Paperless trade system of the Republic of Korea

An analysis of the UNIPASS and uTradeHub single windows

Jonathan Koh

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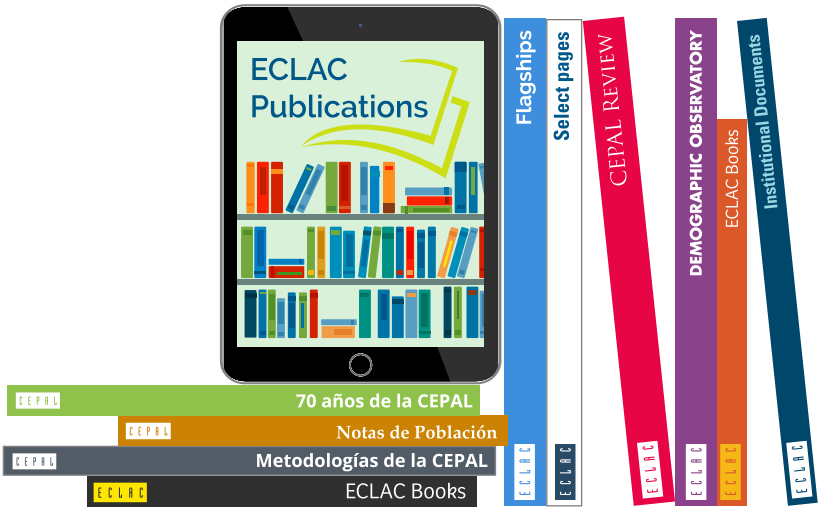

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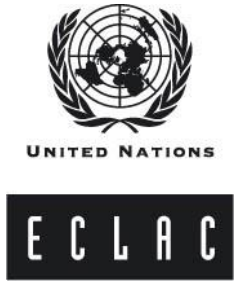

This document was prepared by Jonathan Koh, a consultant with the International Trade and Integration Division of the Economic Commission for Latin America and the Caribbean (ECLAC), within the framework of the cooperation programme between ECLAC and the Republic of Korea, as part of the project "Promoting digital and inclusive trade in Latin America and the Caribbean: learning from single windows in the Republic of Korea and other Asian countries".

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Introduction

In the last two decades, the concept of the Single Window for Foreign Trade (SW) has acquired increasing importance in the global trade facilitation agenda. Recommendation No. 33 of the United Nations Centre for Trade Facilitation and Electronic Business defines the Single Window as "a facility providing trade facilitation that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements. Individual data elements should only be submitted once electronically" (UN/CEFACT, 2020). The establishment of a Single Window plays a crucial role in the move towards paperless trade, generating significant savings in time and money for both companies and the different public bodies involved in foreign trade operations. The Trade Facilitation Agreement of the World Trade Organization (WTO), which entered into force in 2017, establishes the commitment of all its members to maintain or establish a Single Window.

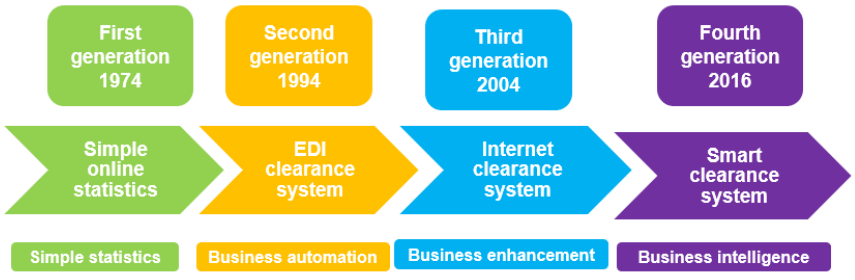
Asia is home to some of the world's most advanced Single Windows, with the Republic of Korea (henceforth Korea) being among the pioneers in the transition towards a paperless trade environment. This document presents the history and main features of its dual system, composed of two interconnected Single Windows: UNIPASS and uTradeHub. Korea's experience in this regard may be useful to policymakers in Latin America and the Caribbean, where Single Windows are generally at a much earlier stage of development. Of particular interest is the inclusion in the Korean Single Windows of several functionalities aimed at promoting the internationalization of micro, small and medium-sized enterprises (MSMEs), including by facilitating their participation in e-commerce.

This document is structured as follows. After this introduction, section 1 presents a brief historical account of the Republic of Korea's efforts to develop a paperless trade environment. Section 2 provides an overview of its Single Windows according to the five key elements outlined in Recommendation No. 33: the parties involved in trade and transport, standardized information and documents, a single entry point, the fulfilment of regulatory requirements, and the single submission of individual data elements. Section 3 focuses on the main functionalities of both Single Windows and on their legal, institutional, and financial arrangements, while section 4 looks at some of their technological characteristics. Finally, section 5 characterizes the Republic of Korea's Single Window environment according to its developmental maturity.

I. Historical background of the Republic of Korea's paperless trade environment

The development of the Republic of Korea's paperless trade environment has taken place gradually over the last five decades (see diagram 1). In 1974, the Korea Customs Service (KCS) introduced a software system for customs clearance procedures. The system was primarily employed for statistical purposes and not for actual customs clearance. It was only in the mid-1990s that customs procedures transitioned from paper-based methods to Electronic Data Interchange (EDI), with the system fully adopting EDI in 1994.

Diagram 1
Development evolution of UNIPASS



Source: Author, adapted from Korea Customs, Presentation on UNIPASS at UNCTAD eCommerce Week, 17 April 2018 [online] https://unctad.org/system/files/non-official-document/dtl_eWeek2018p78_KeunhooLee_en.pdf.

The first phase of the Republic of Korea's Single Window paperless trade journey was the setting up of a legal and technical environment for EDI-based trade and customs automation. In 1989, the then Ministry of Commerce and Industry established an "Integrated Trade Automation Basic Plan" and a Task Force to implement the plan. The Task Force was a collaborative effort, drawing members from both the public and private sectors to ensure comprehensive representation. From the government side, the

Ministry of Commerce and Industry and the Ministry of Information and Technology were involved, contributing their respective expertise in trade and technology domains. The private sector's perspectives were incorporated through the participation of the Korea International Trade Association (KITA), a prominent industry body. The Task Force produced a draft Act on Trade Automation that included the operational scheme. In 1991, KITA established the Korea Trade Network Co. Ltd. (KTNET) and the Ministry of Commerce and Industry enacted the "Act on the Promotion of Trade Automation". In 1992, the Korea Customs Service (KCS) joined the initiative and established a "Six-Year Basic Plan for EDI Customs Automation". Based on the Act, the Ministry of Commerce and Industry designated KTNET as a Trade Automation Business Operator, with KCS entrusting KTNET with the development and operation of the customs automation system.

The second phase of Korea's paperless trade evolution involved the implementation of EDI-based trade and customs automation systems and services. In 1994, export and import permits and EDI export customs declaration services were introduced. In 1996, the EDI import declaration and manifest consolidation system came into play. In 1997, the export cargo EDI system and customs duty drawback service were introduced, followed by the import cargo EDI system in 1998. These EDI systems drastically reduced declaration time from four hours to just five minutes, resulting in annual savings of up to US$ 10 million. In 1999, various regulatory agencies' systems were integrated into the customs system through KTNET, enabling real-time transfer of inspection results. This led to the launch of a "paperless import declaration system" by KCS, initially available to a limited number of importers with high credibility. Over time, the system gained popularity, with 80% of 143,000 importers utilizing it by 2010. Also in 1999, an Investigation Information System was developed, eventually evolving into a Risk Management System. During the same year, KCS decided to outsource the operation of the customs system to a consortium formed by Samsung and KTNET.

The third phase involved transitioning from an EDI-based system to an Internet-based paperless trade system. KTNET introduced a web-based foreign exchange EDI system and, in 2003, launched an Internet-based paperless trade portal that allowed users to submit export and import declarations, manifests, and bonded transportation applications online while receiving results from customs and other agencies. KCS also introduced an Internet-based customs declaration portal in 2005.

The third phase brought forth the Single Window (SW) and National Paperless Trade System in 2003. Under the "Three-Year Plan for Electronic Trade (e-Trade) Promotion," a Korea Public-Private e-Trade Facilitation Centre was established, consisting of government agencies, such as the Ministry of Trade, Industry and Energy (MOTIE), KCS, and the Korea Financial Telecommunications and Clearings Institute, as well as private sector representatives from KITA, KTNET, and the Korea Federation of Banks. This centre initiated the development of a National Paperless Trade Platform dubbed uTradeHub in 2003 and officially launched it in 2006. In 2006, KCS with its own budget implemented an internet-based Single Window system called UNIPASS, offering online customs declaration service free of charge to traders and customs brokers. KCS designated both KTNET and Korea Customs Network (KCNET)[1] to operate value-added services, including customs clearance, manifest submissions, and consolidation and customs duty drawback. Hence, the Republic of Korea has two Single Windows that make up a paperless trade environment covering all trade procedures: UNI-PASS (for customs clearance) and uTradeHub (for conducting export processes). The main features of each are presented below.

In March 2006, KCS officially announced the launch of a single window called UNIPASS, which is a web-based customs clearance portal to facilitate electronic import, export, and other customs clearance transactions. UNIPASS also interfaces with other regulatory agencies' systems. By 2017, 26 agencies verifying 55 requirements had been linked to the single window system, which processed 855,244 cases out of 896,960 (95.3%). KCS also introduced a risk management system to its clearance process. Previously, green lane service was provided only to selected low-risk traders

[1] Korea Customs Network (KCNET) is an affiliate company of Korea Customs UNIPASS Information Association (CUPIA), a non-profit association set up for the promotion of UNIPASS overseas.

and goods. However, with the introduction of the risk management system, administrative control focused on high-risk companies and goods, which resulted in a great improvement in clearance performance.

UNIPASS' key features are:

- A streamlined business process.
- Convenient user-centric interfaces.
- New mobile technology and big data analysis.
- Adoption of the WCO Data Model and the Government of Korea's IT standards.
- Implementation of an Early Warning and Control System for system and service monitoring.

KCS launched the fourth generation of UNIPASS in April 2016. About 150 million dollars were spent to develop the new system, which had been under development since 2013 (Ha and Koh, 2018). Today UNIPASS serves as a one-stop service for all Customs clearance procedures. It processes 430 million declarations and 50 million travellers per year (Cho and Nam, 2016). It integrates 44 organizations for the processing of regulatory permits, enabling the sharing of information between regulatory agencies, Customs, and other stakeholders (including private organizations mandated by the government to conduct verification tasks). It connects over 430,000 trading entities, including trading companies, customs brokers, shipping companies, airlines, delivery companies, and warehouses[2].

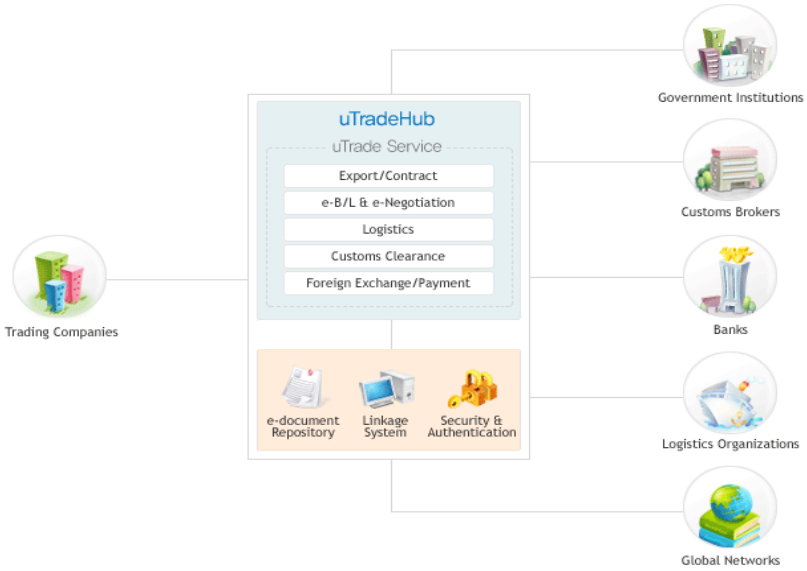
Prior to 2000, the automated trade network in Korea was based on the VAN/EDI network, which proved increasingly limited in coping with the rapid growth of Korea's trade (which surged from 500 million dollars in 1964 to 700 billion dollars by 2007). In 2003, the Ministry of Knowledge Economy and the Korea International Trade Association (KITA) initiated an electronic trade programme as a part of transitioning from an EDI-based system to an Internet-based paperless trade system. The existing EDI-based trade services were limited as the system provided separate services through a one-on-one connectivity between trading companies and various related institutions. In contrast, the Internet-based service has great advantages in that it can simultaneously provide trade automation services with an open network integration. This transition culminated in the development of the Internet-based uTradeHub network.

Launched in May 2007, uTradeHub - developed and operated by KTNet - is a private sector-based paperless trade platform enabling traders to conduct electronic submission with Customs, various government regulatory agencies as well as banks and logistics firms through a seamless system interface. The uTradeHub also complements UNIPASS by providing both business-to-government (B2G) and business-to-business (B2B) electronic trade services such as permits/licences, letters of credit, and trade financing and guaranteed security of electronic documents via a document repository service (see diagram 2).

The uTradeHub offers various services by linking its platform with systems of approximately 30,000 trading and logistics firms and banks. Its major users are trading firms as well as forwarders, logistics firms and customs brokers. The paperless environment enabled by the uTradeHub platform has been estimated to bring annual economic benefits of around US$ 3 billion (KITA, 2010). First, the electronic export/import process can save an estimated US$ 550 million by reducing labour costs and the cost of issuing and circulating documents. Second, an estimated US$ 2.1 billion is saved by reducing the costs of warehousing and inventory management. Finally, an estimated cost cutting of US$ 320 million is realised from the reduction of redundant investment in the Information Technology (IT) sector.

[2] See [online] https://www.dgovkorea.go.kr/service1/g2c_09/uni_pass.

Diagram 2
uTradeHub services



Source: uTradeHub website [online] https://www.utradehub.or.kr/porgw/introduce_en.do?_top=services&_left=services_0101.

To summarise the differences as well as the synergies between Korea's two Single Windows, table 1 below provides the side-by-side approaches and services of each. Diagram 3 depicts schematically the interface between both Single Windows.

Table 1
Comparison of the main features of UNIPASS and uTradeHub

	UNIPASS Customs single window	uTradeHub Trade single window
Main area	Linkage between Customs and other government regulatory agencies to issue licenses and certifications related to import-export online	Automation of B2G and B2B trade procedures via on-line including Customs, Logistics, Banking and Trade Finance, B2B commerce and Licensing and Certification
Leading agency	Customs Authority	Ministry of Trade, Industry and Energy (MOTIE), Ministry of Economy
Scope of service	Interfaced with other government regulatory agencies' licensing and certification systems	Customs, Logistics, B2B Commerce, Banking and Trade Finance, Licensing and Certification
Main users	Customs, Government Regulatory Agencies, Customs Brokers, Private Sector Applicants	Traders, Logistics Companies, Financial Institutes, Industrial Association, Government Regulatory Agencies, Customs, Customs Brokers
Risk management	Towards Integrated Risk Management	Individual Risk Management
B2B commerce	None	Purchase Order, Invoice
Logistics	Advance Manifest Service for Container Security	Shipping Request, e-Airway Bills, e-Bill of Lading
Trade finance	None	e-Letters of Credit, e-Settlement, e-Insurance, e-Letter of Guarantee

Source: Sung Heun Ha, "Comprehensive view on Korean Single Window", Presentation at UNESCAP [online] https://www.unescap.org/sites/default/files/2%20Korea%20SW_Session%207.pdf.

Diagram 3
uTradeHub interface with UNIPASS

Source: Lee, D., "Trade Single Window for SMEs - Analysis on the basis of Korean case". Presentation at ECLAC training workshop "Trade Single Windows for the Internationalization of SMEs". Santiago, 13 May 2019 [online] https://www.cepal.org/sites/default/files/ktnet_-_don_lee_sesion_1.pdf.

II. Key elements of the Republic of Korea's single windows according to UN/CEFACT Recommendation 33

A. Parties involved in trade and transport

One of the key challenges in implementing a national SW is recruiting the cooperation of many regulatory stakeholders. During the early development stage of UNIPASS, a formal interagency coordination platform was established at the operational level to facilitate the integration of some 38 regulatory agencies and 55 forms. This enabled the sharing of information between regulatory agencies, Customs and other stakeholders (such as private organizations mandated by the government to handle requirement verification tasks); not just for regulatory permits, but also for statistics and information used for data analysis and decision-making purposes.

Enlisting and coordinating agencies in the UNIPASS project was a challenging process. Many agencies had their own computerised systems and used different data formats for their own purposes. Therefore, coordinating the business processes of the agencies and harmonising their data formats was necessary. To address agencies' concerns, KCS and eight major agencies formed a taskforce to coordinate each agency's business processes and data format. This led to the revision of seven relevant laws and the modification of 10 application and declaration forms related to eight agencies (Yang, 2012).

To facilitate the participation of agencies in the SW, KCS also developed a permit processing module so that agencies without their own back-end processing system could electronically process permit applications through the SW. This meant that the various regulatory agencies could be integrated into the SW without the need to develop their own backend systems. Through the UNIPASS SW, license approval time was reduced to a few hours, contributing to a 25–33 per cent reduction in total export time (Wang, 2018). It is estimated that by 2010 SW implementation allowed Korea to save 2.1 billion dollars per year in costs of freight, inventory, labour and other aspects (ibid.).

For its part, the uTradeHub operated by KTNET is interfaced with multiple trade-related public and private entities of various sectors involved in exports and imports. They include the Korea Chamber of Commerce and Industry (KCCI), National Quarantine Station, and federations and cooperatives, domestic and international financial institutions such as Bank of Korea, Korea Financial Telecommunications and Clearing Institute (KFTC), SWIFT, and logistics companies, forwarders, warehouses, and Korea Logistics Network Corp. (KL-NET).

B. Standardised information and documents

To meet the need of interconnectivity with neighbouring countries and foreign customs, both the UNIPASS and uTradeHub systems adopted international standards such as the WCO's Data Model Version 3.0 and UN codes (including the United Nations Code for Trade and Transport Locations, UN/LOCODE), as well as open technology standards.

C. Trade process integration

The uTtradeHub allows traders to process exports and imports, local purchases, transactions related to electronic bill of lading (eB/L), and electronic negotiation (e-Nego) which is the digital handling of negotiation documents. It electronically processes all export-related services from contracts, letters of credit (L/C) related business, customs clearance, shipping, insurance, and remittances after export contracts.

Exporters can electronically handle domestic L/C and purchase confirmation to procure raw materials or finished products required for production in Korea. Suppliers can also conduct processes related to the delivery of export goods to exporters and payment collection. uTradeHub can also handle import-related processes, such as import contract, insurance, import L/C opening, shipping document collection, customs clearance (Import Declaration), and payments. Negotiation-related processes can be conducted electronically without visiting financial institutions. In the case of the e-B/L, the system receives a B/L electronically from a carrier, registers the title into a "Title Registry", while depositing the original copy in the "Document Repository" which can be accessed online.

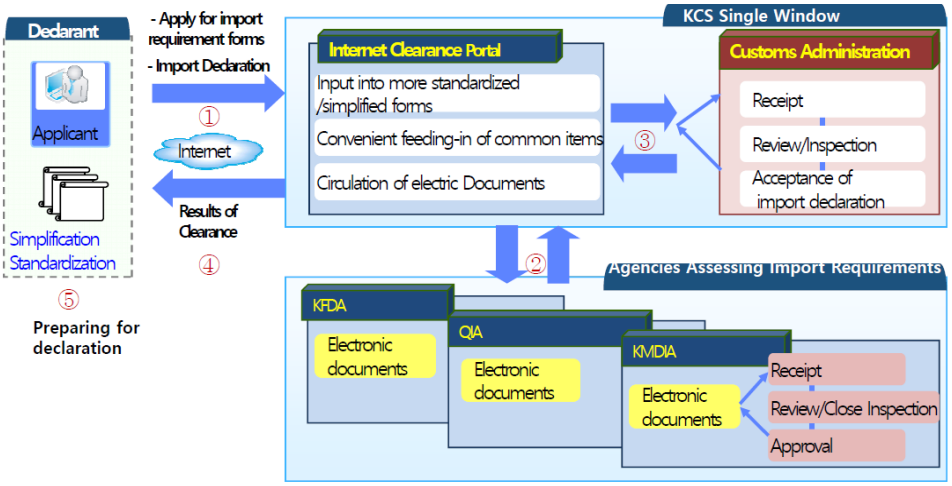
A variety of L/C services is offered in uTradeHub, including notification of incoming L/C, amendment of the terms, issuance of the original copy, e-Negotiation, and L/C transfer. The system also facilitates the negotiation of L/C, by enabling banks to process online negotiation requests from customers.

UNIPASS, as the Customs SW, allows traders to conduct mostly the customs-clearance-related processes and various types of transactions. They can submit online applications for customs clearance, check the real-time status of declaration or cargo, and make online/electronic payment (see diagram 4). Diagram 5 shows the trade process integration between uTradeHub and UNIPASS.

D. Fulfilling regulatory requirements

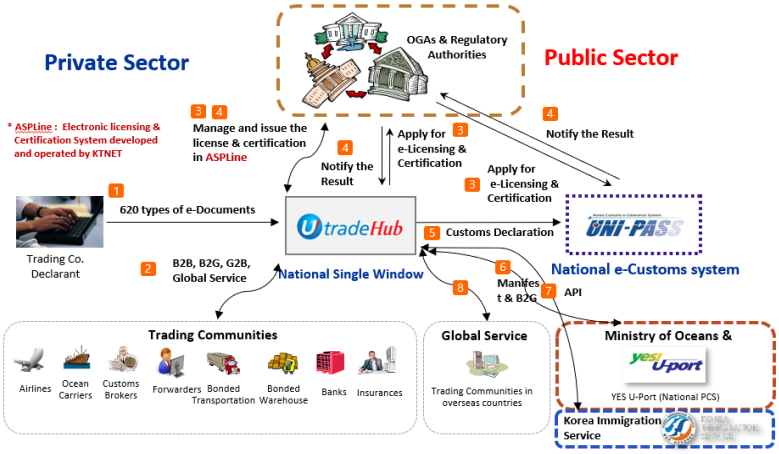
Regarding the purpose of the SW -whereby parties involved in trade and transport shall lodge standardized information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements-, the Republic of Korea achieves this through the combination of both systems. UNIPASS allows lodgement of customs clearance-related applications with a single submission and a single entry point. It also facilitates making permit applications, checking real-time status of declaration or cargo, and making online/electronic payments, customs clearance and cargo control in one single platform. Meanwhile, uTradehub serves as a gateway to traders and service providers in lodging the B2G and B2B import, export regulatory and business requirements.

Diagram 4
Cargo clearance process in UNIPASS



Source: Korea Customs, Presentation on UNIPASS at UNCTAD eCommerce Week, 17 April 2018 [online] https://unctad.org/system/files/non-official-document/dtl_eWeek2018p78_KeunhooLee_en.pdf.

Diagram 5
Integrated trade processes of uTradeHub and UNIPASS



Source: Lee, D., "Trade Single Window for SMEs - Analysis on the basis of Korean case". Presentation at ECLAC training workshop "Trade Single Windows for the Internationalization of SMEs". Santiago, 13 May 2019 [online] https://www.cepal.org/sites/default/files/ktnet_-_don_lee_sesion_1.pdf.

E. Single submission of individual data elements

Although there are two systems which serve as a SW, they are interconnected, sharing all information with respect to international trade transactions. This is supported by a legal framework that provides privacy and security in the exchange of information. In cases where documentation and/or data requirements have already been received through either uTradeHub or UNIPASS, the same documentation and/or data shall not be requested by participating authorities or agencies except in urgent circumstances and other limited exceptions which are made public.

III. Main features of the Republic of Korea's single windows

A. General characteristics of the customs single window

UNIPASS is composed of 5 main systems comprising 77 modules (see diagram 6):

(i) The Single Window System provides a one-stop service for all customs clearance and logistics management processes without visiting process-related offices and organizations.

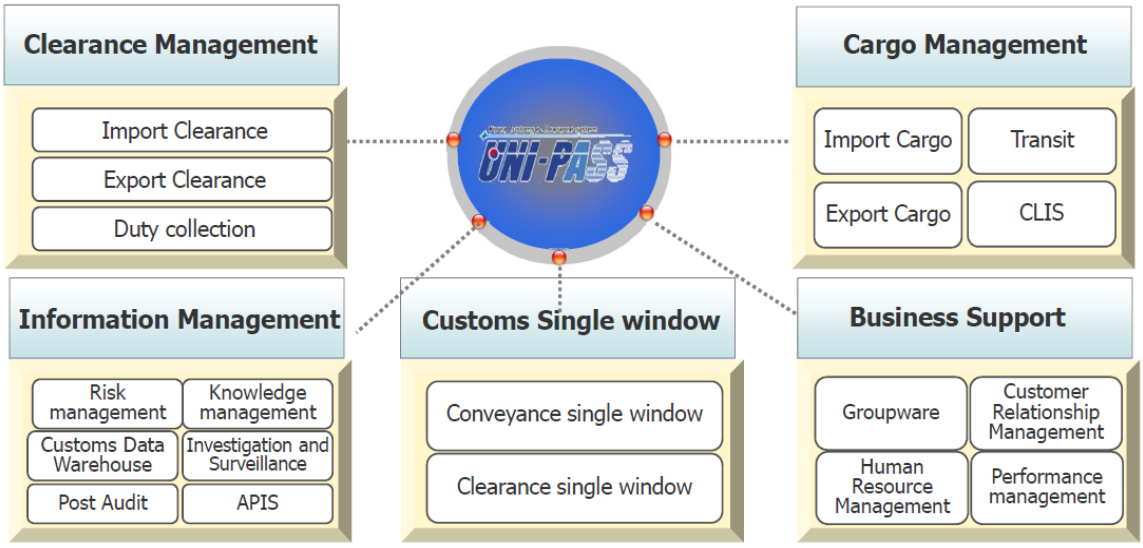
(ii) The Clearance Management System is composed of modules for the automation of customs administration, which includes business procedure modules, such as cargo and clearance management, and non-business procedure modules, notably investigation and audit.

(iii) The Cargo Management System collects Bills of Lading (B/L) from shipping companies, airlines, and forwarders, and assigns a cargo tracking number to each consignment. The system is connected to delivery companies and warehouses, allowing customs officers and traders to access information on the customs clearance process (such as the status of the cargo at each stage of the inspection process), officer in charge, and location of the shipment.

(iv) The Information Management System supports the administration system with modules, such as the Integrated Risk Management (IRM) module and the Advance Passenger Information System (APIS). The IRM analyses customs data and data provided by other entities for risk management, analytical and statistical purposes. This information is available to customs officers during various stages of the audit and inspection procedures. APIS uses data, such as passenger lists, reservation, and entry/exit history for risk analysis before the arrival of travellers.

(v) The Business Support System supports the KCS's management administration in the area of customer relationship management, human resource management, etc.

Diagram 6
Major components of UNIPASS



Source: Sung Heun Ha, "Comprehensive view on Korean Single Window", June 2019, Presentation at UNESCAP [online] https://www.unescap.org/sites/default/files/2%20Korea%20SW_Session%207.pdf.

B. Legal framework

The Republic of Korea enacted the 'Act on Promotion of Trade Business Automation' in 1991, the very beginning of Paperless Trade, and fostered a positive environment for EDI-based Paperless Trade. In 2006, the Act was fully revised into the "Electronic Trade Facilitation Act", making it the underlying Act for paperless trading process in an internet-based environment.

The "Electronic Trade Facilitation Act" established and regulated the operation of the "National Electronic Trade Platform". Its main elements were the facilitation of paperless or e-Trade, the definition of e-trade infrastructure business operators, the scope of SW business, standardization of e-trade documents, the security of e-trade documents and trade information, and development of e-trade technology and training on e-trade. Since its enactment, the government accelerated the implementation of the internet-based electronic trade system. In 2006, the MOTIE designated KTNET as the responsible organization to implement this mission and in 2007, KTNET launched the internet-based uTradeHub.

In 1999, the government enacted the "Digital Signature Act" and the "Framework Act on Electronic Transactions". The latter established the basic framework for digital signatures and their promotions. The law was completely revised in 2002 to clarify legal relations, improve customer protection and privacy, and promote e-transactions. Additionally, legal foundation is offered by the Act on Promotion of Information and Communications Network Utilization and Information Protection (2001) for validity of electronic documents and digital signature as well as operation of Paperless Trading system. Especially, the legal foundation for electronic Bill of Lading (e-B/L) was prepared in 2008 by the revision of Commercial Law which defined the guidelines for enforcement such as the role of the registration authority issuing and circulating e-B/L (see table 2).

Table 2
Legal instruments supporting Korea's single windows

Act	Description
e-Trade Facilitation Act	Fundamental Act on Paperless Trade Internet-based Infrastructure for Paperless Trade Duty to use Paperless Trading infrastructure
Framework Act on Electronic Commerce	Legal validity on electronic documents Policies on promoting electronic transactions
Digital Signature Act	Definition and legal validity of electronic documents and digital signature Guidelines for operating public certification authority
Act on Promotion of Information & Communications Network Utilization & Information Protection	Guidelines for building and using information network Guidelines for data privacy
Provision on electronic Bill of Lading in the Commercial Law	Legal validity on B/L Logical basis for circulating electronic documents overseas (e.g., e-B/L) Guidelines for operating e-B/L registration authority

Source: Korea International Trade Association (KITA), "Towards a Single Window Trading Environment: Case of Korea's National Paperless Trade Platform – uTradeHub". UNNext Brief #3, May 2010.

C. Institutional arrangements

It is generally recognised that customs administrations have a pivotal role in SW development, and this was similarly the case in the Republic of Korea. The institutional arrangements of UNIPASS were led by the KCS, with its Management Planning Division leading a taskforce of customs officers, business consultants, and software engineers to develop a Customs SW. Taskforce members represented their departments and shared information that enabled coordination. Most of the development work was finished in 2008, and since then KCS has focused on increasing the number of agencies to be integrated with UNIPASS (44 organizations to date).

In contrast, the setup of uTradeHub followed a model of public-private collaboration. In 2003, the Ministry of Commerce, Industry and Energy (now Ministry of Trade, Industry and Energy) took the lead in establishing the National Paperless Trade Committee, presided over by the Prime Minister. This committee worked hand in hand with the Private Sector Paperless Trade Advisory Committee, spearheaded by KITA. Together, these two committees established the "Public-Private Paperless Trade Facilitation Centre," consisting of six working groups (see diagram 7). Operating the Centre involved the active participation of several entities, including the then Ministry of Commerce, Industry and Energy, KCS, Korea Financial Telecommunications and Clearings Institute, KITA, KTNET, and the Korea Federation of Banks. Within this framework, the Korea Paperless Trade Office of KITA played a crucial role in gathering input to shape and execute policies, and in creating effective collaborative mechanisms among trading firms, banks, and shipping lines. The aim was to promote the widespread adoption of paperless trade practices within B2B interactions. This collaborative effort extended across various aspects, encompassing legislative reviews and adjustments among stakeholders, allocation of budgetary resources, systems development, and user training. All of these elements were essential in realizing the concept of a SW for streamlined trade processes.

While UNIPASS and uTradeHub are providing a paperless trade environment covering all trade procedures, there is no strong institutional arrangement for harmonization and coordination of these two national platforms. The previous National Paperless Trade Committee led by the Office of the Prime Minister played the role of coordinator but is no longer active. The absence of a national trade facilitation body may lead to conflicts between the two platforms as well as a waste of budget and resources through duplication of activities. For the optimised use of trade data submission and reuse, a coordination mechanism is needed by both platforms (Ha and Koh, 2018).

Diagram 7
Institutional structure of the public-private paperless trade facilitation centre

Source: D. Lee, "Recommendation on promoting SW for SMEs in Latin America - knowledge share with Korean Experience". Presentation at ECLAC training workshop "Trade Single Windows for the Internationalization of SMEs". Santiago, 13 May 2019 [online] https://www.cepal.org/sites/default/files/ktnet_-_don_lee_sesion_2.pdf.

D. Financial sustainability

In 2006, KCS implemented UNIPASS using its internal budget and offered the online customs declaration service to traders and customs brokers without charge. KCS introduced the fourth generation of UNIPASS in 2016 with a total investment of about US$ 150 million (Ha and Koh, 2018), which includes enhanced services, incorporates merger of some of the modules, interfaces with smart devices, cloud computing; convergence of clearance, logistics, trading surveillance investigation refund flow; and facilitates an integrated tax border system.

The initial funding of the Republic of Korea's paperless trade platform came from a government grant, while the operation, management and expansion of the systems and services were awarded to a private operator. In 1991, the fund for the establishment of the paperless trade system was granted by the Ministry of Commerce, Industry and Energy to private-sector organisation KITA. Initially, about US$ 40 million was funded for the basic infrastructure and system development. In 2004 an additional US$ 20 million was granted. With this fund, KITA established Korea Trade Network (KTNET), which has developed a trade and customs system and introduced commercial value-added services.

In 2003, the Ministry of Commerce, Industry and Energy provided funding of US$ 30 million for the development of the National e-Trade platform dubbed uTradeHub 1.0 and designated KTNET to operate the platform in 2007. Since then, KTNET has been operating and enhancing the system and services of the platform. To support increasing cross-border e-commerce and preferential trade transactions, the uTradeHub 2.0 was upgraded between 2019 and 2021 at a cost of US$ 8 million. The lead agencies in this upgrade included the now renamed Ministry of Trade, Industry and Energy (MOTIE) as well as KTNET.

E. Operational continuity

While KCS is the operating entity for the UNIPASS, it designated two entities -KTNET and Korea Customs Network (KCNET)- to operate value-added services, including customs clearance, manifest submissions, and consolidation and customs duty drawback. These services are charged at a fee determined by the operators. For its part, KTNet remains the operating entity for uTradeHub.

F. Services provided to the trade community

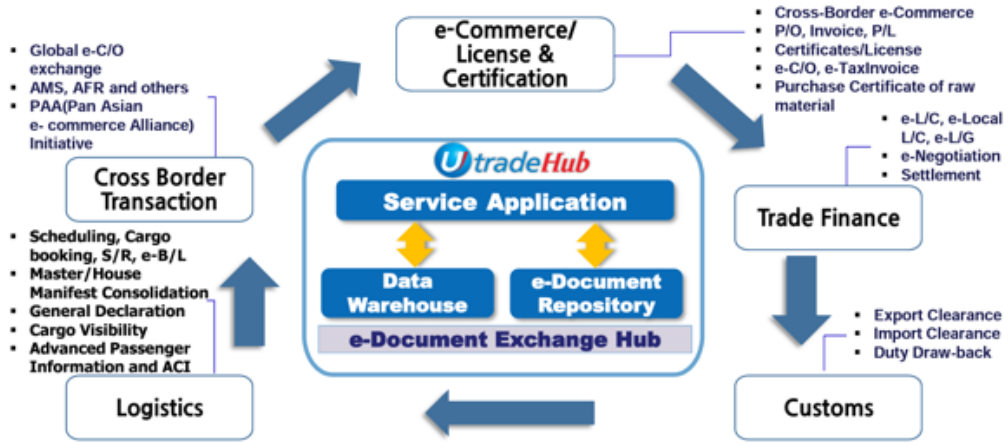
UNIPASS provides all customs-related B2G services, including:

- Import, Export and Express cargo clearance.
- Cargo Management.
- Duty payment and Draw-Back.
- Preferential Certificate of Origin.
- Permit application via interfaces with other regulatory agencies.
- Authorized Economic Operator (AEO) services.
- Simplified and Expedited Clearance for E-commerce cargo.
- Advanced Passenger Information System.
- Harmonized System (HS) code analysis.

The uTradeHub services cater for B2G and B2B trade-related procedures -some of which overlap with UNIPASS-, including the following (see diagram 8):

- Trader Directory Service.
- Licensing, certification.
- Preferential and non-preferential Certificates of Origin.
- Trade Financing and Insurance such as electronic letter of credit, electronic bill of lading and trade settlement; purchase confirmation and L/C-related services required for domestic transactions.
- Trade and Customs Logistics, including manifest and bonded transportation.
- Import, Export and Express cargo clearance.
- Accredited National Certificate Electronic Document Authority services.
- Relay services including the application for a cargo insurance and export insurance policy, the policy issuance notification, etc.
- Free Trade Agreement origin management services such as the origin determination, the issuance, distribution, and storage of certificates, etc.

Diagram 8
Schematic diagram of uTradeHub services



Source: Sung Heun HA, Presentation on the National Digital Trade Platform of Korea. 2022, Presentation at WTO [online] https://www.wto.org/english/tratop_e/tradfa_e/2_don_lee.pdf

The uTradeHub platform includes the following components:

- uLogis is a service of uTradeHub that offers forwarders, airlines, and shipping lines convenient and fast processing of cargo. It provides consolidated service for the import and export of cargo, including conducting operations on bonded goods. The operations are conducted anywhere as the portal connects logistics companies with businesses. This enhances efficiency and improves work processes of businesses.
- uBankers electronic bill of lading service makes it possible to receive shipping instructions from trading companies and to issue the electronic bill of lading online. Forwarders and shipping lines can log into uTradeHub from anywhere in the world and use the uBankers service to issue instructions and the electronic bill of lading.
- uTradeSearch system allows traders to perform in-depth searches for marketing and trade service information. The portal also provides a database of information on trade networks and detailed information provided by experts that can be accessed by any user at any time.
- uCustoms is an electronic import and export clearance service provided by KTNet in association with the Korea Customs Brokers Association. uCustoms facilitates clearance using the Internet as well as the current EDI/VAN system to lay the foundation for an integrated platform for logistics, clearance, and trade.

G. Facilities for Micro, Small and Medium-sized Enterprises (MSMEs)

The Republic of Korea's export promotion agencies provide several digital service platforms that support the exports and internationalization of MSMEs (Lee, 2021). KTNET has a Free Trade Agreement (FTA) information website known as "uFTAKOREA" (fta.utradehub.or.kr) to encourage SMEs to exploit the benefits offered by FTAs. KCS also operates "YesFTA" (www.customs.go.kr/ftawebsitekor) and "FTA-Korea" (www.fta.go.kr)". These portals provide information on the status of various FTAs, custom tariffs by countries and certificates of origin, among others. The information website "TradeNAVI", operated by KITA and MOTIE, provides trade related information, including on FTAs.

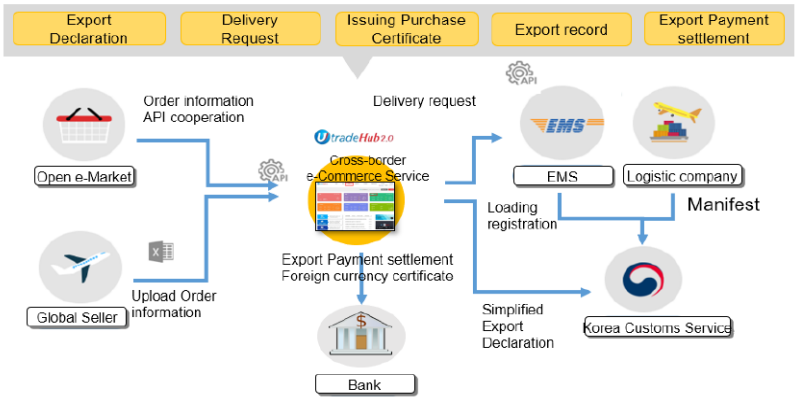
In 2018, the Korean government announced a plan to encourage online exports of SMEs through the establishment of an "Express Customs Clearance System" to simplify the customs clearance process further. This plan should reduce the number of required documents to submit to the administrative authorities. Another objective was to establish a "Common Logistics System" that amasses small volumes of SME export products for their delivery in bulk to reduce shipping costs.

H. Facilities for e-commerce

uTradeHub established an "e-Commerce Cluster" in 2022 for e-traders to simplify the all-online export-related declaration process, and to create a special simplified declaration form and system to provide a simple and convenient online trading environment. The benefits enjoyed by cross-border e-commerce traders, as evidenced by various case studies, include the following (Ha, 2022):

- Integrated delivery request management of express couriers: time saving from 3 hours to 45 minutes achieved by four different express couriers.
- Automated creation of documents for proof of foreign exchange transaction: application processing reduced from 5 hours to 30 minutes.
- Automated Simplified Export Declaration: processing time was reduced from 500 minutes to 15 minutes.
- Automated creation of Purchase Certificate: reduced from 30 minutes to 1 minute.

Diagram 9
uTradeHub cross-border e-Commerce services



Source: Sung Heun HA, Presentation on the National Digital Trade Platform of Korea. Presentation at the WTO, June 2022 [online] https://www.wto.org/english/tratop_e/tradfa_e/2_don_lee.pdf.

KCS also introduced a Simplified Declaration for export system to specifically cater for e-commerce. This simplified declaration greatly reduced the number of data fields in the export declaration from 57 to 33. KCS introduced the function for batch registration of the simplified export declarations in the clearance portal in order to expedite the completion of export declarations for small amounts and multiple declarations. Previously e-commerce traders had to directly enter export declarations on the website. With the new feature, traders can convert Excel file data into the form of export declarations in a batch. Due to the nature of e-commerce, which has multiple non-fixed buyers, at the time of the export declaration the buyer's code which is required to be registered each time is omitted.

The UNIPASS system has real-time cargo tracking management through the Cargo Management System, which collects Bills of Lading from shipping companies, airlines and forwarders and assigns a cargo tracking number to each consignment. The Cargo Management System is connected to delivery companies, warehouses and other private entities moving goods. It allows Customs officers and traders to access information on the process, as well as the status of the cargo at each stage, stating the time, the Customs officer in charge and the location of the cargo, including access to the manifest, the Customs declaration, and other documents required during the clearance procedure. Moreover, the time it takes to deliver or clear goods is also measured in order to avoid logistics issues, such as bottlenecks.

Diagram 10
UNIPASS e-commerce platform

Source: Korea Customs, Presentation on UNIPASS at UNCTAD eCommerce Week, April 2018 [online] https://unctad.org/system/files/non-official-document/dtl_eWeek2018p78_KeunhooLee_en.pdf.

IV. Technological characteristics of the Republic of Korea's single windows

A. Authentication mechanisms

Security is a top priority for the uTradeHub, which was the winner of the Ministry of Information and Communication's Information Security Award and of the ISO 27001 certification for its security systems. It provides security through physical systems, administrative safeguards, physical safeguards, and authentication through certificates. The uTradeHub services can be accessed with a single account, based on the Single Sign-On function.

The UNIPASS SW is equipped with an authorized service program functionality, a platform enabling government authorities without their own system to logon to the SW, and electronically process applications, i.e., receive, review, and approve requests, and issue and send documents.

B. Electronic notification mechanisms

UNIPASS provides electronic notifications via a Gateway, which provides the following functions:

- Notification of clearance result through approval of export.
- Receive result notification of inspection/quarantine.
- Reception/error notification of inspection/quarantine result.
- Clearance result notification on inspection/quarantine.

C. Digital formats

The UNIPASS system applies international standards (such as the WCO DM 3.0 and UN codes) and open technology standards. Interfacing with other countries' SW or customs systems using international data sets eases the entry of Korean goods. In addition, guidelines for development of XML Electronic messages (v3.0) were facilitated by the Korea Institute for Electronic Commerce (KIEC), which established the KIEC Extensible Markup Language (XML) Core Component Library, KIEC Technical Specification, 2003-XML Naming & Design Rules, UN/CEFACT Modelling Methodology, and the UN/CEFACT International Semantic Standards for Global Supply Chain Data.

D. Digital signature

KTNET provides a Joint Certification Service (formerly Known as Public Certification Service)[3] which provides digital signature services such as:

- Issuance of an online ID card and e-seal as an e-signature certification service provider in accordance with the Digital Signature Act.
- Identification of e-commerce counterparties.
- Provision of e-signature, and verification of forgery and falsification of e-documents.

The Joint Certification Service-accredited certificates can be used conveniently for all e-transactions. They can also be used from various types of storage methods, including mobile, desktop, USB memory stick, hardware security module, etc.

KTNet is the only accredited certificate authority in the trade sector that issues accredited certificates for e-trade. It also provides specialized secure certification for e-documents (such as PDF, etc) as well.

E. Electronic payment

Both UNIPASS and uTradeHub facilitate the e-payment of customs duties and fees for electronic submission of cargo manifests, as well as for inspection fees incurred. In particular, UNIPASS features an Integrated Payment function which enables the following features:

- Registering companies with issuance of integrated payment receipt.
- Issuing integrated payment receipt.
- Issuing record book of integrated payment receipt.
- Integrated revenue payment record book.

F. Risk management

UNIPASS includes an Integrated Risk Management (IRM) module which incorporates a multi-point, intelligent risk management engine with self-learning. The IRM facilitates automatic clearance of low-risk cargo. This system analyses not only Customs data, but also data provided by other entities to create risk profiles and targeting criteria on cargo, as well as on the trading entities and passengers. The system analyses their behaviours and risk patterns for predictive analysis. Such analysis is made available to Customs officers during various stages of the audit and inspection procedures to aid them in their decision-making.

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[3] See [online] http://www.tradesign.net.

G. Use of emerging technologies

KCS encountered challenges in assessing current risks due to the limited quality of available data. An effective approach to bolster the risk management system involved acquiring data directly from various parties responsible for generating it, such as e-commerce sellers, express carriers, and Customs brokers. Hence, from 2018 to 2020 KCS conducted a pilot project to explore the application of blockchain technology. The objective was to enhance transparency in information exchange and trust among individual data creators, as well as to automate data entry, which was previously a partly manual process. The pilot yielded success as each participant in a transaction shared their information directly with Customs through the blockchain. This success was attributed, in part, to the simplicity and computerization of e-commerce transactions, with each participant holding specific data at distinct points in the transaction timeline.

In the traditional clearance model, information related to a purchase was submitted to Customs by the delivery company and the declarant who obtained it from the buyer or seller. This process introduced the risk of data alteration, either accidentally or intentionally, potentially resulting in undervaluation or misdeclaration. In the blockchain approach, all transaction participants (sellers, express carriers, and Customs brokers) transmitted their information, or "blocks," directly to Customs in real time. Throughout the pilot, KCS oversaw all transactions recorded on the blockchain and verified the accuracy of the received information.

A key takeaway from the project was that the initial setup and operation costs of a blockchain system were higher compared to other data-sharing systems. Additionally, factors such as maintenance, data privacy, sustainability, and network scalability should be carefully considered when selecting the type of blockchain to implement. KCS opted for a private-permissioned blockchain, but encountered challenges related to the transmission of large volumes of data.

Another usage of blockchain is the Electronic Origin Data Exchange System (EODES). This is a blockchain-based service platform for cross-border e-CO exchange involving issuing, exchanging, and reviewing Certificates of Origin electronically.

V. Characterization of the Republic of Korea's single window ecosystem according to its maturity stage

Based on their evolution in recent decades, the dual Korean SWs can be deemed as an advanced National Single Window ecosystem. Using the seven stages of SW development proposed by Koh (2011)[4] to gauge the maturity of Korea's Single Windows, it is concluded that the following milestones have been achieved:

- Stage 5 (National Single Window): UNIPASS has integrated with 44 domestic organizations, covering mostly all of the country's trade regulatory agencies. Hence, it is a fully nation-wide SW.
- Stage 6 (Extended National Single Window with Business-to-Business Services): uTradeHub is an extended form of SW, providing several B2B services such as trade finance.
- Stage 7 (Regional Single Window): the Republic of Korea has already implemented cross-border data exchange between its SW and other countries' SW. For example, through the Electronic Origin Data Exchange System (EODES) arrangement with China, the electronic certificates of origin are exchanged between the Customs authorities of both countries. Korea's SW also implemented an EODES arrangement with Indonesia's SW in March 2020, and has reached technical agreements with Vietnam and India to implement the same. The EODES systems interact with the UNIPASS database and web application server (WAS) for data management.

[4] A brief explanation of the seven stages is presented in annex 1.

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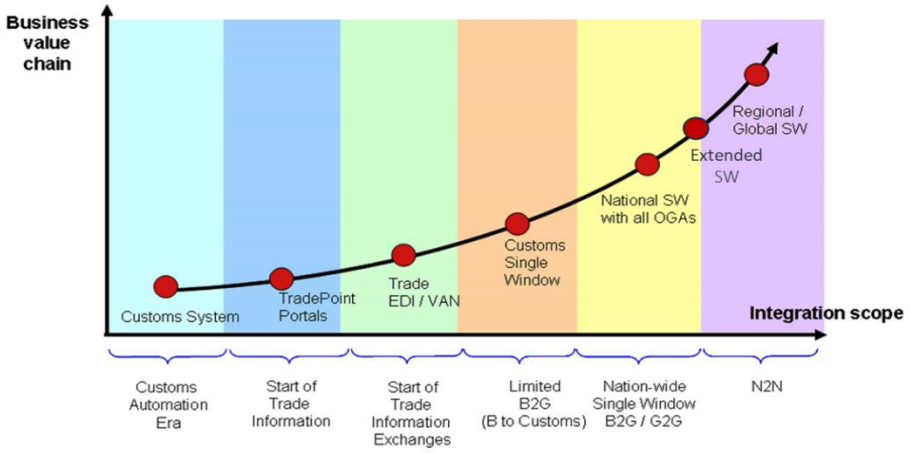
Annex

Annex 1
A characterization of single windows according to their stage of development

Following Koh (2011), seven stages are identified to gauge the developmental maturity of a Single Window (see diagram A1).

Diagram A1
Evolution of single window development



Source: Adapted from J. Koh, "Ten Years of Single Window Implementation: Lessons Learned for the Future", Discussion Paper, UN Global Trade Facilitation Conference (2011) [online] https://unece.org/fileadmin/DAM/trade/Trade_Facilitation_Forum/BkgrdDocs/TenYears SingleWindow.pdf.

A. Stage 1: customs automation

The pre-Single Window evolution's first step in advancing electronic trade facilitation is the development of a paperless customs declaration system, transitioning from manual or traditional Electronic Data Interchange (EDI) systems to electronic customs declaration systems. An electronic automated customs system is the foundational step towards establishing a national Single Window, and typically should include features like electronic customs declarations, e-payment, automated risk assessment, and risk-based inspections.

B. Stage 2: trade point portals

Following this was the era of the development of national Trade Points. These serve as an information source for trade-related information, providing traders with data about business and market opportunities. They also function as trade-facilitation centres, where players in trade transactions (e.g. Customs, banks, chambers of commerce, freight forwarders, transport and insurance companies) are grouped together under a single physical roof or linked virtually to the Trade Point to provide all the services required for trade transactions. Trade Points were originally conceptualized to serve as gateways to global electronic networks, with all national Trade Points interconnected in a worldwide electronic network.

C. Stage 3: trade electronic data interchange/value added network

In paperless customs environments, secure Electronic Data Interchange (EDI) and Value-Added Networks (VANs) facilitate electronic customs document exchange, eliminating the need for physical visits or paper submissions. These systems often expand to cover other customs-related tasks like online duty payment, electronic risk assessment, container loading documentation, and information exchange between customs and terminal operators to expedite customs clearance at ports or borders. One evolutionary development is the use of value-added network (VAN) providers as intermediaries in electronic data exchanges. A Value-Added Network (VAN) provider facilitates secure and efficient electronic data exchanges between businesses. They handle data transmission across different communication protocols, offer translation services for varying data formats, and ensure robust data security. VANs also enable interoperability between disparate systems, provide data storage and archiving, and offer additional services like integration with enterprise systems. They ensure network reliability and provide support for technical issues, often using a mailbox approach for receiving, storing, and forwarding electronic data, thus simplifying and streamlining business communications.

D. Stage 4: customs single window/port community systems

Stage 4 involves the concepts of Customs Single Window and Port Community Systems. Typically, the development and implementation of a Single Window in some countries have to be gradual and depend on agency collaboration, willingness, and cost-benefit justification. To address challenges resulting from the involvement of multiple other government agencies (OGAs)[5], a variation known as the "Customs Single Window" has emerged. It focuses primarily on customs-related interactions but does not cover all regulatory processes outlined in UN/CEFACT Recommendation 33.

Other authorities with significant roles in trade, such as Port Authorities, have established limited, port-centric "Single Windows" referred to as either "Port Single Windows" or "Port Community Systems" (PCS). Port Single Windows provide local-level vessel information to port authorities, while PCS facilitates data exchange in the port environment with a Business-to-Business (B2B) character. A Port Community System serves as a centrally operated system for data transfer, enabling parties interested in sea-borne transport information to avoid bilateral data transfers.

These limited forms of Single Window systems, whether Customs-centric or port-centric, serve as valuable learning experiences for many countries as they work towards achieving the full vision of a "National Single Window" for trade facilitation.

E. Stage 5: national single window

At this stage, the focus is on integrating the automated customs system with all other government agencies (OGAs) responsible for issuing trade-related permits, certificates, and documents. This integration streamlines interactions between traders and multiple government agencies involved in trade, import, export, and transit regulations. A full national SW allows for the electronic application and issuance of permits and certificates, facilitating their exchange among government agencies. This eliminates the need for traders to visit multiple regulatory offices physically. In the beginning, priority is often given to the involvement of agencies handling high transaction volumes, numerous documents, and those impacting national development agendas, like agencies issuing certificates of origin and export permits for strategic products.

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[5] In the context of a Single Window system for trade facilitation, the expression "Other Government Agencies" (OGAs) refers to various government entities or authorities that have regulatory responsibilities and are involved in the import, export, or transit of goods. These agencies play a role in ensuring that imported or exported goods comply with specific regulations, standards, and requirements related to health, safety, security, environment, and other aspects. The term Participating Government Agencies (PGAs) is also synonymously used.

A full SW is achieved when all OGAs and all their permits are included. It needs to be able to interface or integrate the various OGAs' needs and requirements in the SW to facilitate trade. The challenge is that government agencies are traditionally organized in siloed departmental fashion, which creates limited connection with each other either technologically or in the way their services are delivered. Therefore, project teams implementing national single windows often found themselves to be pioneers in establishing a "whole of Government" framework. Few, if any, other electronic government initiatives have as wide a scope and breadth as a national SW project that necessitates the interfacing or integration of many government backend systems. This makes national SW projects even more challenging. Only countries that already have a strong electronic government foundation are able to build upon it towards the ""whole of Government" connected government structure.

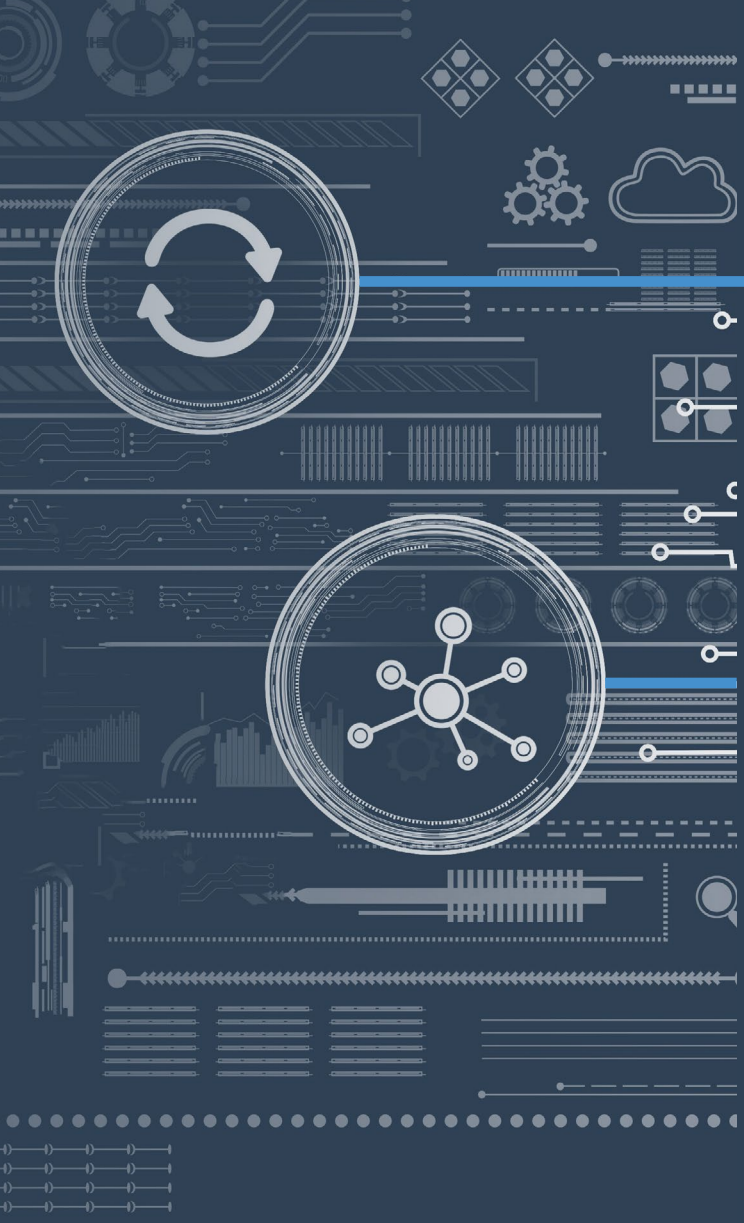
F. Stage 6: extended national single windows with business-to-business services

A national SW, by definition, caters for Business-to-Government (B2G) and Government-to-Government (G2G) connectivity. An interesting extended variant of NSW provides for the extension of the services to offer Business-to-Business (B2B) services as well, such as trade-financing instruments (letter of credit, letter of guarantee, bill of ladings), commercial documents (purchase/sales order, order confirmation, packing list, advanced shipment notice, commercial invoices), etc. These services hinge on the concept of a national "paperless trade" ecosystem. Examples of such extended paperless trade ecosystems include the Republic of Korea's u-TradeHub, Singapore's Networked Trade Platform, and Indonesia's National Logistics Ecosystem.

G. Stage 7: regional single windows

As more national Single Windows are created, there is considerable impetus in regional and international fora for greater connectivity between countries, regions and across continents. The model currently being contemplated foresees supra-national Nation-to-Nation (N2N) exchange of trade information between National Single Windows.

The ASEAN Single Window (ASW) is the first regional initiative that seeks to enhance regional connectivity. It is defined as: "The secured environment where National Single Windows (NSWs) integrate and operate". Other regions and groupings have also instituted regional SW projects including the Pacific Alliance initiative connecting the national SWs of Chile, Peru, Mexico, and Colombia; the European Union SW Environment for Customs which connects the limited Customs SWs between EU states; and the East African Community (EAC) regional electronic SW.



Over the last two decades, the concept of the single window for foreign trade has become an increasingly important item on the global trade facilitation agenda. Asia is home to some of the world's most advanced single windows, and the Republic of Korea is among the pioneers in the transition towards a paperless trade environment. This document presents the history and main features of its dual system, composed of two interconnected single windows: UNIPASS and uTradeHub. The experience in the Republic of Korea may be useful for policymakers in Latin America and the Caribbean, where single windows are generally at a much earlier stage of development. Of particular interest is the inclusion in UNIPASS and uTradeHub of several functionalities aimed at internationalizing micro-, small and medium-sized enterprises, including by facilitating their participation in e-commerce.

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