, as it sets a foundation and creates a conducive atmosphere for multilateral connections with other countries. However, engaging in discussions with multiple countries like ASEAN may require significant time and effort, but maintaining communication with individual countries is still essential.

Regarding system implementation, if the Republic of Korea decides to incorporate technical elements based on what it has developed with China, Indonesia, and Viet Nam, it is strategically crucial for the Republic of Korea to initially negotiate first with countries that have sufficient trade volumes with Republic of Korea. Demonstrating the effectiveness of system implementation and cost savings will be persuasive for investment on establishing system and its implementation.

As indicated in Table 5, countries that have signed AEO MRAs with Republic of Korea are also implementing paperless trade. This demonstrates the commitment of the governments to trade facilitation, and it suggests that the process of negotiating other documents is likely to proceed smoothly. Therefore, among the countries where such cooperation has been sufficiently established, namely China, Viet Nam, Indonesia which are countries that issue C/O by governmental agencies, can be considered as suitable

candidates for future pilot tests of documents other than C/O. In particular, the establishment of EODES with India is regarded as the most closely aligned environment in every aspect to the previous country-specific cooperative partners. Therefore, the Republic of Korea may consider pursuing this cooperation with India. Since India holds the 8th position in terms of trade volume with Republic of Korea as of December 2022[9], indicating that it will have a significant impact when it comes to setting up EODES.

III.1.2 e-Phyto

As for e-Phyto, it is essential for Republic of Korea to proactively engage with various countries in electronic quarantine document exchange. The fact that the Republic of Korea has exchanged e-Phyto with Australia, Israel, Sri Lanka, Guatemala, Panama, Jordan, Uganda, Tunisia, Madagascar, Cameroon, Fiji, and Samoa indicates the potential for rapid adoption with numerous countries compared to other documents. To this end, creating an environment within UNESCAP to promote IPPC's e-Phyto system and reach national agreements on possibilities of participation is crucial. Republic of Korea should actively engage with countries participating in the IPPC's e-Phyto exchange to lead in realizing electronic trade.

III.1.3 Electronic animal quarantine certificate

Australia and the United States are among the Republic of Korea's largest trading partners in livestock as of 2023. The expansion of negotiations within UNESCAP, utilizing insights from the collaboration with New Zealand, may create pathways for another essential paperless trade agreement, complementing e-C/O and e-Phyto. In terms of animal quarantine certificates, which are in the preliminary stages of development, talks have commenced with Australia in 2023, drawing upon New Zealand's practices.

It is critical to bring these discussions with Australia to fruition and, ultimately, to establish similar arrangements with the United States (as indicated in Table 8), potentially catalyzing a transformation in the electronic trade of animal products. Unlike e-Phyto, there

[9] Country import and export, accessed on 23 Oct, 2022, available at: https://stat.kita.net/stat/kts/ctr/CtrTotalImpExpList.screen

is currently no universal system or legal framework for the exchange of certificates on animal products, necessitating individualized negotiations and bilateral agreements. The Republic of Korea and New Zealand are ahead with domestic legal structures that support the exchange of electronic trade and inspection certificates.

Leveraging such infrastructure could facilitate the anticipated digitization of various animal and plant inspection processes if proactive exchanges with other UNESCAP region countries, where animal product exports are significant, are pursued. With the Republic of Korea's 2022 trade data showing the United States and Australia as key partners in beef, pork, and poultry trade (refer to Table 8), and considering the extensive trade volume with the United States as a prominent economy within UNESCAP, the introduction of electronic exchanges would be a milestone in the digitization of animal inspection procedures, presenting a future challenge to be addressed.

The present animal quarantine trade with New Zealand, although being the sole electronic document exchange partner ranked 11th in volume (refer to Table 8), highlights the need for further progress to enable paperless trade with other major partners. The implementation of digital quarantine documentation between the Republic of Korea and larger economies like the United States and Australia, as well as rapidly developing markets like Viet Nam, is anticipated to enhance the global paperless trade landscape for animal products significantly.

Thus, adopting and applying electronic documentation for animal products should be a strategic decision for each UNESCAP member state, considering their individual trading volumes of animal products. This venture is poised to streamline quarantine processes and bolster responses to zoonotic diseases such as mad cow disease.

Table 8. The Top 15 Trading Partner Countries for Beef, Pork, and Poultry Products with Republic of Korea in 2022

Countries	Total Import-Export Weight (ton)	Ranking	Total Import-Export Amount (1,000 USD)	Ranking	Trade Balance	UNESCAP membership
USA	401,784	1	3,049,316	1	-3,052,316	Member
Australia	171,089	2	1,350,802	2	-1,351,155	Member
Brazil	167,550	3	193,442	6	-425,011	No
Spain	147,405	4	534,763	3	-534,763	No
Canada	79,406	5	360,750	4	-360,750	No
Viet Nam	61,076	6	61,473	12	78,825	Member
Netherlands	51,304	7	200,534	5	-200,534	Member
Chile	33,435	8	167,911	7	-167,911	No
Austria	28,478	9	131,816	9	-131,816	No
Denmark	23,381	10	79,071	10	-80,264	No
New Zealand	21,731	11	136,087	8	-136,055	Member
Mexico	17,019	12	77,780	11	-77,780	No
Thailand	14,849	13	14,849	17	-46,756	Member
Ireland	10,042	14	27,696	15	-27,696	No
France	9,473	15	48,635	13	-48,635	Member

Note: The total import-export weight is in tons, and total import-export amount is in thousands of US dollars. The table above represents the author's analysis and compiles import-export statistics from HS codes 0201, 0202, 0203, and 0207, sourced from KCS data from January to December, 2022. HS code 0201 refers to “Meat of bovine animals, fresh or chilled”, HS code 0202 refers to “Meat of bovine animals, frozen”, HS code 0203 refers to “Meat of swine, fresh, chilled or frozen”, HS code 0207 refers to “Meat and edible offal, of the poultry of heading 01.05, fresh, chilled or frozen”.

III. 2 Exploring other trade-related documents

Table 9 is composed of a selection of documents that are most frequently utilized in international trade within the Republic of Korea, exclusive of Certificates of Origin (C/O), electronic phytosanitary certificates (e-Phyto), and animal product quarantine documents. It is essential to evaluate which of these documents would be most appropriate for conducting a pilot test to facilitate trade between the Republic of Korea and member countries of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

Table 9. Types of Documents, Issuance, and Trade Cargo Volume

Category	Types of Documents	Issuance	Trade Cargo Volume	Possible Target Country
Trade Contract	Packing list	Private	High	All
	Contract sheet	Private	High	All
	Purchase order	Private	High	All
	Insurance policy	Private	High	All
	Commercial Invoice	Private	High	All
	Letter of Credit	Private	High	All
Quarantine and Disease Control	Fumigation certificate	Public	Low	All
	Health certificate	Public	High	China, ASEAN countries, Muslim countries, etc.
	Organic certificate	Public	Mid	Australia, USA, Europe, etc.
	Certificate of environmental radioactivity level	Public	Low	Japan, etc.
Quality, Customs, and others	CITES certificate	Public	Low	All
	Halal certificate	Private	Low	Muslim countries
Transport and Logistics	Bill of Lading	Private	High	All
	Surrender Bill of Lading	Private	High	All
	Sea Waybill	Private	High	All
	FIATA Bill of Lading	Private	Mid	All
	Cargo Manifest	Private	High	All
	Air Waybill	Private	High	All
	Dangerous Goods Declaration	Private	Mid	All

Source: Compiled by the author

The selection of documents for any pilot project needs to be based on certain criteria and standards. The selection process will involve assessing whether there is a sufficient volume of potential cargo movement and whether there is substantial potential for development through the establishment of such a document exchange system.

First, most documents involved in paperless trade in the Republic of Korea thus far have been issued primarily by governmental agencies. This is because governmental agency-issued documents provide a basis for intergovernmental exchanges and offer clear lines of responsibility in case of serious issues arise. In contrast, private organizations' documents would require additional negotiations and discussions, making them less

prevalent among countries. From this perspective, the following governmental agency-issued documents have the potential for exchange: fumigation certificate, health certificate, organic certificate, certificate of environmental radioactivity level, and CITES certificate.

Second, there should be a business case for the selected document. Notwithstanding the benefits of cross-border paperless trade, implementation of any specific cross-border paperless trade requires investment and maintenance. Therefore, it is essential that the benefits outweigh the costs.

Among the numerous documents required for Republic of Korea's trade, this study has selected those for which there is a sufficient volume of cargo movement and recognized necessity. After examining the characteristics and importance of these documents, the aim is to provide an appropriate direction for pilot testing.

III.2.1 Health certificate

Health certificates are frequently required for the Republic of Korea in the trade of goods, especially with China, ASEAN, and many Muslim countries. The requirement for a health certificate varies depending on the import regulations of the destination country, including factors such as heat treatment conditions during processing and storage methods. As of 2022, Republic of Korea issued 48,304 health certificates, which is considered quite significant in terms of issuance quantity. China, including Hong Kong, accounted for a significant 35%, and 24% for ASEAN member countries[10]Republic of Korea issues these certificates through the Ministry of Food and Drug Safety, ensuring the safety of exported products overseas. This makes it a suitable candidate for global exchange, particularly with countries like China and ASEAN countries, which have established a paperless trade cooperation with Republic of Korea in the past. A health certificate is a document that attests that the product is recognized as safe for consumption, and it typically requires verification by an issuing authority in the exporting country. Many countries often demand it depending on the product category. In the case of Republic of Korea, the export of Korean food and

[10] This information has been provided by the government of Reupblic of Korea based on an official request from the researcher.

pharmaceuticals, particularly in the Asian region, has seen significant growth influenced by the Korean wave. Consequently, many importing countries frequently request health certificates, and vice versa. Republic of Korea's trade volume of food and pharmaceuticals, among other products, is substantial, and the accompanying demand for document submissions is expected to continue to increase. Therefore, electronic transition of this document is undoubtedly beneficial for Republic of Korea and all participating member states in the UNESCAP.

III.2.2 Organic certificate

Organic certificates are highly relevant to the Republic of Korea, as the country imports many organic food products for infants and the elderly. These certificates are issued by the Ministry of Agriculture, Food, and Rural Affairs. Generally, certifications are issued by governments based on assessments from specialized private sector companies. Countries such as Japan, Singapore, and the Republic of Korea share similar circumstances. Given the limited scope of organic product exports from Republic of Korea and the predominance of imported organic products from agricultural powerhouses like the United States and Europe, discussions should be conducted independently from those involving Asian-Pacific countries. From the Republic of Korea's perspective, attempting document exchange with the agricultural giant of the United States seems most favourable and holds significant growth potential in the UNESCAP region. However, there is a limitation due to the small number of target countries and the overwhelming volume of data transmission from the United States to the Republic of Korea.

III.2.3 CITES document

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) stands out as a candidate for international digitization for Republic of Korea and also the countries in the UNESCAP. Regarding CITES documents, while the trade volume is not extensive[11], the increasing demand for personal pets in Republic of Korea and the steady supply of related items in the past five years indicate that the exchange of CITES

[11] Import permit of endangered species reached 1,005 as of 2021, accessed at 24, Oct 2023, available at: https://www.yna.co.kr/view/AKR20220930166100530 (In Republic of Korean)

documents with UNESCAP member countries can be necessary and is feasible. The CITES agreement, ratified by 184 countries worldwide as of 2023[12], includes the majority of UNESCAP member nations. CITES documents, issued by the Ministry of Environment in Republic of Korea, seem readily adaptable for electronic exchange among CITES contracting parties within UNESCAP. The digitization could make a significant contribution to preventing illegal trafficking and unregulated capture of endangered wildlife. Items susceptible to smuggling within UNESCAP, such as elephant ivory, frequently move from Africa to Asia and continue to be detected[13]. Digitizing CITES documents could provide a more flexible and accurate platform for addressing these activities. However, the limitation lies in the fact that the data transmission volume is not significantly high, with around 1,000 per year in Republic of Korea, and the target countries extend beyond the Asia-Pacific region to an unspecified multitude. This makes it comparatively less suitable for attempting pilot tests with specific countries.

III.3 Financial support for cooperations

Considering that many countries in the Asia-Pacific region are developing nations, one of the most critical requirements is securing financial resources. How to secure funds is a strong incentive for countries with limited financial resources to participate and make a decisive contribution to the establishment of paperless trade. Republic of Korea, which received international aid for decades, has now transitioned from a recipient of aid to a donor country. From this perspective, sharing Republic of Korea's development experience and providing Official Development Assistance (ODA) to many developing countries can be seen as a commendable endeavor.

Looking at official ODA statistics, as of 2022, Republic of Korea's grant aid to the Asian region amounted to $910 million, to the Americas $181 million, and to Africa $563 million[14]. Republic of Korea's Customs Administration, often called as KCS, also allocates funds for inviting public officials from developing countries for training and for the purpose of modernizing local customs operations. In 2021, Republic of Korea provided $4.2 million

[12] CITES, List of Contracting Parties, 13, Sep, 2023, Accessed at: https://cites.org/eng/disc/parties/chronolo.php

[13] Eunbi Cho, Interpol international investigation results in the arrest of over 100 smuggling suspects, 08, Jan 2023, accessed at: https://www.newspenguin.com/news/articleView.html?idxno=10577 (In Republic of Korean)

[14] ODA statistics, accessed at 15 Oct 2023, available at: https://stats.odaRepublic of Korea.go.kr/portal/odaRepublic of Korea/status

in Customs Administration ODA funding for the modernization of local customs in Tajikistan[15]. From 2005 to 2023, Republic of Korea exported its UNIPASS system to 14 countries (4 in Asia, 6 in Africa, 4 in Central and South America) and conducted customs modernization advisory programs in 39 countries[16]. This initiative has helped promoting Republic of Korea's customs procedures and technology worldwide.

Regarding collaboration with the ASEAN member states, there are several funds available, such as the ASEAN-ROK Cooperation Fund, which may provide support to five ASEAN countries: Cambodia, Lao People's Democratic Republic, Thailand, and Viet Nam. However, when pursuing collaboration with financially challenged developing countries, it is essential that government support is provided as a priority when it is mutually beneficial, which can justify the investment from the Korean side. Moreover, at the government level in Republic of Korea, securing the budget in advance should be implemented before starting the negotiation, taking into account the requirements and conditions of the partner countries. It is also necessary to encourage these countries to share and utilize information on various financial resources they can secure.

[15] Northern silkroad is connected by Republic of Korean Customs System, accessed at 19 Oct 2023, available at: http://www.kplus.kr/news/articleView.html?idxno=322316

[16] Public and private partnership on going to Africa with Korean Customs system, Press release from Republic of Korea Customs Service, accessed at 18 Oct 2023. (In Korean)