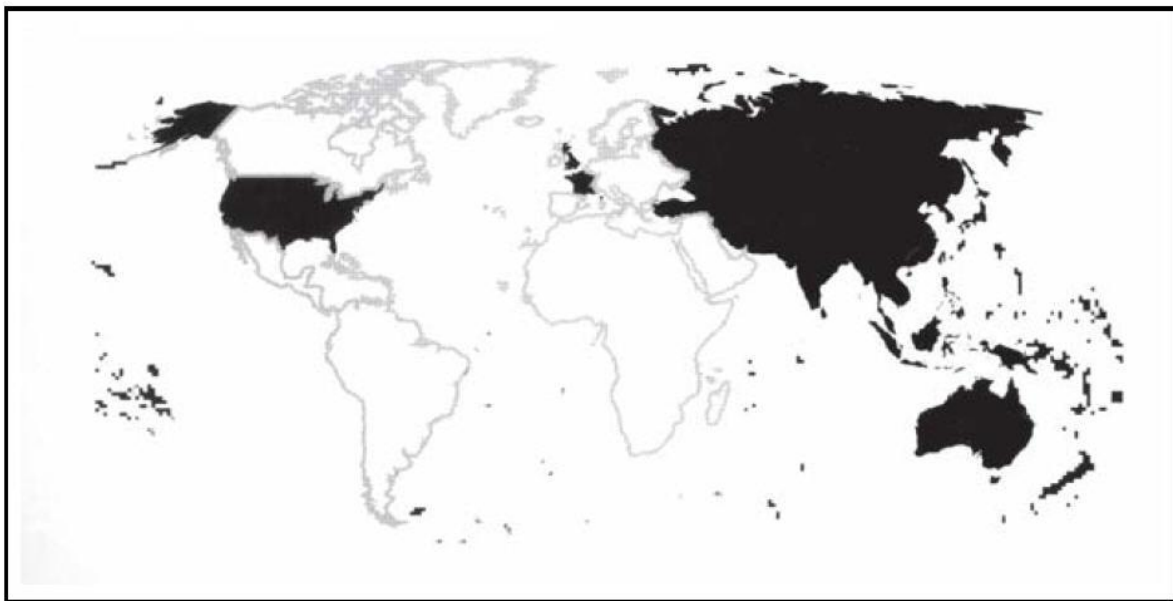


CROSS-BORDER SINGLE WINDOW INTEROPERABILITY: A MANAGERIAL GUIDE



Economic and Social Commission for Asia and the Pacific (ESCAP) serves as the United Nations' regional hub promoting cooperation among countries to achieve inclusive and sustainable development. The largest regional intergovernmental platform with 53 member States and 9 associate members, ESCAP has emerged as a strong regional think-tank offering countries sound analytical products that shed insight into the evolving economic, social and environmental dynamics of the region. The Commission's strategic focus is to deliver on the 2030 Agenda for Sustainable Development, which it does by reinforcing and deepening regional cooperation and integration to advance connectivity, financial cooperation and market integration. ESCAP's research and analysis coupled with its policy advisory services, capacity building and technical assistance to governments aims to support countries' sustainable and inclusive development ambitions.



The shaded areas of the map indicate ESCAP members and associate members.

The United Nations Network of Experts for Paperless Trade and Transport in Asia and the Pacific (UNNExT) provides a networking and knowledge-sharing platform for policy makers, practitioners and technical experts to bridge the implementation gaps between the countries with different level of trade facilitation. Its mission is to establish an ongoing community of knowledge and practice to facilitate the implementation of Single Window and paperless trade and transport in the Asia-Pacific region. The UNNExT intends to enhance capacity of its members to make informed decisions about policy issues at stake and to implement related international instruments and standards. It is operated jointly by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the United Nations Economic Commission for Europe (UNECE).

CROSS-BORDER SINGLE WINDOW INTEROPERABILITY: A MANAGERIAL GUIDE

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ABBREVIATIONS AND ACRONYMS

| | |
|-----------|---|
| ACDD | ASEAN Customs Declaration Document |
| AQIS | Australian Quarantine and Inspection Service |
| ASEAN | Association of Southeast Asian Nations |
| ASW | ASEAN Single Window |
| ATIGA | ASEAN Trade in Goods Agreement |
| B2B | Business-to-Business |
| CA | Certification Authority |
| CITES | Convention on International Trade in Endangered Species |
| G2B | Government-to-Business |
| G2G | Government-to-Government |
| EAEU | Eurasian Economic Union |
| UNECE | United Nations Economic Commission for Europe |
| ESCAP | United Nations Economic and Social Commission for Asia and the Pacific |
| HTTP | Hypertext Transfer Protocol |
| HTTPS | Secure Hypertext Transfer Protocol |
| ICT | information and communication technology |
| IEEE | Institute of Electrical and Electronics Engineers |
| IMO FAL | International Maritime Organization – Facilitation Committee |
| IP | Internet Protocol |
| ISO | International Organization for Standardization |
| IT | information technology |
| LDC | least developed countries |
| NEAL-NET | Northeast Asia Logistics Information Service Network |
| NSW | National Single Window |
| NTFC | National Trade Facilitation Committee |
| NZFSA | New Zealand Food Safety Authority |
| PAA | Pan Asian e-Commerce Alliance |
| REST | representational state transfer |
| PKI | public key infrastructure |
| RSW | Regional Single Window |
| SOAP | Simple Object Access Protocol |
| SPS | Sanitary and Phytosanitary |
| SSL | secure socket layer |
| SW | Single Window |
| SWI | Single Window interoperability, or cross-border Single Window interoperability |
| TFA | Trade Facilitation Agreement |
| UN/CEFACT | United Nations Centre for Trade Facilitation and Electronic Business |
| UNNExT | United Nations Network of Experts for Paperless Trade and Transport in Asia and the Pacific |
| UNRC | United Nations Regional Commissions |
| UNTDDED | United Nations Trade Data Element Directory |
| VPN | Virtual Private Network |
| WCO | World Customs Organization |
| WTO | World Trade Organization |

XML extensible Markup Language

EXECUTIVE SUMMARY

This guide provides a management framework and actionable recommendations for cross-border interoperability between national Single Windows, bilaterally or multilaterally. This guide builds upon UN/CEFACT Recommendation 36 and develops a five-pronged management framework for Single Window interoperability (SWI). In addition to actual business needs for SWI, four critical areas for successful implementation of SWI are proposed and discussed in detail, further elaborating on guidelines included in the Recommendation 36. In this guide, these areas are referred to as the four levels of interoperability, i.e., policy and legal interoperability, people and organizational interoperability, process and data interoperability, and platform and technical interoperability.

Descriptions and recommended actions are provided for each of these five issues. As defined in chapter 1, the scope of SWI in this guide is regulatory and cross-border in nature. As a consequence, the SWI initiative must be a collaboration effort mainly between government agencies in the participating countries.

When the business needs/objectives for SWI are mutually agreed on, the SWI that will be created must have the ability to electronically exchange information between disparate and diverse ICT-enabled SW facilities. The identification of business objectives and the enablers or the critical success factors for achieving these objectives are summarized as follows:

- (a) Business needs. This comprises the capture, analysis, evaluation and agreement on business needs as the primary driver for cross-border SWI by including perspectives from public and private stakeholders in trade by the participating countries;
- (b) Policy and legal interoperability. This involves securing the highest-level political commitment between or among the participating countries for collaboration in establishing cross-border SW interoperability. It also covers the enactment of related laws and regulations related to mutual recognition of electronic data exchanges across borders;
- (c) People and organizational interoperability. This includes the establishment of an intergovernmental governance and management structure among the participating countries, with mandated directives and supporting resources. This also covers building and improving people capacity to cope with new technology, innovation and change related to cross-border SWI;
- (d) Process and data interoperability. This comprises the analysis of the current/as-is processes, design and agreement on better target/to-be processes related to information exchange across borders. It also covers analysis, harmonization and agreement on better to-be standardized data and documents in electronic form for exchange across the borders of the participating countries;
- (e) Platform and technical interoperability. This covers the analysis, design and agreement on several necessary set of common platform and technical aspects, e.g., interface specifications and common ICT infrastructure if needed, so that different SW facilities can connect and communicate with each other.

The recommended actions are discussed in detail in chapter 3 and summarized in the annex. Chapter 4 provides details and options for specific issues, e.g., legal issues, connectivity options and interface protocol specifications.

This guide also suggests a governance and management structure as well as phase-by-phase programme management for governing and managing the establishment of cross-border SWI. The three main phases for governance are evaluating, directing and management monitoring. The other four phases of management include planning (including designing to-be, and possibly proof-of-concept development), building, operating and monitoring. Chapter 5 discusses these phases in the context of programme/projects life cycle in detail.

TERMS AND DEFINITIONS

| TERMS | DEFINITION |
|-------------------------------------|---|
| SINGLE WINDOW (SW) | A facility 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 .If information is electronic, then individual data elements should only be submitted once. |
| NATIONAL SINGLE WINDOW (NSW) | A Single Window facility that handles all cross-border trade-related regulatory requirements in a country, in particular in the context of Single Windows of ASEAN member states .The designation National Single Window (NSW) normally indicates that there is only one official SW and all related government agencies should – either at the outset or progressively – participate in this facility ¹ . |
| REGIONAL SINGLE WINDOW (RSW) | A mechanism that handles trade-related regulatory requirements within a given region .This is either to create a collaborative system of NSWs, a network of networks that provides additional levels of functionality, such as shared procedures between countries, or completely replaces the NSWs. |
| SUBREGIONAL | The term “subregional ”used in this guide is generally in alignment with the United Nations geoscheme, devised by the United Nations Statistics Division .In this geoscheme, for example, Asia comprises five subregions :Central Asia; East Asia; South Asia; South-East Asia; and West Asia .In the context of this guide, any economic community comprising more than two countries, such as a customs union, may also be considered a subregion .With the contexts given above, the term “subregional ”used here conforms to the definition of “subregion ” given in the Oxford English Dictionary – “A division or part of a region.” ² |

¹ Adapted from “Technical Note on Terminology for Single Window and other electronic platforms,” United Nations Economic Commission for Europe, Executive Committee, Centre for Trade Facilitation and Electronic Business, Twenty-third session, Geneva, 3-4 April 2017.

² Adopted from ESCAP (2017). Explanatory note to the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific. Accessed from <http://www.unescap.org/sites/default/files/Explanatory-Note-to-the-FA.pdf>

CHAPTER 1. SINGLE WINDOW: CONCEPT AND CHALLENGES

A. What is a Single Window?

A Single Window is a facility that enables operators involved in trade and transport of goods to fulfill import, export and transit-related regulatory requirements especially with a single point of data submissions. Trade and transport operators can submit those regulatory-required information and documents through a single location or a single-entry point. Such information and documents are typically related to customs declarations and clearance, licenses, permits, certificates, trading invoices, freight-related documents, and those involving with import, export and transit-related regulatory requirements.

A definition of the term "Single Window", as proposed in the United Nations Economic Commission for Europe (UNECE) Recommendation No.33 for establishing a Single Window [ECE/TRADE/352] is as follows:

"A facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfill all import, export, and transit-related regulatory requirements. If information is electronic then individual data elements should only be submitted once."

This facility is implemented preferably with information and communication technology (ICT). Electronic information and electronic transactions can efficiently facilitate interactions among traders, regulatory agencies and transport-related operators for efficient cross-border trade transactions.

B. Benefits of a Single Window

The value proposition of establishing a SW facility is to increase efficiency through time and cost savings for traders and transport operators in their dealings with government authorities, for example, in obtaining the relevant licences, certificates, permits and clearance in order to move goods across borders.

Electronic services provided by a SW facility could offer specific benefits to stakeholders in international trade. For example, government authorities, such as customs, permit-issuing agencies, ministries and other trade monitoring bodies, would be able to obtain international trade-related data and statistics in a comprehensive and timely manner for the regulatory requirements. Shipping and freight forwarding agents, shippers, traders as well as the banking and insurance community can obtain necessary information and handle related transactions electronically and efficiently through this facility. Without such a facility, traders and transporters traditionally have to deal with duplicate paper documents, and make several physical visits to multiple government agencies in different locations to obtain the necessary paperwork and clearances in order to complete their import, export or transit-related processes. For more than 10 years, SW facilities and their benefits have been widely recognized and promoted by several international and regional organizations concerned with trade facilitation. Among them are the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Economic Commission for Europe (UNECE) and its Centre for Trade Facilitation and Electronic Business (UN/CEFACT), the World Customs Organization (WCO), the United Nations Network of Experts for Paperless Trade and Transport in Asia and

the Pacific (UNNExT), the Association of Southeast Asian Nations (ASEAN) and the World Trade Organization (WTO).

With the WTO Trade Facilitation Agreement (TFA) entering into force on 22 February 2017, two-thirds of its 164 members ratifying this agreement have commitments on trade facilitation measures, including the implementation of SWs. The objective is to reduce the vast amount of red tape that still exists in moving goods across borders. The TFA contains provisions for expediting the movement, release and clearance of goods, including goods in transit, and is expected to create a significant boost for multilateral trading. In particular, Article 10.4 of the agreement calls for all ratifying member States to endeavour to establish and maintain an SW facility. This will enable traders to submit documentation and/or data requirements for the importation, exportation, or transit of goods through a single-entry point to the participating authorities or agencies. After examination by the participating authorities or agencies of the documentation and data, the results will be notified to the applicants through the SW in a timely manner. With this agreement, many more WTO member countries should move towards establishing SW facilities.

C. Need for Cross- border Single Window Interoperability

Interoperability can be defined in many ways. Referring to an international standard organization (IEEE Standard Glossary, 1990), the term “interoperability” means “the ability of two or more systems to exchange information and to use the information that has been exchanged in a meaningful way.”

On that basis, the term “cross-border SWI” is defined here to mean “the ability of SWs in two or more countries to exchange information and to use the information that has been exchanged to meaningfully facilitate regulatory-related requirements for the movement of goods across those countries.” The exchanged information will support re-use and processing with minimum effort, thereby speeding up international trade, transport, administrative and regulatory-related transactions along the supply chain. This definition of cross-border SWI within this guide is in general congruent with what is described in the UN/CEFACT Recommendation 36: Single Window Interoperability.

Several developed and developing countries have successfully established SW facilities to improve their international trade through electronic transactions³. Many more countries, including least developed countries,⁴ are in the stages of planning or establishing their national-level SWs. Through such national-level facilities, information and several documents required by authorities are transacted in electronic form; however, many other documents needed are still in paper form. Governments and traders have recognized the opportunity and potential benefits of further reductions in the number of paper-based documents through cross-border information exchange. The users of domestic-level SWs are increasingly requesting interoperability of SW facilities across trading countries. Single Window Interoperability (SWI) should allow secure electronic information exchange across the borders or between two or more National Single Windows (NSWs) in such a way that collaboration among traders, transport operators and Governments along the international supply chain can be further improved.

³ Doing Business 2018 - A World Bank Group Flagship Report, World Bank, 2018.

⁴ According to the list of 122 WTO member States that ratified the TFA, 36 are least developed countries (as of 20 November 2017).

For example, in an average case, there could be up to 15 business and government agencies within a country's borders involved in international trade. However, international trade involves not just stakeholders within one country, but also stakeholders within the other country where the trading occurs. In the same cross-border trade or shipment, data and documents that are created in one country will then be used in the other country. Information in one country's export declaration can be the same as, or similar to the other country's import declaration. A Certificate of Origin issued in the exporting country is normally accepted by the importing country. Therefore, if the information can be shared by electronic information exchange between the two countries' SW facilities, the transactions along the international trade supply chain can be handled in less time, and more reliably and more cost-efficient. The other potential benefits include improved data accuracy, closer cooperation between countries, better risk analysis, faster advanced security declarations, better intelligence information gathering and advanced processing.

Cross-border SWI and enabling cross-border paperless trade can also strategically support the vision of regional integration and sustainable development⁵. The rise of regional and global product networks in many industries also creates needs for interoperability of SWs of multiple countries. The purpose of SWI is to better integrate the international supply chain among the participating countries through cross-border paperless trade transactions.

D. Challenges of Single Window interoperability

The interoperability of SWs in the context of this guide is cross-border and regulatory in nature; therefore, there can be many challenges in managing, implementing and maintaining such a collaborative initiative. The critical challenges to establishing and maintaining SWI include the high-level political commitment of Governments between two or more countries involved, intergovernmental collaboration, adequate financial support, and technical and operational challenges.

In reference to the adopted definition of cross-border SWI, SWI implies the following two abilities:

- (a) The ability to exchange data. This could be called “syntactic interoperability” between two or more SWs. This interoperability could be implemented with some agreed interfaces and protocols;
- (b) The ability to correctly interpret the data being exchanged in a meaningful way. This is called “semantic interoperability”. In this case, the exchanged data must have some common structure and meaning, and therefore meaningfully support some specifically required processes along the cross-border trade transactions.

Another definition of interoperability provides potential challenges to be addressed for establishing SWI:

⁵ See Asia-Pacific Trade and Investment Report 2017, available from <http://www.unescap.org/publications/APTIR2017>

“Interoperability is the ability of disparate and diverse organizations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organizations through the business processes they support, by means of exchange of data between their respective ICT systems” (European Union, 2017).⁶

In referring to this definition, and according to the UN Global Survey on Trade Facilitation and Paperless Trade Implementation 2017⁷, issues or challenges that must be managed and resolved in order to successfully establish cross-border SWI include:

- (a) Difficulties of cross-border cooperation, e.g., how to establish an appropriate governance structure to drive this intercountry and interagency collaborative effort;
- (b) Conflict of interest, e.g., how to align and agree upon common beneficial goals among the participating countries and stakeholders;
- (c) Innovative business processes, e.g., how to design new business processes for more efficient regulations, faster and less expensive cross-border trading;
- (d) Non-harmonized data and documents, e.g., how to harmonize and agree on the meaning of data used among disparate and diverse organizations;
- (e) A lack of adequate laws and regulations to enable cross-border legal recognition of electronic data among the trading countries;
- (f) A lack of necessary ICT infrastructure.

E. Content and scope of the guide

This guide provides a management framework and actionable recommendations for cross-border interoperability between national Single Windows, bilaterally or multilaterally. The intended audience of this guide is primarily government policy decisionmakers and policy managers, although some of the guidelines and practices can be useful for the business community. The guide builds upon UN/CEFACT Recommendation 36 and develops a five-pronged management framework for Single Window interoperability (SWI). In addition to actual business needs for SWI, four critical areas for successful implementation of SWI are proposed and discussed in detail, further elaborating on guidelines included in the Recommendation 36.

Chapter 2 of this guide reviews the current state of implementation of SWs and other paperless trading facilities at the country level, cross-border interoperability or information exchange facilities across some countries as well as examples of their best practices, especially in the Asia-Pacific region. A conceptual framework for cross-border SWI is proposed in chapter 3. The proposed framework classifies the critical success factors in establishing the cross-border

⁶ To apply this definition to the context of cross-border SWI, the term “organizations”, for example, could be interpreted as regulatory authorities within the Single Window facility of each participating country, while “their respective ICT systems” could mean “the National Single Window facilities” of the participating countries.

⁷ <https://unnex.unescap.org/content/un-global-survey-trade-facilitation-and-paperless-trade-implementation-2017>

interoperability facilities into four layers, i.e., policy and legal interoperability, people and organizational interoperability, process and semantic interoperability, and platform and technical interoperability.

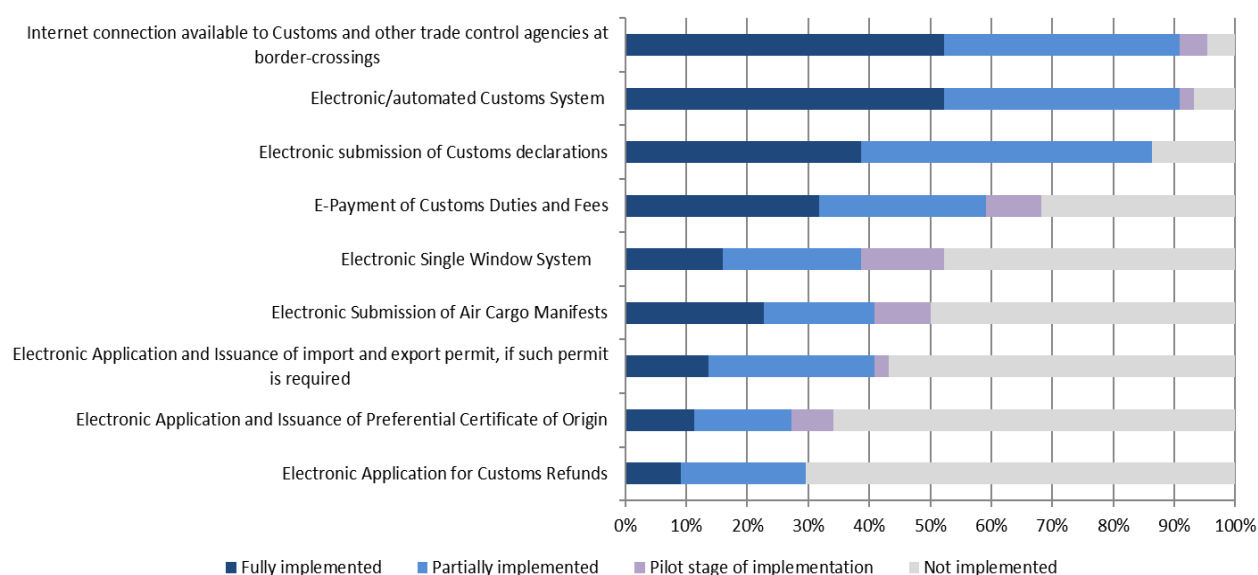
Chapter 4 provides guidelines and options dealing with technical issues where different domain specialists need to be involved, e.g., connectivity options, business process analysis, data harmonization, data quality, technical interfaces, cybersecurity and legal issues. Chapter 5 covers managerial issues for organizing and establishing cross-border SWI for paperless or less-paper trade transactions. Recommendations are given in chapter 6. The annex summarizes the SWI framework, including the key issues and recommended actions.

CHAPTER 2. STATE OF PAPERLESS TRADING IMPLEMENTATION, INCLUDING SINGLE WINDOWS

A. State of implementation in the Asia-Pacific region

Many countries in Asia and the Pacific have pioneered and established different types of paperless trading measures, including SWs, for facilitating import, export and transit requirements. This guide uses the term “paperless trading measures” to mean “trade taking place on the basis of electronic communications, including exchange of trade-related data and documents in electronic form” (Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific, 2016). The paperless trading measures, including electronic SWs, have been implemented for different types of services and scopes. A survey conducted by ESCAP as part of the second global survey on trade facilitation and paperless trade implementation in 2017 summarized the state of implementation of paperless trading measures in Asian and Pacific countries (figure 1). Beyond the use of electronic data and documents for customs procedures, electronic SW facilities have been implemented fully, partially or on a pilot basis by 23 countries, i.e., just over 50% of all the Asian and Pacific countries surveyed. Compared against the high implementation rate of customs automation, electronic SW implementation remains at a relatively early stage, with many countries not yet having taken any significant steps towards its implementation.

Figure 1. State of implementation of paperless trade measures in Asian and Pacific countries



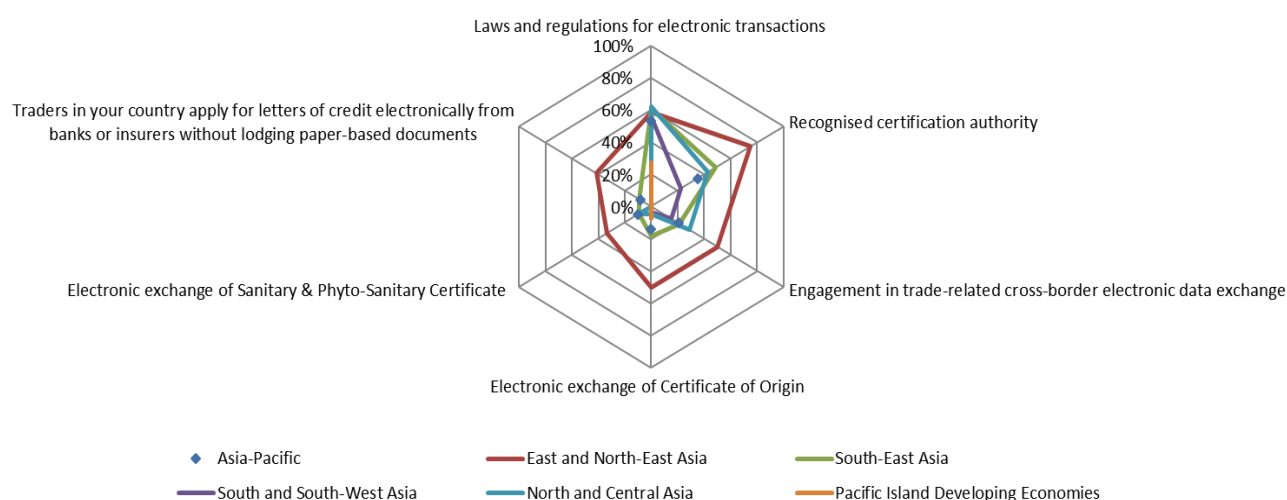
Source: The second global survey on trade facilitation and paperless trade implementation, 2017.

The survey also discovered that electronic submission of air cargo manifests, electronic applications and issuance of trade licenses, electronic applications of customs refunds, and electronic applications and issuance of preferential Certificates of Origin are implemented less than the SW facilities.

The state of implementation of cross-border paperless trade measures (meaning electronic information exchange across borders) in Asian and Pacific countries on average are also low. According to the survey result (figure 2), laws and regulations for electronic transactions and recognized certification authorities are the basic building blocks for enabling the exchange and legal recognition of trade-related data and documents, not only among stakeholders within a country, but importantly also between stakeholders along the entire international supply chain. The other four measures (figure 2) relate to the implementation of systems that can enable the actual exchange of trade-related data and documents across borders in order to remove the need for sending paper documents.

Figure 2 also illustrates the fact that at the regional level, the implementation of these measures is very low, with the exception of laws and regulations for electronic transactions whose implementation level is slightly more than 50 per cent. The pattern is very similar at the subregional level, except in the East and North-East Asia subregion where implementation levels far exceed those of other subregions for most of the cross-border paperless trade measures.

Figure 2. Implementation of cross-border paperless trade measures: Asia-Pacific average



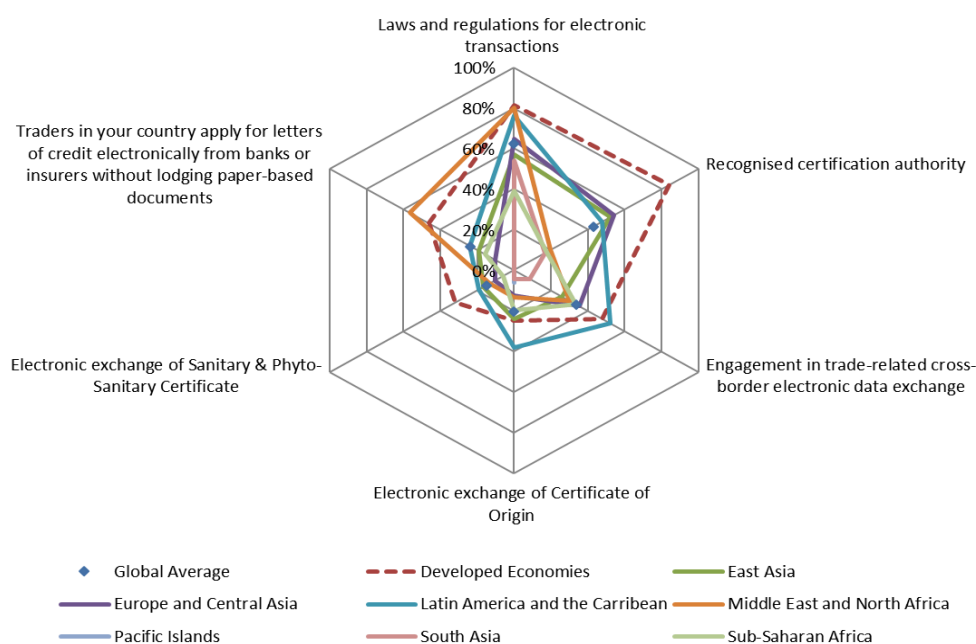
Source: The second global survey on trade facilitation and paperless trade implementation, 2017.

B. Global cross-border paperless trading implementation

A global-scale United Nations survey on trade facilitation and paperless trade implementation conducted in 2017, covered 120 countries in eight regions. **Error! Reference source not found.** shows the average implementation scores of cross-border paperless trading across regions. Again, two of the measures, laws and regulations for electronic transactions and recognized certification authority, are the basic building blocks in enabling the cross-border legal recognition of electronic data exchanged between countries. The other four measures cover implementation of some specific electronic information exchanges across the borders.

The implementation gap between the developed regions and developing countries is quite wide for most of these measures. Several developing countries have enacted electronic transaction laws, but they mostly concerned with legally recognizing electronic documents and transactions within countries. The average implementation of the other five measures (figure 3) is very low for most developing regions.

Figure 3. Implementation of cross-border paperless trade measures: Asia-Pacific average

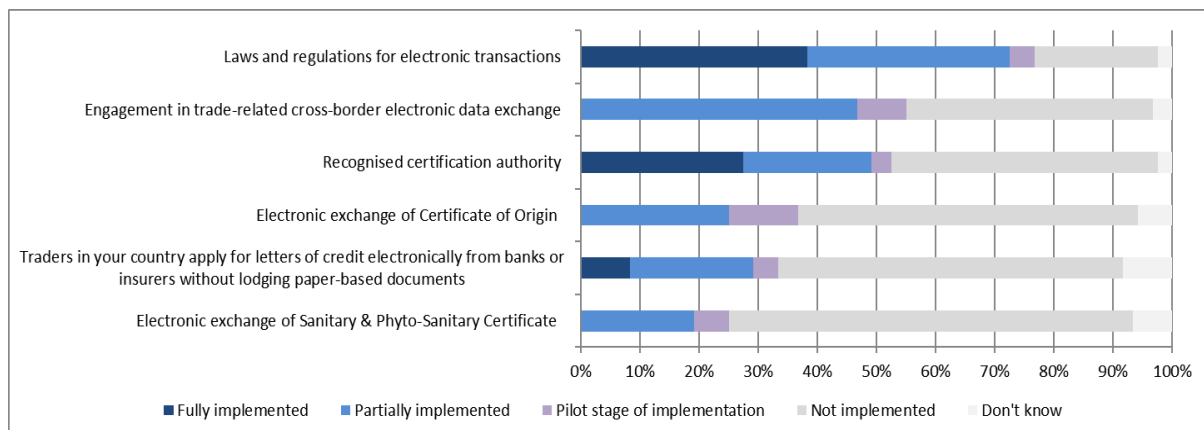


Source: The second global survey on trade facilitation and paperless trade implementation, 2017.

Figure 4 shows that more than 70 per cent of the countries surveyed have taken steps to develop the laws and regulations needed to support electronic transactions. However, such legal frameworks have yet to be fully developed in more than half of these countries. Recognized certification authorities needed for issuing electronic signatures have been fully or partially implemented in less than 50 per cent of the countries. Less than 50 per cent of the surveyed countries have only partially engaged in trade-related cross-border electronic data exchange.

The state of implementation of three advanced cross-border measures have been fully or partially implemented in less than 30 per cent of the countries surveyed. These measures include electronic exchange of Certificates of Origin, applying for letters of credit electronically from banks or insurers without lodging paper-based documents, and electronic exchange of sanitary and phytosanitary (SPS) certificates.

Figure 4. Implementation stages of cross-border paperless trade measures globally



Source: The second global survey on trade facilitation and paperless trade implementation, 2017.

C. Case studies of cross-border interoperability

Several countries, particularly in the Asia-Pacific region, have initiated collaboration to establish cross-border interoperability between their electronic facilities. Those initiatives are bilateral, multilateral or subregional in nature. Some of cross-border interoperability facilities of the collaborating countries, aiming towards the electronic information exchange across the borders, have been fully implemented, partially implemented or planned to be implemented. Some of these initiatives and the lessons learnt are briefly discussed below.

- (a) China, Japan and the Republic of Korea. The Northeast Asia Logistics Information Service Network (NEAL-NET)⁸ is a transnational network for logistics information interchange and a transnational collaboration initiated by the Ministries of Transport in China, Japan and the Republic of Korea. This collaboration was initiated under the Japan-China-Republic of Korea Ministerial Conference on Maritime Transport and Logistics in 2010. Logistics information, including cargo status tracking and query requirements, are now transacted among the electronic facilities of some major seaports in China, Japan and the Republic of Korea.

The benefits and usage of this cross-border information exchange network, which has been fully implemented between China's Ningbo-Zhoushan port, Japan's Tokyo-Yokohama Port and the Republic of Korea's Busan Port, have been reported. The benefits include the reduction of logistics information-sharing costs, timeliness of responses to data queries, and better accuracy and security of data.

Key lessons learnt from the establishment of this facility have highlighted the need for: (a) reaching a consensus among countries about the sharing of information; (b) the necessity of setting common objectives and goals for pursuing information exchange services; (c) identifying needs from each user side before implementing cross-border information exchange; (d) analyzing and preparing the necessary legal support; (e) and working on common data standardization among the participating countries.

⁸ <http://english.nealnet.org/>

- (b) Australia and New Zealand, whenever plant products or animal products are to be exported, they often must be accompanied by appropriate certification, i.e., exchanges of electronic SPS certificates between the Australian Quarantine and Inspection Service (AQIS) and New Zealand Food Safety Authority (NZFSA).

The cross-border electronic information exchange of SPS certificates has been fully implemented and is operating efficiently between these two countries. Case reports of this facility have shown major benefits to the Governments and business community. These include the savings of about US\$100 per transaction, and enhanced the security of traded foods and agricultural products. Certification data directly sent and received by the government authorities of both countries reduces fraudulent activities and improves efficiency at the port of entry.⁹

- (c) Pan Asian e-Commerce Alliance (PAA). The PAA is an alliance of paperless trade service providers in Asia. Currently, PAA comprises 11 members. PAA members are private enterprises, but authorized by their respective Governments for electronic trade declaration and permits, providing business-to-business (B2B) and business-to-government (B2G) local and cross-border electronic messaging services along the international supply chain as well as logistics and financial transactions. Cross-border electronic certificate of origin exchanges have been in operations between Taiwan Province of China and the Republic of Korea since 2008.

One of the most important PAA roles in cross-border interoperability is the building and maintaining of trust among SWs and their operators. In most cases, it was the distrust among the stakeholders that blocked coordination and cooperation in sharing electronic data and messages across borders. Therefore, policy commitment, service level agreements, interconnecting agreements and mutual recognition agreements of legal electronic documents across borders are among the key critical success factors in this endeavour.

- (d) ASEAN Single Window. In 2005, the 10 members of ASEAN¹⁰ signed an agreement to establish and implement the ASEAN Single Window (ASW) as a subregional network for facilitating trade via electronic means. Each ASEAN member country has agreed to establish its own National Single Window (NSW) and to develop connectivity with the NSWs of the other ASEAN member countries for cross-border information exchanges. The preferential certificates of origin, called ATIGA Form D supporting the ASEAN Trade in Goods Agreement (ATIGA), and the ASEAN Customs Declaration Documents (ACDD) were the first two types of documents that have been electronically exchanged between the NSWs of four ASEAN member countries, i.e., Indonesia, Malaysia, Singapore and Thailand. Transit documents and SPS certificates are two other types of documents planned for electronic exchange across borders; they are currently in the design and pilot stage.

⁹ ADB/ESCAP (2013). *Designing and Implementing Trade Facilitation in Asia and the Pacific*.

¹⁰ ASEAN is a regional intergovernmental organization comprising 10 South-East Asian States. It promotes intergovernmental cooperation and facilitates economic, political, military, educational and cultural integration among the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam.

The critical success factors for establishing ASW facilities include the political commitment of the Heads of ASEAN member States, and inter-government collaboration through the ASW Steering Committee and several working groups. The ASEAN Secretariat also plays the critical role in coordinating the work of the ASW Steering Committee and the working groups. Other important factors include: (a) from sharing of lessons learnt among ASEAN member States; (b) a focus on regional activities and assisting national activities; (c) the creation of a common understanding of terminology used and decisions made; (d) active engagement in inter-sessional discussions and timely implementation in order to meet the agreed deadline and commitments; (e) an appropriate business model and governance for sustainability; (f) capacity-building among government official; and, (g) awareness programmes for policy decision-makers.

- (e) National Single Windows of the Eurasian Economic Union's member States. Five Eurasian Economic Union (EAEU)¹¹ member States have agreed, through Decision No. 68 of the Supreme Eurasian Economic Council, dated 29 May 2014, on the development of NSWs and cross-border interoperability of the NSWs of the member States. This initiative includes a specific agreement for each member State to (a) develop an NSW; (b) coordinate the efforts in achieving convergence approaches to NSW development; (c) ensure mutual recognition of electronic data; and (d) use the infrastructure and integrated information system for the organization of NSW information exchange.

D. Key findings

A study conducted by ESCAP on regional best practices of Single Windows found the following lessons from paperless trading measures, including SW implementation, both domestically and cross-border:

- (a) Certificates of origin are chosen as the most commonly acknowledged regulatory documents available in many SW facilities, followed by purchase certificates, SPS certificates, and national standard and quality certificates;
- (b) Lesser paper documents needed for verification, and faster approval by government agencies are well acknowledged as resultant benefits of business process reform, as they have been adopted in SW facilities of most countries;
- (c) Further simplification of processes and documentation requirements within SWs are top priority as they have been proposed by the business community for further advancement of SW development. Other improvement features include trade financing and cross-border electronic commerce-related services.
- (d) The private sector is interested in cross-border exchange of electronic trade-related data and documents through Single Windows, not only for cross-border government to government (G2G) information exchange, but also for business to business (B2B) and business to government (B2G) information exchange.

¹¹ The Eurasian Economic Union (EAEU) is an economic union of states located primarily in the northern Eurasia. EAEU comprises five member States – Armenia, Belarus, Kazakhstan, Kyrgyzstan and the Russian Federation.

From the ESCAP study on Single Window for Trade Facilitation: Regional Best Practices and Future Development¹², key lessons for establishing cross-border SWI can be summarized as follows:

- (a) High-level political commitment among participating countries must be established, for example, through official intergovernmental agreements;
- (b) Inter-government collaboration, e.g., through the Steering Committee and working groups for cross-border interoperability of SWs must be mandated under the high-level policy decision makers of the participating countries;
- (c) A strong coordinating secretariat or a programme management office with adequate resources is needed to manage and coordinate the work of the Steering Committee and the working groups;
- (d) Specific business needs and mutually-agreed goals for cross-border interoperability must be carefully articulated, especially by capturing the needs of the users and the potential beneficial stakeholders;
- (e) Mutual recognition and trust of cross-border electronic information exchanges and their operators must be established, for example, by laws and regulations enacted for the recognition of electronic data exchanged across borders, the mutual recognition of cross-border certification authorities and agreed service-level agreements;
- (f) Business process reform to support electronic data exchange across borders must be analyzed, designed and agreed;
- (g) Common data interpretation must be established by conducting data harmonization and standardization in order to enable meaningful cross-border data exchanges and sharing;
- (h) Sharing of lessons learnt and experiences of interoperability among participating countries is crucial for this type of intergovernmental and inter-agency collaboration.
- (i) Capacity-building and awareness creation for enabling a common understanding among policy decision-makers, policy managers and technical teams must be continuously conducted;
- (j) Appropriate business financial models and governance for sustainability must be analyzed, agreed and established;
- (k) The connectivity model and common technical protocols must be agreed among the participating countries;
- (l) Development and sustainable operations of NSW, and the interconnectivity between NSWs must be ensured. Cross-border SWI must cover common G2G regulatory-related

¹² Single Window for Trade Facilitation: Regional Best Practices and Future Development (2018) available at <http://www.unescap.org/resources/single-window-trade-facilitation-regional-best-practices-and-future-development>

data and documentary requirements, such as certificates of origin, SPS certificates and transit-related documents. Other types of documents that should be considered as appropriate, in the context of participating countries, are B2G and B2B information exchanges such as electronic letters of credit and cross-border e-commerce-related services.

The above findings form the basis of the proposed framework and guidelines for establishing cross-border SWI that are addressed further in the subsequent chapters.

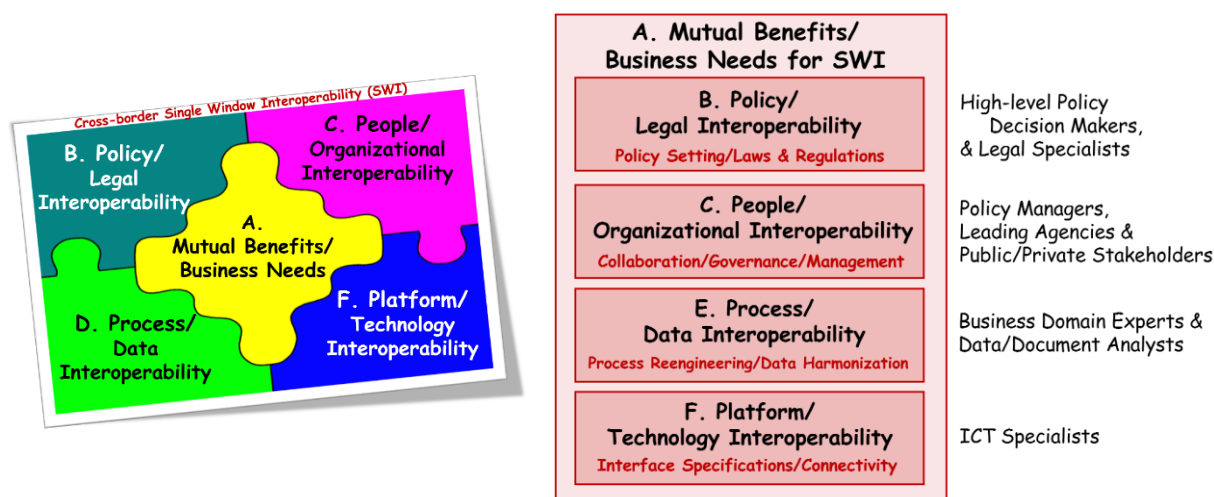
CHAPTER 3. A FRAMEWORK FOR CROSS-BORDER SINGLE WINDOW INTEROPERABILITY

This chapter proposes a conceptual framework for establishing cross-border SWI by structuring its challenges into five issues, that is, the issue of business drivers and the issues of four critical success factors. As defined in chapter 1, the scope of SWI in this guide is regulatory and cross-border in nature. As a consequence, the initiative of SWI must be a collaboration mainly between government agencies from the participating countries, whether bilaterally or multilaterally.

The objective of this framework is to provide a work structure and guidelines for government policy decision-makers, policy managers and relevant government authorities of participating countries in their collaborative work to establish the cross-border information exchange facility for regulating and facilitating the international trade. However, some of the issues and guidelines offered here can also be useful for the business community.

5 shows the proposed framework for cross-border SWI. The business needs for cross-border interoperability of SWs must be identified and rationalized whether they are really the primary drivers or they would offer good mutual benefits to the participating countries. The issue of the potential business needs/business goals for SWI must be at the center of this inter-government collaboration initiative. The other four critical success issues or factors are shown in figure 5. They are the four levels of interoperability including policy and legal interoperability, people and organizational interoperability, process and data interoperability, and platform and technical interoperability. These are the necessary issues that must be addressed to establish the cross-border SWI to achieve the business goals.

Figure 5. A framework for cross-border Single Window Interoperability



Based on these issues, this framework offers actionable options on how to identify the business needs and how to address the four interoperability levels for the successful establishment of cross-border SWI. These issues and recommended actions are discussed in the following subsections. As mentioned above, the technical issues and more detailed actionable options are described further in chapter 4. Managerial issues and options are discussed in chapter 5.

A. Business needs

Capturing, analyzing, evaluating and agreeing on business needs as the primary driver for cross-border SWI by including perspectives from public and private stakeholders in trade of the participating countries.

The general driver of cross-border SWI is to facilitate traders conducting international trade across borders while assisting government agencies in taking care of their regulatory tasks. Trade-related information exchange related to the needs and requirements of exporting and importing, can be utilized by Governments and agencies in different countries, and possibly countries of transit. Government agencies should accomplish their tasks with a minimum cost of compliance for traders, and with maximum transparency and predictability of official procedures. Government agencies and businesses need to fulfil their responsibilities in the most effective and efficient ways while meeting their legal and operational requirements. However, the specific business needs or benefits for the cross-border SWI must be identified and analyzed in the context of the participating countries' trading environments.

The United Nations Economic Commission for Europe Recommendation No. 36 provides guidelines for SWI across borders with the following four key recommendations:

- (a) Identify and analyze the primary drivers and needs for SWI, including perspectives from public and private sector stakeholders in trade;
- (b) Research and examine the type of business processes and information to be exchanged between SWs – notably through the harmonization and standardization of processes;
- (c) Consider the most appropriate model(s) of governance for the proposed interoperability at the various stages of planning, implementation and ongoing operations in a way that is both financially and administratively sustainable;
- (d) Research all relevant multinational and bilateral trading agreements and arrangements to ensure that specific protocols or legally binding obligations are considered when developing an NSW and interoperability with other NSWs.

The issue of business needs and the four critical success factors proposed in this guide follow, and are aligned with, Recommendation No. 36 as mentioned above. The business drivers and needs for SWI according to Recommendation No. 36 are the same issue as mentioned in this guide. Reference to the Recommendation No.36 provides a candidate list of business needs for the establishment of electronic information exchange facilities across borders, e.g., the needs for regional integration, trade facilitation, risk analysis, advanced security declarations, infrastructure-use planning and combating illicit activity. The key purpose of interoperability is primarily enabling Governments and the trading community to communicate trade-related information easily, quickly and more cost effectively.

However, as noted in several SWI implementation cases, detailed fact-finding about current situations of specific data and documentation requirements, associated business processes and the steps involved, and their related quantitative indicators must be captured and analyzed. The fact finding and analysis with consultation of the relevant public and business stakeholders,

including its potential impact analysis of the better to-be scenarios, should be conducted before engaging in actual implementation.

More specific guidelines for identifying and analyzing the primary drivers and needs for cross-border SWI are provided, as follows:

- (a) Capturing the current or as-is processes and indicators related to the types of documents/data to be exchanged across borders.

Processes to be analyzed may be related to import, export and/or transit-related transactions. They could be the processes that involve documents/data needed across borders. The candidates for fact-findings and analysis are, for example, those related to certificates of origin, SPS certificates, CITES certificates and permits, transit documents and letters of credit. Those documents/data and associated processes are the candidates for the better to-be processes with cross-border electronic information exchange and automatic transactions. These are possible candidates for improvement of their efficiency and effectiveness through electronic interoperability among authorities and trading partners along the cross-border supply chain of the participating countries.

Quantitative indicators and statistics related to those documentation requirements and processes should be captured as much as possible, e.g., the average number of SPS certificates per day sent from the exporting country to the importing country, including cost and time for the paper document exchange and related manual transactions;

- (b) Analyzing the captured as-is processes, especially examining for any duplication and redundancy related to document/data submissions and manual processes, bottlenecks, delayed or costly steps with no value addition or any improvement opportunities. Quantitative analysis techniques should also be applied, for example, to analyzing and quantitatively comparing between the as-is process and the to-be paperless processes with cross-border electronic information exchange and automatic transactions, without submitting paper documents and with less-manual operations;

- (c) Mapping the proposed to-be electronic information exchange and automatic transactions with the list of possible primary drivers and business/economic needs of the participating countries. This is to check whether it has the potential or in what ways it can support or enable any of the primary impacts, e.g., regional integration, trade facilitation, risk analysis, advanced security declarations, infrastructure-use planning, and combating illicit activity;

- (d) Refining and improving the proposed to-be processes, and the impact analysis with relevant public and private stakeholders of the participating countries.

The above recommended guidelines are generally referred to as the business process analysis (BPA) technique, which will be discussed again in chapter 4. The BPA technique should be used during the identification and analysis of business needs for starting the collaborative SWI initiative. It should also be noted that the BPA should be carried out again during the detailed design and implementation of the cross-border SWI. Normally, the BPA is conducted several times, but at different levels of details. For example, the BPA carried out during the identification of business needs for starting the SWI initiative may be briefly conducted at the conceptual level, while the BPA with the same scope of analysis during the ICT design and implementation is normally conducted at a deeper level of details.

Again, the clear business needs or goals must be identified and agreed on as the primary driver for the cross-border SW interoperability initiative. The critical success factors and necessary actions will then be developed to establish the cross-border SWI for the purpose of achieving the value of its business goals.

B. Critical success factors

Four critical success factors are proposed as a guide towards necessary actions for the establishment of cross-border SWI. As shown in figure 5, these factors are referred to as four levels of interoperability, as similarly proposed in an interoperability framework developed for European countries (European Union, 2017). This guide labels these factors, respectively as policy and legal interoperability, people and organizational interoperability, process and data interoperability, and platform and technical interoperability.

To establish the SWI across countries, whether bilaterally or multilaterally, it is important that the leading government agency and relevant authorities of the participating countries work together not just to agree on the common business needs and goals, and then address these four levels of interoperability, which are considered as the critical success factors.

The following subsections describe these four levels of interoperability and recommended actions.

1. Policy and legal interoperability

Securing the possible highest-level political commitment between the participating countries for the collaboration towards the establishment of cross-border SWI.

Policy interoperability for cross-border SWs means the establishment of necessary policies and political commitment between the participating countries for collaboration towards the implementation and operations of cross-border SWI.

Sound business needs and mutual benefits of all the participating countries should, at least, be conceptually analyzed such that they could be drafted as the proposal of the primary driver for collaboration between the participating countries. Since cross-border SWI has several potential tangible benefits, as shown by several case studies, it is most likely that most countries, especially those already ratifying the WTO TFA, will eventually establish an SW within their country, then possibly interoperability with the SWs of other trading countries.

To establish the necessary policy interoperability for cross-border SWs, the following actions are recommended:

- (a) Secure the necessary bilateral or multilateral political commitment by the highest-possible-level policy decision-makers among the participating countries, e.g., Heads of States (Prime Ministers or Presidents) or Ministers.

With the business drivers and mutual benefits in mind, the political commitment is the most important critical success factor, as highlighted by many case studies of cross-border SWI.

- (b) Formally sign or ratify a bilateral agreement or a multilateral agreement between the participating countries. A formal agreement by Heads of States or Ministers could provide a more sustainable legal binding or continuous political will among the participating countries. The agreement will be utilized to mandate and synergize the national-level agenda in implementing NSWs as well as for collaboration towards the establishment of cross-border SWI among the participating countries.

Analyzing, developing and enacting related laws and regulations for mutual recognition of electronic data exchanged across the borders, and establishment of legally binding related operational and service level agreements among stakeholders

Legal interoperability for cross-border SWs covers the laws, regulations and other legally-binding agreements needed to allow mutual legal recognition of electronic information exchanged between SWs of participating countries.

When information is exchanged between participating countries to fulfill cross-border regulatory requirements and to support paperless transactions, the legal validity of such information must be accepted across all participating States, and all relevant legislation must be respected. However, differences in legislation of the participating countries may make it difficult or even impossible to mutually recognize the electronic data exchanged between the countries.

Some specific actions recommended for legal interoperability are:

- (a) Carry out a legal assessment with a checklist among the participating countries of SWI to identify laws and regulations that need to be enacted or amended, especially with regard to mutual recognition of electronic data exchanged across borders. Furthermore, analyze the legal interoperability issues in a broader scope, not only regarding the necessary laws and regulations but also the related operational and service-level agreements of SWI facilities and the operators of SWs.
- (b) Consider adoption of relevant uniform texts and international agreements, including the Framework Agreement on the Facilitation of Cross-border Paperless Trade in Asia and the Pacific (FA-PT). The FA-PT, adopted by ESCAP in 2016, is the first region-wide legally-binding framework agreement for promoting the establishment of cross-border paperless trade and SWs in the Asia-Pacific region. It is an effort to achieve multilateral intergovernmental collaboration in working towards establishing related policy, legal, organizational, semantic and technical interoperability for cross-border paperless trade in Asia and the Pacific. The FA-PT also supports sharing of lessons learnt and the establishment of concrete policy commitments, goal-setting and any necessary legislation among participating countries so that SWI in the region could be established.

2. People and organizational interoperability

Establishment of intergovernmental governance and management structure among the participating countries with mandated directives and supporting resources

Organizational interoperability for cross-border SWs covers the organization of intergovernmental agencies and relevant stakeholders of the participating countries in cooperating and agreeing on mutual benefits or business needs of SW interoperability as well as in working together to synchronize and establish cross-border SWI.

SWI is about collaboration across borders. As a consequence, it is essential to establish intergovernmental cooperation among the participating countries for policy steering, management, coordination and synchronization in the development and operation of SWI among those countries. Some recommended actions for establishing the inter-government cooperation include:

- (a) Establishing a National Trade Facilitation Committee (NTFC) as an organization model for the governance and management of trade facilitation initiatives, including an NSW. The WTO TFA's provision for the establishment of National Trade Facilitation Committee (Article 23) and the UNECE Recommendation No. 4 National Trade Facilitation Bodies provide good guidelines for such establishment;
- (b) Extending the NTFC's mandate to manage and work collaboratively for intergovernmental cooperation of SW) among participating countries. The WTO TFA also emphasizes the fact that cross-border agency cooperation is an important tool for international trade facilitation (Article 8.2). The TFA also contains a provision for the establishment of National Trade Facilitation Committees (Article 23) for the organization and management of trade facilitation initiatives, including SWs. These national trade facilitation bodies may be considered as a viable organization for intergovernmental cooperation;
- (c) Formulating an appropriate structure for intergovernmental cooperation, i.e., the SWI intergovernmental steering committee, and at least two or more SWI working groups, e.g., one for business process and data harmonization, one for legal issues, and another for technical issues. The steering committee and working groups should be mandated to collaborate with the high-level policy decision makers of the participating countries;
- (d) Designating a strong coordinating secretariat or a programme management office with adequate resources to manage, coordinate and support the work of the steering committee and the working groups.

Building and improving people-capacity to cope with new technology, innovation and change related to cross-border SW interoperability

People interoperability for cross-border SW, in this guide, means human resources and their capacity to work collaboratively in designing, managing and dealing with new technology, innovation and change related to the development and operation of cross-border SWI. People capacity-building is a critical component that will make the innovative SWI initiative sustainable and successful. Two recommendations are:

- (a) Conduct capacity-building programmes, using lessons learnt and experience sharing, and training workshops among participating countries in interoperability. The capacity-building and awareness-raising for creating common understanding should be continuously conducted for policy decision makers, policy managers and technology teams involving in the inter-government cooperation.
- (b) To conduct awareness activity and specific trainings for a wider audience including government officers and trade-related operators, especially those involved in the implementation and the operations of the cross-border SW facilities.

The FA-PT, in addition to supporting a policy and legal interoperability, also provides a people and organizational interoperability. In Article 11, the FA-PT contains provisions on institutional arrangements, which specify organizational mechanism for parties to collaborate on issues related to cross-border interoperability of paperless trade systems and measures for ensuring mutual recognition of trade-related documents and data in electronic form. The FA-PT also has a capacity building provision on its Article 13 to support improving people interoperability.

3. Process and data interoperability

Analyze the as-is processes and design and agree on better to-be processes of those related to information exchange across borders

Process interoperability of cross-border SWs refers to an interoperability among the related business processes, including import, export and transit-related processes, transactions and information, required for interaction among regulatory agencies of participating counties.

As mentioned in chapter 3 on business needs, it is necessary to capture and analyze the current or as-is business processes and documentary requirements related to the cross-border interoperability of interest. Innovative or better to-be business processes must then be proposed, refined and agreed on among relevant stakeholders across borders. In addition, related electronic information exchange used within those business processes must be designed.

Analyze, harmonize and agree on better to-be standardized data and documents in electronic form, in order to enable paperless information exchange across borders of participating countries in a meaningful way.

Data interoperability for cross-border SWs refers to the ability to ensure that the precise meaning of exchanged information is unambiguously interpretable by different SWs and users.

Process and data interoperability means ensuring a common understanding on the business processes and data being exchanged between two or more SW facilities in a meaningful manner. It should ensure that business processes and the precise meaning of exchanged information is understood and preserved throughout exchanges between parties along the cross-border trade supply chain. To achieve data interoperability, the following recommended actions must be carried out:

- (a) Capture and analyze the as-is documents, data elements and their meanings used across the borders;
- (b) Develop, harmonize and agree on those data elements, including their meanings, to be turned into electronic form and used in cross-border information exchange;
- (c) Design and agree on the syntax or formats of electronic documents and data elements to be exchanged electronically between multiple SWs.

More detailed guidelines on business process analysis, data harmonization and other specific techniques are discussed in chapter 4.

4. Platform and technical interoperability

Analyze, design and agree upon a set of common platforms and open technical specifications, e.g., interface specifications and ICT infrastructure if needed, such that different SW facilities can connect and communicate with each other.

Platform and technical interoperability for cross-border SWs refers to a set of common platform and open technical specifications, such that different SWs/ICT platforms can connect and exchange electronic information without the need for extra operator intervention. This includes aspects such as technical interface specifications, interconnection model and services, security specifications, data syntax structures, any necessary common development platform and any common ICT infrastructure if needed.

The chosen technical specifications should be open in the sense that such specifications are available for everyone to study and use and that several solutions may be available in the market to support those specifications.

The term “platform”, in this guide, means a group of technologies that are used as a base upon which software applications are developed and used.

The platform and technical interoperability is the ability of different information technology systems and software applications within different SWs to communicate and exchange data electronically. Some recommended actions for platform and technical interoperability are:

- (a) Designing and agreeing on the connectivity model of SWI, e.g., a centralized model (one common SWI system for all participating countries) or a distributed model (each country having its SW, and then having a network connectivity among SWs);
- (b) Designing and agreeing on common technical interface specifications, preferably open specifications, e.g., communication protocols for system-to-system connectivity, and security protocols;
- (c) Establish a common ICT infrastructure if needed, e.g., network linkage among SWs across countries;
- (d) Agree on the schedule and planning for the establishment of the common ICT infrastructure and SWI implementation, including conducting cross-border, proof-of-

concept implementation projects or pilot projects, sharing lessons learnt and assisting each other technically.

The summary of the framework discussed in this chapter is provided in Appendix A, including challenges, their descriptions and recommended actions for establishing cross-border SWI. Some other technical guidelines are described in chapter 4.

CHAPTER 4. SPECIFIC ISSUES FOR CROSS-BORDER SINGLE WINDOWS INTEROPERABILITY

The purpose of this chapter is to address some of the technical issues concerning the implementation of SWI across borders. The objective is to provide more technical guidelines to complement the conceptual framework and issues as discussed in chapter 3, whose indication is that technical specialists from different fields, not just ICT specialists, should be involved in the implementation.

Various technical issues covered here are those related to business process analysis, data harmonization, data quality, messaging structures, connectivity options, cybersecurity measures and legal issues. Recommendations and options are proposed for each of these issues.

A. Business process analysis

1. What is a business process analysis?

A business process analysis (BPA) is the analysis and redesigning of workflows within and between organizations in order to optimize and automate end-to-end processes.

(a) When should a BPA be conducted?

It is recommended that a BPA be conducted during the identification of business needs at the start of the cross-border SW initiative, and during its detailed design and implementation in order to achieve its process interoperability.

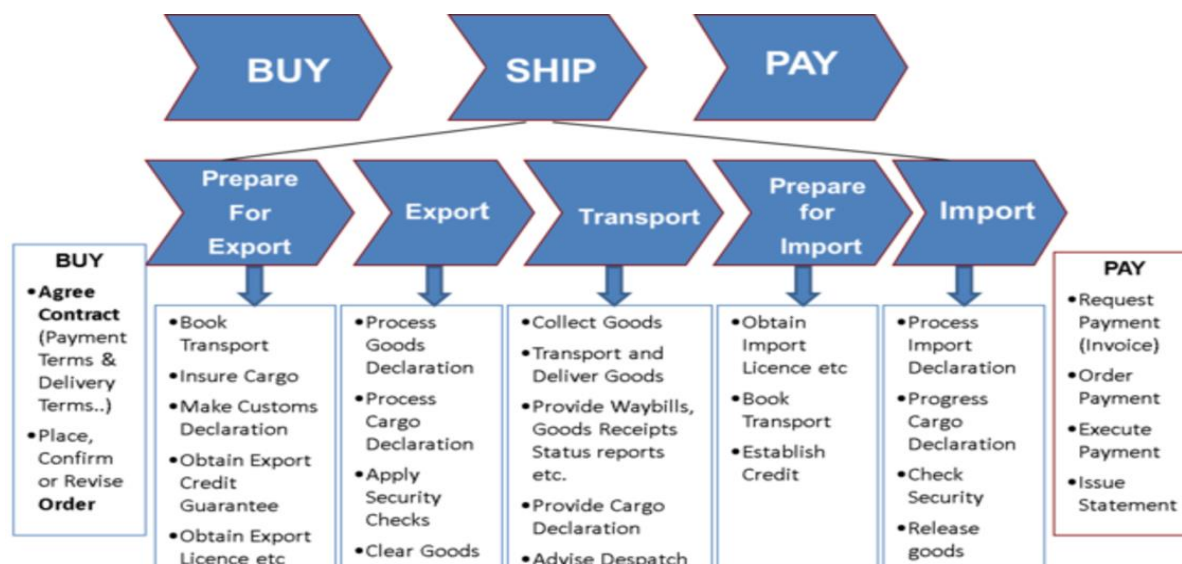
The overall scope of a BPA in the context of SWI is related to import, export and transit-related regulatory processes, including information and documentary requirements, in the international trade, especially processes and information exchange across borders.

SWI is more than just the exchange of electronic information between stakeholders or between electronic SW facilities of different countries. It is about information and documentary requirements in the context of international trade processes and business transactions. Therefore, it requires an understanding of how regulatory agencies, traders and other business stakeholders operate in regulating and facilitating trade across borders. It requires the development of new effective business processes that cut across organizational boundaries. Therefore, the business processes within the international trade supply chain must be analyzed, and some of them – e.g., manual and inefficient processes – replaced or enhanced with electronic means and electronic information exchange to better coordinate operations among the stakeholders.

In this guide, the term “a business process” refers to a set of related regulatory and trade activities or operations that, together, deliver an expected service or outcome, or create value and assist stakeholders to achieve certain objectives. The buy-ship-pay model, shown in figure 6, as developed by UN/CEFACT (2003), is normally used as a reference model to describe the business processes and stakeholders in the international supply chain. This international supply chain reference model reflects the fact that goods are ordered, shipped and paid for while complying with regulatory requirements of the export country and the import country. The buy-ship-pay model identifies the commercial, logistical, regulatory and payment-related processes

involved in the international supply chain as well as the information required by the stakeholders throughout the various steps.

Figure 6. A buy-ship-pay international supply chain reference model



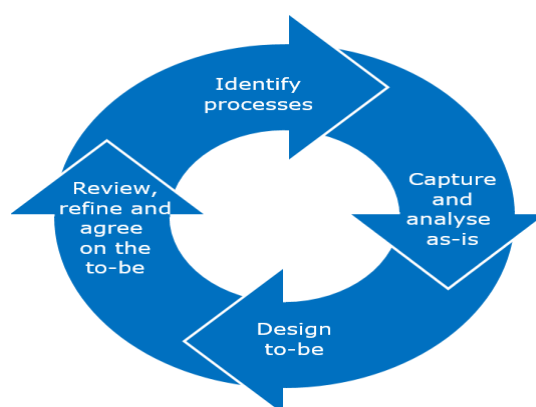
Source: UN/CEFACT, 2003.

2. Conducting a BPA

Simplifying and automating the processes, and handling related information/documents electronically along the international supply chain can have a dramatic impact on the effective operations of the relevant stakeholders.

The UNNExT Business Process Analysis Guide for Simplifying Trade Procedures (2012) offers a good BPA guide in details. This section briefly describes the key BPA steps adapted for the cross-border SWI initiative (figure 7).

Figure 7. Business process analysis cycle¹³



¹³ This is congruent with the description made in the UNNExT BPA Guide (2012) where three main phases are suggested: (a) scope setting for the BPA (equivalent to the “identifying processes” in **Error! Reference source not found.7**); (b) capturing as-is processes; and (c) analysis of the as-is and then the designing of the better to-be processes.

The four steps for business process analysis, as shown in figure 7, are:

- (a) Identify the candidate processes that should be improved. In the context of SWI, the candidate processes include particularly those processes related to information and documents required to be exchanged across borders, e.g. processes related to certificates of origin;
- (b) Capture and analyze the as-is processes and associated data/documents. For example, if the BPA scope of interest is about the cross-border processes related to certificates of origin, it is necessary to capture the as-is processes related to certificates of origin, and analyze and understand their costs, any delays or difficulties associated with these processes, e.g., high possibility of paper fraud. This understanding is necessary for designing better to-be processes, e.g., radical change and automation of specific processes and what required documents should be designed;
- (c) Design better to-be processes, especially by eliminating non-value-added processes, turning manual transactions into electronic transactions with electronic information exchange, if possible without paper document submission.
- (d) It is recommended that graphical notations and diagrams be used to capture and visualize the as-is processes, and to propose the to-be processes. The usage of the graphical diagrams could help in reducing ambiguity and improving understanding among stakeholders.
Some standard notations, i.e., the Unified Modelling Language (UML) or Business Process Modelling Notation (BPMN), are normally used by process analysts and ICT specialists. The Business Process Analysis Guide (UNNExT, 2012a) provides guidelines on how to conduct a business process analysis for trade facilitation improvement together with case studies using UML notations.
In some cases, it is acceptable to use non-standard notations for a business process analysis when very high precision is not necessary. For example, figure 8 is a less formal diagram but still communicates the main message well enough for most audiences;
- (e) Review, refine and agree on the proposed to-be processes, including holding several rounds of consultation with public and private stakeholders. The proposed to-be business processes should be reviewed by relevant public and private stakeholders, and improved, refined, agreed on and approved by the key stakeholders.
The approved to-be processes will form the baseline for the next stage of work, as the primary drivers in securing the necessary intergovernmental political commitments among the participating countries for the cross-border SWI initiative, or as basic requirements for cross-border SWI implementation.

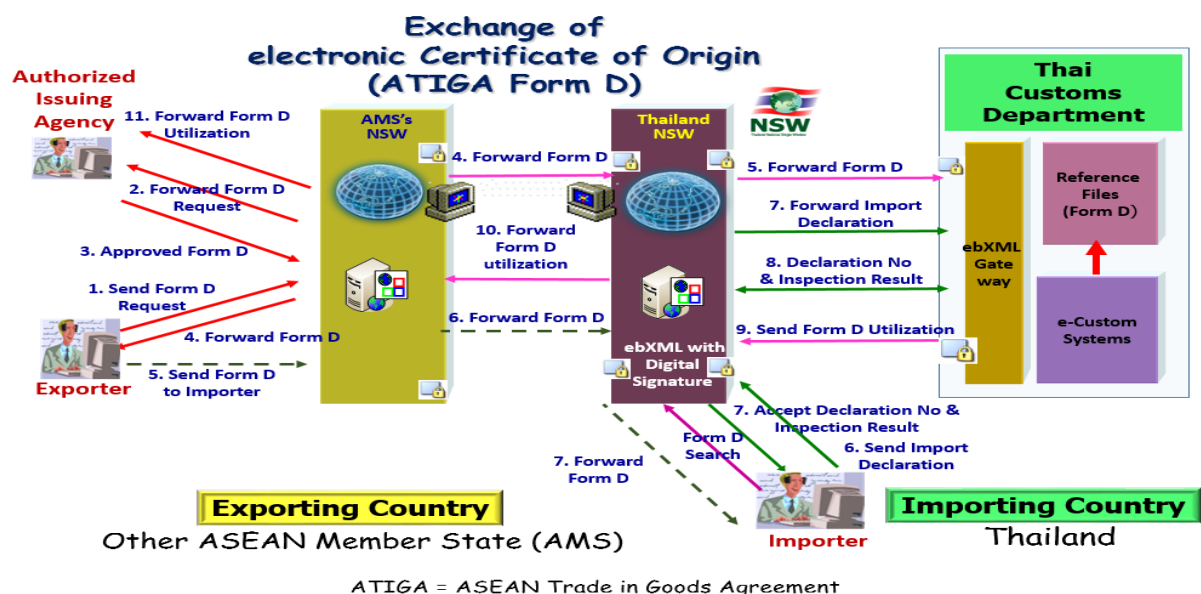
Effective and close collaboration among regulatory agencies and relevant business representatives is critical at this stage. Buy-in from key stakeholders is needed so that they can work together in (i) capturing the current or as-is processes of regulatory and business operations as well as identifying performance measures such as time and cost for each key operation, (ii) analyzing those existing processes and any bottlenecks, (iii) identifying possible improvements, (iv) gaining agreement from senior management and (v) establishing a

governance mechanism for any proposed changes. Governance arrangements may need to be reviewed to ensure that the relevant people are engaged in the decision-making.

3. An example case

Error! Reference source not found.8 is an example of business processes for the preferential Certificate of Origin (ATIGA Form D) electronically exchanged between two ASEAN countries' National SW facilities. ATIGA is the Agreement on Trade in Goods among ASEAN member States (AMS). This electronic information exchange helps in facilitating regulatory processes, both in the exporting country and in the import country.

Figure 8. Processes related to electronic information exchanges of the Certificate of Origin (ATIGA Form D) between two ASEAN NSWs



Source: Kiatjanon, 2012.

Figure 8 shows the processes and activities involved, starting within the exporting country. The exporter sends an electronic request of Form D to the authorized issuing agency; the approved Form D is sent back to the NSW facility in the exporting country; and then it is sent electronically to the importing country's NSW in such a way that a customs officer in the importing country can access the information about the import customs declaration; and the corresponding Certificate of Origin (the approved Form D) is sent out from the importing country directly and electronically. A fast clearance time with better compliance can be achieved, since the Certificate of Origin is sent directly to the importing country's relevant authority by the issuing agency in the exporting country. Note also that a particular Certificate of Origin that has already been utilized in the importing country can be reported back to the exporting country (i.e., Steps 9, 10 and 11 in figure 8). These types of electronic transactions and information sharing help to reduce types of fraud that previously were very difficult to detect in the normal paper-based operations.

The innovative to-be business processes for better cross-border coordination along the international supply chain, especially those enhanced by cross-border information exchange between countries, will be designed, reviewed and agreed by key stakeholders and authorized

agencies of those trading partner countries. The agreed to-be processes will then be used for implementing and establishing the operational environment.

B. Data harmonization

1. What is data harmonization?

Data harmonization comprises a set of activities for reconciling the definitions and representation formats of data elements. In the context of SWI, data harmonization is carried out to ensure that the types of documents to be exchanged across borders are in common use by the involved parties. It is recommended that international and regional document standards be taken into account. These documents, e.g., Certificates of Origin or SPS certificates must be standardized and all the data elements in the documents must have the same meanings commonly recognized between the countries' SW facilities.

Therefore, data harmonization entails a set of activities aimed at achieving consistency in the use of data elements, in terms of their meanings and representation formats. Through data harmonization, a set of core data elements used in documents and information will be extracted. If any conflict, overlapping or ambiguity exists among the data elements, they must be reconciled or resolved. A clear description of each core data element, including its definition and representation format, will then be harmonized and agreed.

Paper documents or forms, including the meaning and formats of their data elements used in a regulatory agency, are normally established with little coordination with other regulatory agencies. Consequently, the same information used by different agencies is usually in different formats and with different scopes of meaning. This is also true for the case that most ICT systems of one government agency are developed with little consultation with other government agencies with regard to any reconciliation or harmonization of common data structures. These differences make it difficult for making automatic information exchanges between different agencies in a meaningful way. Even though two different systems may be able to exchange data electronically, the receiving system cannot semantically interpret or map the received data in a way that the data can be used in that system.

Another negative consequence of non-harmonized data is that, for the same trade shipment, the trader must comply by submitting a variety of paper documents, or a variety of electronic messages and forms to different regulatory agencies, resulting in increased time consumption and costs. Data harmonization is one important step ahead in achieving data interoperability as it reduces duplicate data submissions and the harmonizing of those data elements and forms. Data harmonization can enable electronic data exchange across borders in a meaningful and useful way.

2. When should data harmonization be conducted?

It is recommended that data harmonization be carried out on documents and their set of information that needs to be exchanged across borders to enable electronic cross-border SWI, normally during or after the BPA activities.

In the context of cross-border SWI, data harmonization may mean the reconciliation or agreement on a form or document that the participating countries will exchange electronically

between their SW facilities as well as the set of data elements with the data element names, the meaning/definition and the format of each data element. For example, if the Certificate of Origin is expected to be electronically exchanged, this type of document must be harmonized both in the overall document format and its data elements among the participating countries of cross-border SWI.

3. Conducting data harmonization

For cross-border SWI, designated government agencies of the participating countries need to work collaboratively in establishing and agreeing on the harmonized forms, data definitions and their meanings.

Very useful detailed guidance on how to conduct data simplification and harmonization is provided by UNECE (2013a) and UNNEXT (2012b).

This particular guide briefly describes activities for data harmonization and the development of a data set for an identified business process as follows:

- (a) Identify data requirements in the country of departure, the country of transit and the country of destination;
- (b) Identify data requirements for existing electronic data exchange (if; any);
- (c) Develop harmonized data names and their definitions/descriptions to be used at the bilateral or multilateral level of the participating countries, if possible, with the international standards' data definitions, e.g., the United Nations Trade Data Element Directory (UNTDDED);
- (d) Develop a standardized data format and structure by adopting existing international standards, e.g., mapping to the WCO Data Model, or the UN/CEFACT Supply Chain Data Reference Model (SCDRM).

The data harmonization process could lead to the discovery of redundancies of data and could assist in ensuing data standardization. The harmonized set of data elements and their structures could lead to automatic and electronic operations instead of paper transactions. The key idea of NSWs as well as cross-border interoperability is to dematerialize the existing as-is paper documents and turn them into electronic forms, i.e., using electronic data submission, electronic data exchange, automatic electronic transactions as well as sharing and reusing electronic data instead of paper documents.

Governments need to work together to develop a standardized multi-agency data set with defined data element names, meaning, data types and schema. It is recommended that the number of data requirements be kept as few as possible; the objective is to include in the standardized data set only information that agencies are currently allowed to collect, i.e., the need-to-have list of information requirements.

The use of international standards in data on import, transit and export transactions, where the same data can be submitted once and used by all government agencies, is one of the key features

of an SW facility. Among others,¹⁴ UNTDED could be adopted as a set of referenced data elements for facilitating open exchanges of data. The use of the World Customs Organization (WCO) Data Model is the choice of many countries, in order to ensure compatibility among the government agencies' reporting requirements and enable the exchange and information sharing among relevant government agencies.

4. Example case 1: Certificate of Origin

Error! Reference source not found.⁹ shows an example of ATIGA Form D, which is a preferential Certificate of Origin used among ASEAN members – the paper form and the definitions of its data elements mapping to the UNTDED data elements

**Figure 9. Certificate of Origin for ASEAN (ATIGA Form D):
The paper form and its data definitions by mapping to UNTDED**

| ASEAN ATIGA FORM D Data | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| 0-1 Reference Number TDED 1004: Reference number identifying a specific document. an..35 (Min=1, Max=1) | | | | | | | | | |
| 1 Goods consigned from (Exporter's business name, address, country) TDED 3036: Name (and address) of the party consigning the goods as stipulated in the contract by the party ordering the transport (This may be the exporter or seller.) an..35 (Min=1, Max=1) | | | | | | | | | |
| 2 Goods consigned to (Consignee's name, address, country) TDED 3132: Name and address of party to which goods are consigned an..512 (Min=1, Max= 1) | | | | | | | | | |
| 3-1 Departure date TDED 2380: The value of a date, a date and time, a time or of a period in a specified representation. an..35 (Min=1, Max= 1) | | | | | | | | | |
| 3-2 Vessel's name/aircraft etc. TDED 8212: Name of a specific means of transport such as the vessel name an..35 (Min=1, Max= 1) | | | | | | | | | |
| 3-3 Port of discharge TDED 3224: Name of a location. an..256 (Min=1, Max=1) | | | | | | | | | |
| 4 For official use (Declaration Type) TDED 1001: Code specifying the name of a document. an..3 (Min=1, Max=1) | | | | | | | | | |
| 5 Item No. TDED 1050: To identify a position within a sequence an..10 (Min=1, Max=1) | | | | | | | | | |

| | | | |
|--|----------------------------------|---|---|
| 1. Goods consigned from (Exporter's business name, address, country) | | Reference No. ASEAN TRADE IN GOODS AGREEMENT/ ASEAN INDUSTRIAL COOPERATION SCHEME CERTIFICATE OF ORIGIN (Combined Declaration and Certificate) FORM D Issued in _____ (Country) See Overleaf Notes | |
| 2. Goods consigned to (Consignee's name, address, country) | | 4. For Official Use <input type="checkbox"/> Preferential Treatment Given Under ASEAN Trade in Goods Agreement <input type="checkbox"/> Preferential Treatment Given Under ASEAN Industrial Cooperation Scheme <input type="checkbox"/> Preferential Treatment Not Given (Please state reason/s) | |
| 3. Means of transport and route (as far as known) Departure date Vessel's name/ Aircraft etc. Port of Discharge | | Signature of Authorised Signatory of the Importing Country | |
| 5. Item number | 6. Marks and numbers on packages | 7. Number and type of packages, description of goods (including quantity where appropriate and HS number of the importing country) | 8. Origin criterion (see Overleaf Notes) |
| | | | 9. Gross weight or other quantity and value (FOB) |
| | | | 10. Number and date of invoices |
| 11. Declaration by the exporter The undersigned hereby declares that the above details and statement are correct; that all the goods were produced in _____ (Country) and that they comply with the origin requirements specified for these goods in the ASEAN Trade in Goods Agreement for the goods exported to _____ (Importing Country) _____ Place and date, signature of authorised signatory | | 12. Certification It is hereby certified, on the basis of control carried out, that the declaration by the exporter is correct. _____ Place and date, signature and stamp of certifying authority | |
| 13. <input type="checkbox"/> Third Country Invoicing <input type="checkbox"/> Accumulation <input type="checkbox"/> Back-to-Back CO <input type="checkbox"/> Partial Cumulation | | <input type="checkbox"/> Exhibition <input type="checkbox"/> De Minimis <input type="checkbox"/> Issued Retroactively | |

Source: UNNExT, 2012b.

¹⁴ The Supply Chain Data Reference Model (SCDRM), a UN/CEFACT project, is an international reference data model for international and national trade (available at <https://uncefact.unece.org/pages/viewpage.action?pageId=5472398>).

Error! Reference source not found.1 shows the mapping of ATIGA Form D’s data elements to the data elements of a reference data model developed by WCO, the WCO Data Model v3.0. The advantage of mapping to a reference data model, such as WCO DM, is that the meaning and formats of the data elements can be harmonized and standardized among different countries, enabling data interoperability to be implemented.

Table 1. ATIGA Form D data elements mapping to WCO DM v3.0

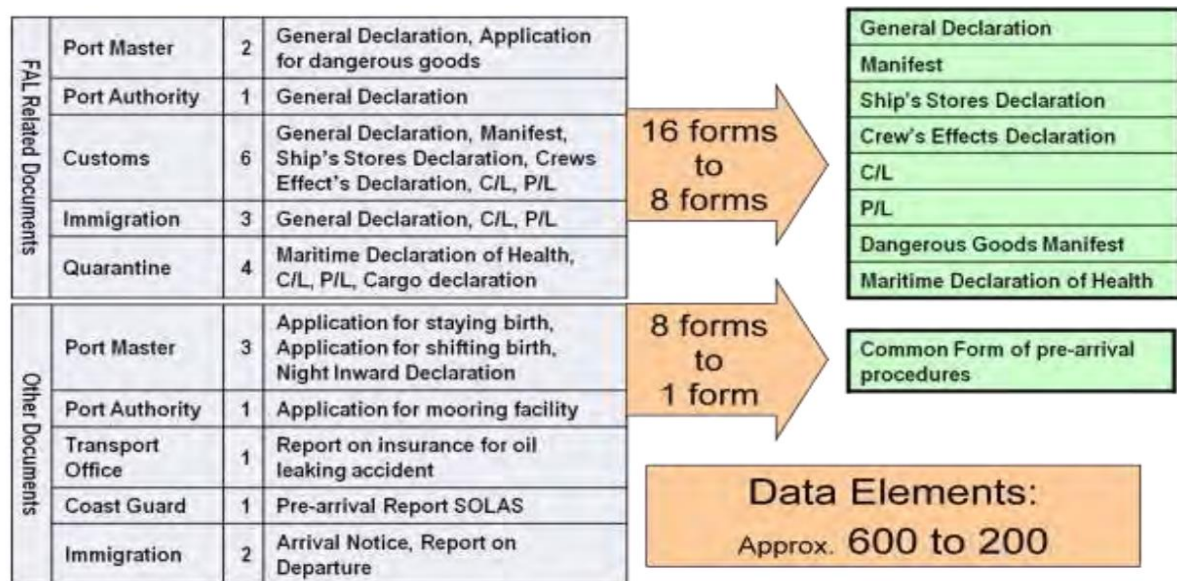
| ASEAN ATIGA FORM D Data | WCO ID | Data Model Classes | WCO Dictionary Entry Name |
|--|--------|-------------------------|---|
| 0-1 Reference Number TDED 1004: Reference number identifying a specific document. an..35 (Min=1, Max=1) | D014 | Declaration | Declaration. Identification. Identifier |
| 1 Goods consigned from (Exporter’s business name, address, country) TDED 3036: Name (and address) of the party consigning the goods as stipulated in the contract by the party ordering the transport (This may be the exporter or seller.) an..35 (Min=1, Max=1) | R031 | Exporter | Exporter. Name. Text |
| 2 Goods consigned to (Consignee’s name, address, country) TDED 3132: Name and address of party to which goods are consigned an..512 (Min=1, Max= 1) | R037 | Importer | Importer. Name. Text |
| 3-1 Departure date TDED 2380: The value of a date, a date and time, a time or of a period in a specified representation an..35 (Min=1, Max= 1) | 030 | Goods Shipment | Goods Shipment. Departure. Date time |
| 3-2 Vessel’s name/aircraft etc. TDED 8212: name of specific means of transport such as vessel name an..35 (Min=1, Max= 1) | T001 | Arrival Transport Means | Arrival Transport Means. Name. Text |
| 3-3 Port of discharge DED 3224: Name of a location. an..256 (Min=1, Max=1) | L012 | Unloading Location | Unloading Location. Name. Text |

Source: UNNExT, 2012b.

5. Example case 2: IMO FAL

In the maritime domain, the result of the data harmonization exercise is very beneficial. As shown in figure 10, the simplification of data requirements based on IMO FAL (International Maritime Organization – Facilitation Committee) Convention on Facilitation of International Maritime Traffic is significant. The reduction in data elements as a result of data harmonization is 3:1 (down from about 600 data elements to 200 data elements).

Figure 10. Results of data harmonization based on the IMO-FAL Convention on Facilitation of International Maritime Traffic



Source: UNECE, 2013a.

The simplification and harmonization of data elements has been adopted by many major successful seaports for better coordination among sea freight stakeholders and government authorities. The standardization of these data elements also supports cross-border information exchanges between countries. The NEAL-NET connectivity and electronic information exchange networks between seaports in China, Japan and the Republic of Korea has successfully developed a set of standardized data set of logistics information including data elements, code sets and interface format. For example, nine basic events and standardized data for dynamic vessel schedule and container status have been developed for dynamically checking vessel status and container status along the export/import/transit chain of operations within each port and across the ports.

6. Data quality

One of the most important elements in the cross-border information exchange facility is managing data quality. It is essential to ensure that the data exchanged and used among public and business users is accurate, reliable and completely without errors. Data management is essential because all government officers and business users will use these data in making important decisions; therefore, mandatory compliance is required in order to maintain the quality of the data.

Data are generally considered to be high quality if acceptable for use in operations, decision-making and planning (Redman, 2013). For the SWI facility, normally the agency that originates and sends the information electronically must manage and ensure the quality of the data. There are many necessary steps to improve the quality of the data (e.g., understanding the purpose and context of the data; creating, maintaining and using a data dictionary; performing regular reviews of the data to uncover anomalies; and conducting data cleansing activities). ISO 8000 is a global standard for data quality that should be considered in implementing the SWI facility.

C. Messaging and interface specifications

To ensure interoperability among participating countries at the ICT technical level, it is necessary to select messaging structures, interface specifications and a connectivity option between the SWs of participating countries.

The issue concerning messaging structures is ensuring that data field and length are compatible between SW facilities. Therefore, it is recommended to follow message standards from international organizations, such as WCO and UNECE. Normally, data harmonization and messaging structures are analyzed and designed together. However, while data harmonization actions concentrate more on the semantic level or the meaning of each data element from the perspective of business domain experts, the messaging structures are considered from the perspective of the common ICT data structures or the data in some agreed syntax structures to be exchanged by different ICT systems.

This section briefly addresses the messaging structures and interface specifications. The issue of connectivity options is discussed in the next section.

According to the ESCAP trade facilitation survey described in chapter 2, many countries in the Asia-Pacific region are still using traditional Electronic Data Interchange messaging standard systems mainly for electronic customs administrations. Many of those countries are planning to, or are in the process of migrating and extending their customs systems to cover other regulatory processes with the establishment of an SW. They are moving to web-based platforms and incorporating XML message structures,¹⁵ web services¹⁶ or a more lightweight data-interchange format, e.g., the JavaScript Object Notation format¹⁷ for electronic information change and interoperability between different ICT systems.

It is therefore recommended that web-based platforms, i.e., using Internet and web technology, XML message structures, web services (e.g., SOAP/REST, JavaScript Object Notation, and Application Programming), to enable technical interoperability between the SWs of participating countries.

More and more SW data exchanges are taking place via Web based platforms. The XML message structures and Web Services protocols like SOAP/REST, and the JavaScript Object Notation lightweight data-exchange format and protocols seem to gain ground to provide connectivity and meaningful communication between disparate and diverse information systems of different agencies, and as well as between two or more SW platforms.

¹⁵ XML is an extensible markup language to describe the data format containing the data and also its metadata.

¹⁶ Web service is a service offered by an electronic device to another electronic device, communicating with each other via the World Wide Web, e.g. Simple Object Access Protocol (SOAP), and Representational State Transfer (REST) or RESTful web services.

¹⁷ JavaScript Object Notation is an open-standard file format that uses human-readable text to transmit data objects.

D. Connectivity

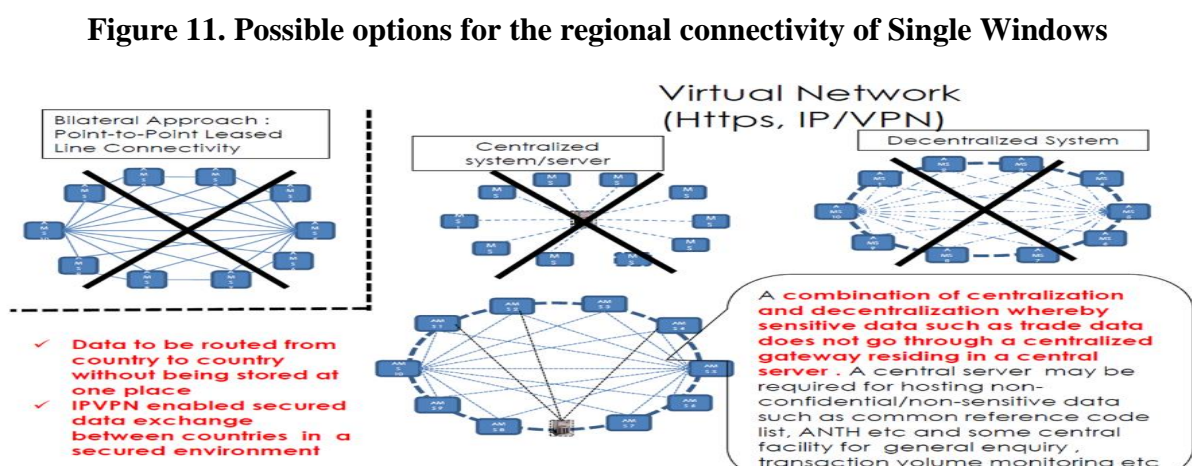
There are at least four options for connectivity between SW facilities. Each of the options has several advantages and disadvantages as follows:

- Bilateral approach.** Point-to-point leased line connectivity between any pair of SWs may be suitable if only two countries or two SW platforms need to be interconnected. This approach is not economical when there are more than three national platforms because growth of the number of links is about n square or $n(n-1)$ links when n is the number of SWs to be interconnected;
- Centralized system/server approach.** This approach comprises a central system/server to coordinate and keep information about the interoperability of all participating SW systems. The disadvantage is that sensitive data (e.g., trade data) should be kept confidential; therefore such data should not be kept in a centralized system;
- Decentralized system approach.** This approach is where each SW needs to interact and exchange information with other SWs without keeping any information in the central system;
- A combination of centralization and decentralization.** This approach may be a most feasible choice, whereby sensitive data such as trade data do not go through a centralized gateway residing in a central server. However, a central server may be required for hosting non-confidential/non-sensitive data, such as common reference codes, and some central facility for general enquiries, transaction volume monitoring etc.

The virtual private network (VPN) based on the VPN protocol over the Internet (IP/VPN) and communication protocol, such as HTTPS (secure Hypertext Transfer Protocol), could be utilized to ensure that the communication channel is more secure by using a PKI signing and secure transport mechanism.

- Example case 3: ASEAN Single Window connectivity

The ASW environment has adopted the combined centralization/decentralization approach (figure 11).

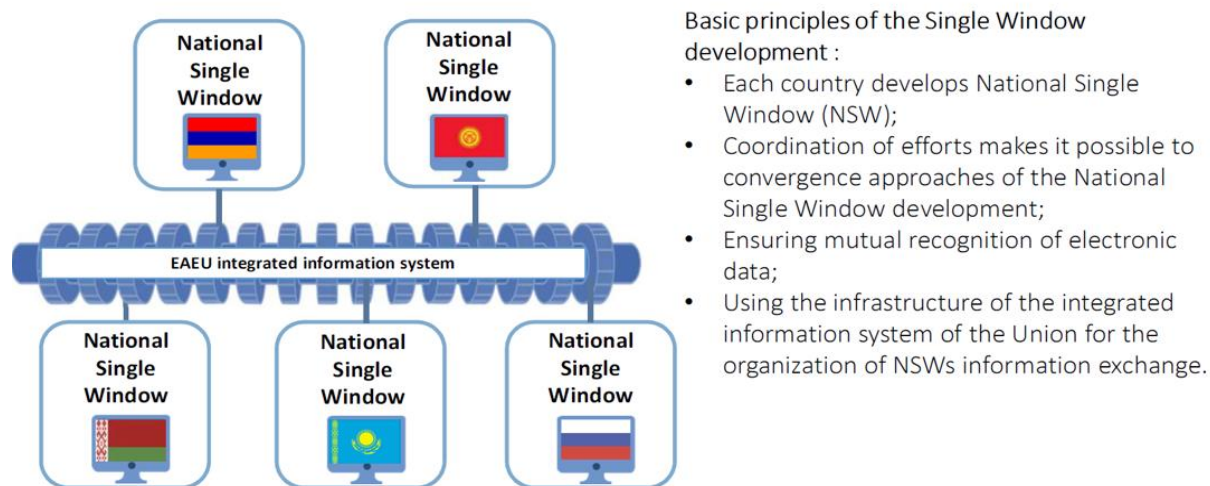


Source: Wong, 2015.

(b) Example case 4: EAEU Single Window connectivity

As an example, the model for achieving SWI through the use of a regional information hub that is provided by EEC (Integrated Information System of the EAEU) can be used here (figure 12).

Figure 12. EAEU Single Window connectivity



Source: EEC, 2017.

E. Security and privacy

One of the issues of most concern among business and governmental users for the usage of any electronic facility are threats to information security and the violation of data privacy. Some of the most common threats seen in many cases are software attacks, theft of intellectual property, identity theft, information theft, sabotage and information extortion.

The issues of information security and privacy that must be addressed cut across all levels of interoperability. Security and privacy policies for the cross-border SWI must be articulated, agreed and enforced among the participating countries. Related laws and regulations with each country must be assessed and, if necessary, amended or enacted, e.g. data privacy laws, and cybersecurity-related laws, such that cross-border information security and privacy could be legally enforced. Acceptable operational procedures and practices that promote information security and privacy for each stakeholder or user role of the SWI must be established, e.g. operations for different levels of access control authorization, and emergency response operations.

The cross-border SWI facility including its functionality and ICT infrastructure must be designed, implemented and operated in compliance with security policy, security design principles, security services agreement and standard operational procedures that protect information at a level of information security risk and data privacy acceptable by the key stakeholders in the SWI facility.

For this, four recommendations are to:

- (a) Establish information security and privacy policy among the participating countries such that the design and operations of the cross-border SWI facility, and the operational procedures of stakeholders/users must comply with
- (b) Assess, and amend or enact any necessary laws and regulations within the participating countries such that cross-border information security and privacy could be legally enforced
- (c) Design and operate the cross-border SWI facility to comply with the information security and privacy policy and requirements, e.g. adopting the defense-in-depth architecture design, identifying roles and access privileges, and establishing standard operational procedures for each stakeholder/user with the security and privacy concern.
- (d) Conduct regular security/privacy monitoring, auditing, and risk assessment, and implement improvement measures, e.g. by utilizing some international security standards like ISO/IEC 27001¹⁸;

It is essential to design features that can protect SWI facilities/systems from unlawful or unauthorized access and enable recovery easily if the system is compromised, in addition to managing common identity and authorization process. It is also recommended that substantial efforts be made in the implementation of well-recognized or international security standards, such as adopting the defense-in-depth architecture design¹⁹, and ISO/IEC 27001, for the SWI facility as well as the NSW.

Personal Identification Number (PIN), user account and password, or Public Key Infrastructure (PKI) are examples of authentication tools for accessing ICT systems including SW facilities. Non-PKI digital certification, authentication token, biometrics and smartcard technologies are other options. It is necessary that identity management or identification information mapping for identifying and authenticating partnering agencies, stakeholders and business users across borders should be considered and resolved. A mutual recognition or an agreement to mutually recognize the identities of users across the borders (across the SW of different countries) may be developed.

To ensure that connectivity protocol is adequately secure, a PKI signing and secure transport mechanism can be used – for example, the secure socket layer (SSL). A certification authority (CA), which is an important part of PKI, is a trusted entity that issues digital certificates. A digital certificate certifies the ownership of a public key by the named subject on the certificate. The digital certificate for an individual will be used in electronically signing a contractual document to make it legally binding. The recognition of CAs and each CA-identified digital certificate should be mutually and legally accepted across borders. PAA has chosen the contract agreements as an instrument to make the involved transactions and electronic documents legally binding (figure 13).

¹⁸ <https://www.iso.org/obp/ui/#iso:std:iso-iec:27001:ed-2:v1:en>

¹⁹ Depth-in-defense is the multi-layered architecture design that can protect the computer system with a series of defensive layers and mechanisms such that if one mechanism fails, another will be in place to thwart an attack.

F. Legal issues

To be successful in dematerializing paper documents and turning them into paperless transactions, mutual recognition of electronic documents and data in electronic form must be legally accepted across borders. Such chain of trust should be addressed at the national level as well as across the participating countries of paperless trade. The chain of trust must be managed since, for example, certificates or permits issued by one regulatory agency can be electronically sent and recognized by other agency at the border within the exporting country, then these electronic certificates may be sent and checked in the importing country. As an example, in the case of dematerialization of CITES, SPS certificates, Certificates of Origin etc., the connection between export and import authorities should be established, e.g., connection between CITES managements of the two trading countries. The import authority may have to formalize an understanding with the export authority to guarantee the authenticity of the electronically signed documents exchanged in the export and the import transactions.

As mentioned in the previous section, the mutual recognition of electronic communications, including electronic signatures, between all participating countries must be addressed from the legislative perspective, not just from the ICT technical angle. It is necessary to eliminate legal barriers or to address inadequate legislation. Participating countries must collaborate in establishing an effective bilateral or multilateral legal framework to support cross-border paperless trade. The common approach for the mutual recognition and acceptance of electronic documents and data in electronic form across borders must be formally agreed on by the participating countries' authorities.

For example, the exchange of electronic SPS certificates or electronic Certificates of Origin need mutual recognition of electronic signatures by the quarantine agencies of each country. Moreover, in the case of dematerialization of CITES, SPS certificates, Certificates of Origin etc., the connection between export and import authorities should be established, e.g., connection between CITES authorities of the two trading countries. The import authority may have to formalize a memorandum of understanding (MoU) with the export authority to guarantee the origin and integrity of the electronically signed documents exchanged for export and import operations.

Other legal issues that need to be considered include ownership of data, privacy and protection of commercial information, liability issues, data retention, archiving, and audit trails, intellectual property rights and database ownership, and dispute resolution. UNNEXT (2012c) provides more detailed guidance on legal aspects of SW implementation.

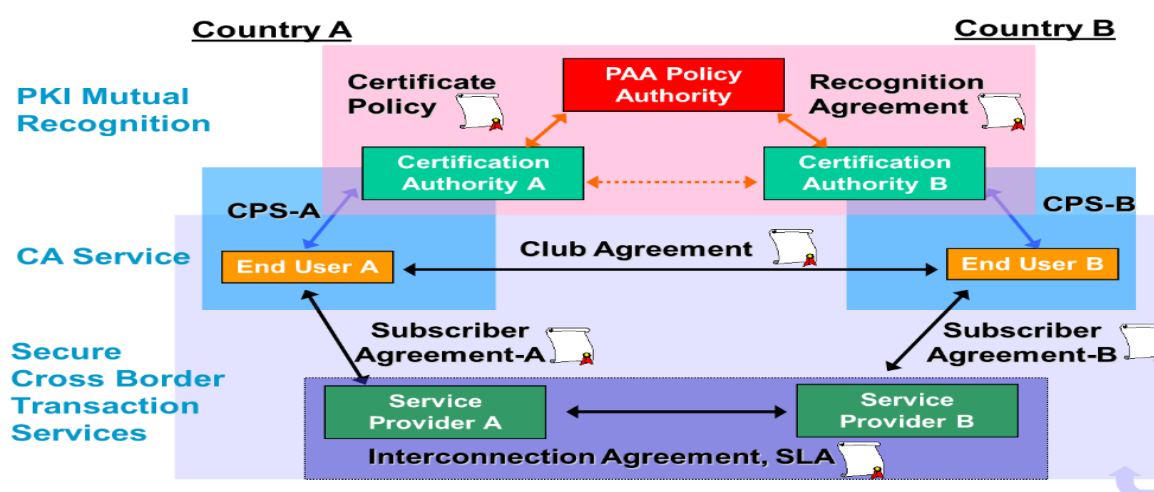
An example case: Pan Asia e-Commerce Alliance (PAA)

PAA has established a legal framework which provides some legal recognitions among its PAA members and the users of their services across the borders. This legal framework consists of three major levels of legally-binding agreements. These agreements enable cross-border interoperability and mutual recognition of electronic information exchanged among the PAA's members in 11 countries.

Figure 13 illustrates how this PAA legal framework works. The three layers of legal agreements are:

- (a) The first layer is the Recognition Agreement between the PAA Certificate Policy Authority and the Certificate Authorities of the PAA members. This is to recognize digital certificates issued among certified Certificate Authorities of the PAA members;
- (b) The second layer is the Interconnection Agreement among PAA members. This includes the Service Level Agreement for secure cross-border transaction services;
- (c) The third layer is the Subscriber Agreement between each PAA member and its users who are the users of the cross-border transaction services. By entering into the Subscriber Agreement with PAA members, the users accept the PAA Club Agreement.

Figure 13. PAA legal framework



Source: HA, 2017.

The PAA Club Agreement is a governing agreement defining the relationships of all the mentioned agreements in the PAA legal framework.

G. Financial models

The investment or financial options for development and operations of SWI are complicated issues, which the participating countries need to consider. Conceptually, the investment for establishing the SW facility and the operator(s)/provider(s) within a country normally depends on the individual country policy decision-making. However, the shared infrastructure for connectivity between different SW facilities, and, probably, any common ICT applications and services between SWs, means new investment and costs, both for development and for continuous operation. This is a long-term endeavour, which implies long-term investment, e.g., for the initial installation and future improvements, and a long-term operational costs, e.g., for long-term services and maintenance.

Different long-term financial options and business models must be evaluated, such as public investment, private investment or public-private partnership (PPP) models. In cases of private or PPP models, business users are usually charged service fees; however, how much should be

charged needs to be considered and accepted. In this case, the governance body must make a final decision on the agreed financial and business model. It is crucial that each designated operator/provider must be formally or, even better, legally appointed by the authorized high-level policy decision-makers.

CHAPTER 5. GOVERNANCE AND MANAGEMENT OF CROSS - BORDER SINGLE WINDOW INTEROPERABILITY

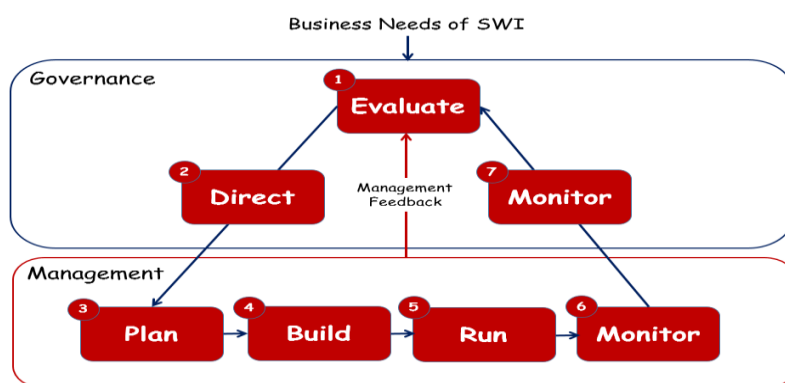
The objective of this chapter is to propose a governance and management approach and recommendations for establishing cross-border SWI.

The definitions of the terms “governance” and “management” in this guide were inspired by an international framework²⁰ but adapted to fit the context of intergovernmental cooperation on SWI. The governance of SWI is about ensuring that:

- (a) A governance body, task forces and supporting resources of the participating countries are established;
- (b) Business needs/objectives of SWI are captured through consultation with public and private stakeholders of the participating countries;
- (c) Strategic directions and plans by which prioritization and decision-making are set;
- (d) Impacts of, performance and progress on agreed directions and objectives are monitored;
- (e) Agreed business needs/objectives are achieved.

The management of SWI is about planning, building, running and monitoring activities aligning with the strategic directions and implementation plans approved by the governance body to establish the SWI facility and achieve the business needs/objectives of SWI. An SWI governance and management life cycle is proposed whereas seven phases are illustrated in figure 14. Next subsequent sections provide further elaboration and recommendations.

Figure 14. Governance and management of cross-border Single Window Interoperability



This guide recommends that cross-border SWI initiatives be treated as programmes consisting of several related projects that need to be governed and managed systematically. The elements of a programme/project life cycle should define: (a) what work must be accomplished; (b) what

²⁰ COBIT 5 (Control Objectives for Information and Related Technologies) business framework for the governance and management of enterprise IT. Available at <https://cobitonline.isaca.org/>.

deliverables must be generated and reviewed; (c) who must be involved; and (d) how to control and approve each phase.

A. Phase 1: Evaluation

This is a conceptual phase that needs exploration of its initial concept and a feasibility study. Therefore, the objective of this phase is to initially explore the concept by capturing and evaluating strategic business needs and the feasibility of SWI across potential participating countries. It usually begins with evaluating business cases or business scenarios of cross-border information exchanges as discussed in chapter 3.1. In this phase, a special task force, e.g., a consulting team or a special intergovernmental team, is designated to research whether strategic business cases are sound and SWI is feasible, and whether the initiative should be undertaken. If feasibility testing needs to be done, this is the stage of the project in which it will be completed.

The feasibility study should cover the feasibility of all four levels of interoperability as discussed in chapter 3.2. In this conceptual phase, the proposed objectives are normally evaluated at a high-level or strategic business needs. The depth of the feasibility study and its recommendations are also at least at the strategic level. However, it should be analyzed in adequate detail so that the study can lead to policy decision-making on its implementation with the support of proven evidences and rationale.

- (a) What work must be accomplished?- Capture, analysis and evaluation of strategic business needs and the feasibility of establishing cross-border SWI by including perspectives from public and private stakeholders in the trade of the participating countries.
- (b) What deliverables must be generated and reviewed?- A conceptual report including proposed strategic business needs/objectives, feasibility and recommendations whether an SWI initiative should be prepared.
- (c) Who must be involved?
 - A designated task force, e.g., a consulting team or a special intergovernmental team, to conduct the study;
 - Key public and private stakeholders in trade across borders in order to support facts, opinions, feedbacks and provide due diligence to help in deciding if the initiative is a “go”;
 - High-level policy decision-makers in the participating countries to review and make decisions.
- (d) How to control and approve this phase? - High-level policy decision-makers in the participating countries need to review and make decisions on whether the SWI initiative is ready to proceed to the next phase, or to stop the initiative.

B. Phase 2: Directing

This phase involves securing the highest possible level of political commitment between the participating countries on collaboration in establishing cross-border SW interoperability. It also includes the formal establishment of an intergovernmental governance and management structure with the necessary mandates and directives, and adequate supporting teams and resources. Therefore, this phase covers the establishment of policy interoperability and organizational interoperability among the participating countries as mentioned in chapter 3.2.

- (a) What work must be accomplished?
 - Reaching agreement on the strategic business needs and strategic directions among the participating countries;
 - Establishing the intergovernmental governance and management structure among the participating countries with mandated directives and supporting resources.
- (b) What deliverables must be generated and reviewed?
 - A formal bilateral and multilateral agreement with strategic directives for establishing the cross-border SWI to be reviewed and signed by the highest possible level policy decision-makers of the participating countries;
 - A proposal for establishing an intergovernmental governance and management structure among the participating countries with mandated directives and proposed resources.
- (c) Who must be involved?
 - A designated task force, e.g., a consulting team, a special intergovernmental team or the candidate intergovernmental management team, for developing the draft agreement as well as the governance and management proposal.
- (d) How to control and approve this phase?
 - The highest-possible-level policy decision makers, e.g., Heads of States or Ministers, should sign the agreement as well as approve and mandate the governance and management structure with the necessary supporting resources;
 - The governance structure must include the highest-level policy decision-makers, e.g., Head of States or Ministers, who make the final policy decisions, but normally with the assistance of an intergovernmental SWI steering committee that works on evaluating strategic needs, refining the policy and the strategic plan, and monitoring the progress on behalf of the highest-level policy decision-makers.

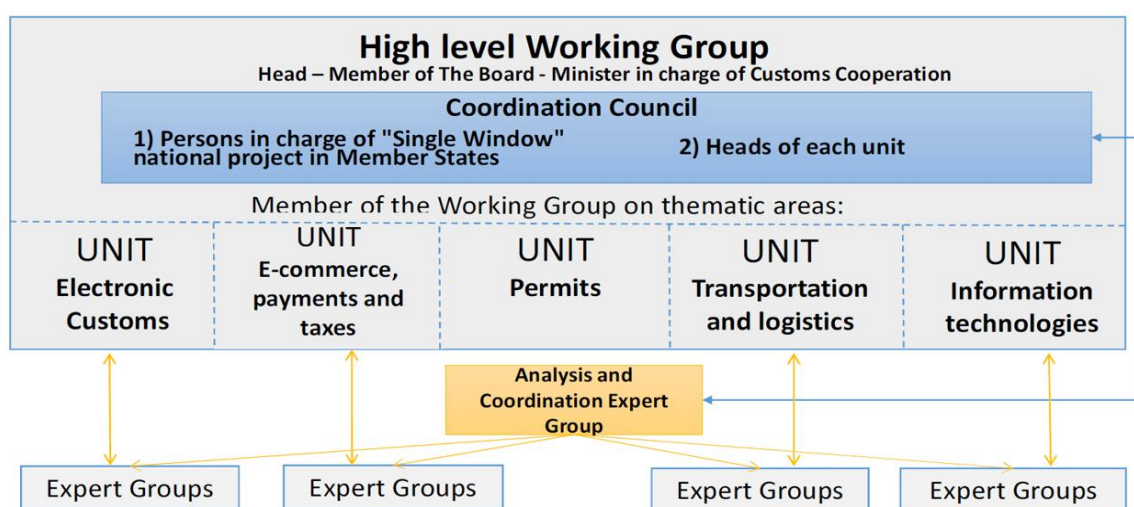
It is recommended that when the draft agreement and the proposal have been completed, an intergovernmental SWI steering committee should review, refine and recommend to the high-level policy decision-makers to consider and, if approved, formally sign the agreement, and approve the necessary supporting teams, e.g., a programme management office, and other required resources.

When the intergovernmental SWI steering committee is formed, intergovernmental task forces or working groups operating under the committee should also be established and mandated to conduct their assigned tasks or thematic areas accordingly, e.g., working groups on business process analysis, legal issues and technical ICT issues.

An example

Figure 15 shows an example of a governance and management structure for the EAEU SWI. The high-level policy decision-makers in this case are the Heads or members of the Board, who are the Ministers in charge of customs cooperation between the EAEU member countries. The Coordination Council acts as the intergovernmental steering committee comprising those persons in charge of NSW projects of the member States and the heads of working groups. There are five working groups, comprising experts on different thematic areas. An analysis and coordination expert group is also included to ensure coordination among the different working groups.

Figure 15. A governance and management structure for EAEU Single Window Interoperability



Source: EEC, 2017.

C. Phase 3: Designing the to-be and planning

This phase, which is a key to successful programme management,²¹ focuses on designing the to-be and developing a roadmap that synchronizes and coordinates SWI establishment across the participating countries. This phase involves conducting a detailed evaluation of business needs and a goal-setting, detailed analysis and design of the to-be for all four interoperability levels. The four levels of to-be interoperability must also be embedded with the design, operation and monitoring of information security and privacy measures. This is necessary for the building phase and the operating phase of the SWI project(s) and facility.

A popular method for setting goals is SMART. This method helps ensure that the goals have been thoroughly vetted. It also provides a way to clearly understand the implications of the goal-setting process, which includes:

- Specific – Setting specific goals, by answering the questions of who, what, where, when, which and why;
- Measurable – Creating criteria that can be used to measure the success of a goal;

²¹ The term “programme” in this guide means a set of actionable projects that are to be carried out synchronously in order to achieve identified goals/objectives.

- Attainable – Identifying the most important goals and what it will take to achieve them;
- Realistic – Willingness and ability to work towards a particular goal among the key stakeholders, e.g., high-level policy decision-makers, and the governance and management teams;
- Timeliness – Creation of a timeframe to achieve the goals.

This is why this guide recommends that a detailed analysis of business needs and the impacts of the to-be cross-border SWI facility be conducted. To set the SMART goals, it is necessary to conduct the analysis and design of not just process interoperability – i.e., using the BPA technique – but also other interoperability issues, such as data harmonization, legislations and technology, as discussed in chapter 3.2.

(a) What work must be accomplished?

- To analyze the as-is processes, design and agree on the better to-be processes of those related to information exchange across borders (to-be process interoperability)
- To analyze, harmonize and agree on the better to-be standardized data and documents in electronic form in order to enable paperless information exchange across borders of the participating countries in a meaningful way (to-be data interoperability)
- To analyze, develop and enact related laws and regulations for mutual recognition of electronic data exchanged across the borders, and establish legally binding related operational and service level agreements among stakeholders (to-be legal interoperability)
- To analyze, design and agree upon a set of common platforms and open technical specifications, e.g. interface specifications and ICT infrastructure if needed, such that different SW facilities can connect and communicate to each other (to-be technical interoperability)
- To consider initiating, and possibly implementing a proof-of-concept project to validate the design and receive feedback from stakeholders

(b) What deliverables must be generated and reviewed?

- A design specification document containing proposed to-be business processes for cross-border information exchange and interoperability;
- A design specification of proposed to-be data harmonization;
- Draft laws and regulations, draft operational and service level agreements;
- A design specification document containing proposed technical interface specifications, connectivity models and other recommended technology;
- Proposed implementation and change management plans, including estimated budgets and possible sources.

(c) Who must be involved?

- Intergovernmental working groups and domain experts on thematic areas, i.e., on business processes, data harmonization, laws and regulations, and technical ICT issues;
- The intergovernmental SWI steering committee as well as high-level policy decision-makers when necessary, for reviewing and approving the design and plans;
- Key public and private stakeholders in trade, to offer facts, opinions, feedback and provide their due diligence in helping to decide if the design and plans are a “go” to the next phase (the building phase).

(d) How to control and approve this phase

- The intergovernmental SWI steering committee, and the high-level policy decision makers when necessary, to review and approve the design and the programme/project plans, including granting and/or coordinating the necessary budget.

During this phase, the scope of the programme/projects is defined, and a project management and change management plan is developed. This involves identifying the cost, quality, available resources and a realistic timetable. The programme/project plans also include establishing baselines or performance measures. These are generated using the scope, schedule and cost of a project. A baseline is essential to determine if a project is on track.

Roles and responsibilities will be also clearly defined, so everyone involved knows exactly for what they are accountable. Some of the contents within the proposed implementation and change management plans, to be created by an intergovernmental programme manager(s) or programme coordinator(s) working group during this phase to ensure the project will be well-implemented, include:

- (a) **Scope statement.** This is a description that clearly defines the business need, benefits of the project, objectives, deliverables and key milestones. A scope statement may change during the project, but it should not be done without the approval of the intergovernmental project manager/project coordinators and the sponsor (e.g., the SWI steering committee and high-level policy decision-makers).
As noted above, the scope of this design and planning phase covers all four levels of interoperability. Therefore, the implementation programme involves not just the software applications and ICT infrastructure implementation project, but also most likely a law/legislation amendment/enactment project, a capacity-building/training project, a detailed data harmonization project and a data cleansing project;
- (b) **Work Breakdown Schedule.** This is a visual representation that breaks down the scope of the programme/project into manageable sections for the team;
- (c) **Gantt Chart.** A visual timeline that the team can use when planning tasks and visualizing the programme/project timeline;
- (d) **Milestones.** Identification of high-level goals that need to be met throughout the programme/projects and included in the Gantt Chart;
- (e) **Communication plan.** This is of particular importance if the projects involve outside stakeholders. It covers development of the proper messaging around the project and creation of a schedule for when to communicate with team members, based on deliverables and milestones;
- (f) **Risk management plan.** This is to identify all foreseeable risks. Common risks include unrealistic time and cost estimates, customer review cycle, budget cuts, changing requirements and a lack of committed resources.

D. Phase 4: Building

The objective of this phase is to build, acquire and implement the endorsed projects including, among others: software applications and ICT infrastructure development projects; capacity-building projects; and projects for amending and/or enacting necessary laws, regulations and legally-binding agreements. All these projects must be managed and executed in a coordinated way. For example, amending or enacting a new law or regulation, or establishing any legal agreement, normally takes a substantive amount of time; therefore, this should be managed properly or in parallel with the application and infrastructure development.

The recommendations below concentrate more on the management of the application and infrastructure development, while also including change management.

(a) What work must be accomplished?

- Management of all projects from the investment portfolio in alignment with the SWI strategic directions in a coordinated way, e.g., initiate, plan, control and execute projects, and close with a post-implementation review;
- Identification of solutions and analysis of SWI requirements prior to acquisition or creation in order to ensure that they are in line with the business requirements of cross-border interoperability, covering business processes, software applications, data, ICT infrastructure and services;
- Coordination of review on feasible options with affected stakeholders, including approval of requirements and proposed solutions;
- Establishing and maintaining identified solutions in line with the SWI requirements, covering design, development, procurement and partnering with suppliers/vendors;
- Management of configuration, test preparation, testing, requirements management and maintenance of business processes, applications, data, ICT infrastructure and services;
- Maximizing the likelihood of successfully implementing sustainable cross-border organizational change quickly and with reduced risk, covering the complete life cycle of the change and all affected business and ICT stakeholders;
- Formally accepting and implementing new solutions, including implementation planning, system and data conversion, acceptance testing, communications, release preparation, introduction of new or changed business processes and ICT services, early production support and a post-implementation review;
- Defining and maintaining descriptions and relationships between key resources and capabilities required to deliver IT-enabled services, including collecting configuration information, establishing baselines, verifying and auditing configuration information, and updating the configuration repository.

(b) What deliverables must be generated and reviewed?

- This covers the SWI facility, including its applications, data, ICT infrastructure and services, has been developed, tested, deployed, formally accepted and is readiness for use.

(c) Who must be involved?

- Designated programme/project managers;
- Suppliers/vendors who provide solutions, development and installation;
- Users who provide input for requirements specification, tests and utilization of the facility;
- Users who receive training and take assigned roles in the new operational solutions.

- (d) How to control and approve this phase
 - Authorized representatives, e.g., the procurement evaluation committee, must formally approve and accept the delivered facility.

E. Phase 5: Running – delivering services and support

This phase comprises the delivery, including servicing and support, of a cross-border SWI facility to the stakeholders and users, i.e., service continuity – providing continuous operational services to the users together with support and resolutions whenever problems occur. One recommended source for information on managing ICT services is the Information Technology Infrastructure Library (ITIL²²), which offers a set of detailed practices for ICT service management that focus on aligning ICT services with the needs of business. Some key recommendations related to the SWI facility are listed below.

- (a) What work must be accomplished?
 - Coordination and execution of the activities and operational procedures required for delivering SWI services, including the execution of pre-defined standard operating procedures and the required monitoring activities;
 - Providing timely and effective responses to user requests and resolution of all types of incidents; restoring normal service; recording and fulfilling user requests; and recording, investigating, diagnosing, escalating and resolving incidents;
 - Establishing and maintaining a plan to enable the business and ICT to respond to incidents and disruptions; ensuring the continuation of operation of critical business processes and required ICT services as well as maintaining the availability of information at a level acceptable to business needs of cross-border trading;
 - Managing security services by protecting information in order to maintain the level of information security risk acceptable to the key stakeholders of the SWI facility in accordance with the security policy, e.g., by complying with ISO 27001; establishing and maintaining information security roles, accessing privileges, and performing security monitoring.
- (b) What deliverables must be generated and reviewed?
 - The SWI facility continuously delivers services to support the business of cross-border electronic information exchange and interoperability;
 - Whenever incidents occur, they are managed and resolved systematically according to the standard operational procedures.
- (c) Who must be involved?
 - SW operators of the participating countries who provide services and support;
 - Operators of the SWI, coordinating or central facility, if any, who provide services and support;
 - Stakeholders and users who use the SWI facility.
- (d) How to control and approve this phase

²² Source: ITIL, formally an acronym for Information Technology Infrastructure Library, is a set of detailed practices for IT service management that focuses on aligning IT services with the needs of business. (Source: David Cannon (2011). ITIL Service Strategy 2011 Edition. The Stationery Office)

- Use service-level agreements and standard operational procedures to control and audit for compliance.

F. Phase 6: Management monitoring

The objective of this phase is to monitor, evaluate and assess performance and conformance of the SWI facility from the management perspective. Key recommendations for achieving this objective are:

- (a) What work must be accomplished?
 - Monitor, evaluate and assess performance and conformance by collecting, validating and evaluating business, ICT and process goals and metrics. Monitor that processes are performing against agreed-on performance and conformance goals and metrics, and provide reports that are systematic and timely;
 - Monitor, evaluate and assess the system of internal control by continuously monitoring and evaluating the control environment, including self-assessments, independent assurance reviews, and improvement plans and actions;
 - Monitor, evaluate and assess compliance with external requirements by evaluating ICT processes and ICT-enabled business processes for compliance with laws, regulations and contractual agreements.
- (b) What deliverables must be generated and reviewed?
 - Periodic reports, e.g., daily and monthly, about performance and conformance assessment, internal control, and compliance with external requirements.
- (c) Who must be involved?
 - SW operators of the participating countries who provide periodic reports;
 - Operators of the SWI, coordinating or central facility, if any, who provide periodic reports;
 - Internal auditors, and certified external auditors.
- (d) How to control and approve this phase
 - Some international standards, e.g., the ISO/IEC 27001, should be adopted in order to control security measures through internal audits and certification by certified external auditors;
 - Implementation of improvement plans proposed and endorsed by relevant sponsors of the SW or SWI operators.

G. Phase 7: Governance monitoring, evaluating and directing

The objective of this phase is to monitor and evaluate the performance and conformance by the SWI facility and its services as well as to ensure that business benefits are delivered and that risks and resources are optimized. The outcome of the monitoring and evaluation of the current SWI facility, and a newly identified business requirements feasibility report should also include the proposed improvement plans or the next cycle of development. The governance body should evaluate and establish any new political mandate/directive with principally granted resources, e.g., extending the current SWI facility to exchange more document types. Key recommendations for this phase are listed below.

- (a) What work must be accomplished?
 - Ensure delivery of benefits by optimizing the value contribution to the business from the business processes, ICT services and ICT assets;
 - Ensure risk optimization by ensuring that the SWI facility's risks and tolerance are understood, articulated and communicated, and that risks to the SWI value related to the use of ICT are identified and managed;
 - Ensure resource optimization by making available adequate and sufficient IT-related capabilities (people, process and technology) to support enterprise objectives effectively at optimal cost;
 - Ensure stakeholder transparency by making sure that the SWI facility's ICT performance and conformance measurement and reporting are transparent, with stakeholders approving the goals and metrics and the necessary remedial actions.
- (b) What deliverables must be generated and reviewed?
 - Evaluation reports about benefits delivery, risk optimization, resource optimization, stakeholder engagement and transparency.
- (c) Who must be involved?
 - The governance body, e.g., the SWI steering committee and high-level policy decision-makers, who review the evaluation reports and make a mandate decision;
 - The working groups, with support from the SW/SWI operators who prepare the evaluation reports including the improvement plans;
 - Stakeholders and users who provide facts and recommendations for improvement.
- (d) How to control and approve this phase
 - How The governance body will evaluate and formulate the policy mandate/directive.

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ANNEX. ISSUES/CHALLENGES FOR ESTABLISHING CROSS BORDER SINGLE WINDOW INTEROPERABILITY, AND RECOMMENDED ACTIONS

| Issues / challenges | Description | Recommended actions |
|--------------------------|---|--|
| A. Business needs | Clear business needs must be established among the participating countries, as the primary drivers in engaging in the cross-border SW interoperability. | <p>Capture, analyze, evaluate and agree on business needs as the primary driver for cross-border SWI by including perspectives from public and private stakeholders in trade of the participating countries.</p> <ul style="list-style-type: none"> • Capture the current or as-is scenarios and indicators related to the types of documents/data and their associated import, export and/or transit-related processes . • Types of documents/data needed across borders that can be the candidates for fact-finding and analysis are, for example, those related to certificates of origin, SPS certificates, CITES certificates and permits, transit documents, and letters of credit .Those documents/data and associated processes are the candidates for the better to-be scenarios of cross-border electronic information exchange and automatic transactions .These are possible candidates for improving efficiency and effectiveness of interoperability among authorities and trading partners along the cross-border supply chain of the participating countries . • Quantitative indicators and statistics related to those documentation requirements and processes should be captured as much as possible, e.g., the average number of SPS certificates per day sent from the exporting country to the importing country of interest, including cost and time for the paper document exchange and related transactions. • Analyze the as-is scenarios, especially examining for any duplication and redundancy related to document/data submissions and manual processes, bottlenecks, delayed or costly steps with no value addition, or any improvement opportunities . Quantitative analysis techniques should be applied, for example, to analyze and quantitatively compare between the as-is scenarios and some possible target or to-be paperless scenarios with cross-border electronic information exchange and automatic transactions, without submitting paper documents and with less-manual operations. • Map the proposed to-be electronic information exchanges and automatic transactions with the list of possible primary drivers and business/economic needs of the participating countries .This is to check whether there is potential or in what ways they |

| Issues / challenges | Description | Recommended actions |
|--|--|---|
| | | <p>support or enable any of the primary impacts, e.g., regional integration, trade facilitation, risk analysis, advanced security declarations, infrastructure-use planning, and combating illicit activity .</p> <ul style="list-style-type: none"> • Verify, validate and refine the captured as-is situations, the proposed target or to-be scenarios, and an impact analysis with relevant public and private stakeholders of the participating countries. |
| B. Policy and legal interoperability | <p>Policy interoperability for cross-border Single Windows covers any necessary policies and commitments between the participating countries that are needed for establishing interconnectivity that allows the seamless exchange of information between their Single Window facilities.</p> | <p>Secure the highest-level political commitment between or among the participating countries for collaboration in establishing cross-border SWI.</p> <ul style="list-style-type: none"> • Secure bilateral or multilateral political commitment by the highest-level possible decision-makers among the participating countries, i.e., Heads of States, Prime Ministers or Ministers . • Formally sign or ratify bilateral or multilateral agreements among the participating countries. |
| | <p>Legal interoperability for cross-border Single Windows covers the broader environment of laws, regulations, operational and legally-binding agreements needed to allow the seamless exchange of information between National Single Windows.</p> | <p>Enact related laws and regulations for mutual recognition of electronic data exchanges across borders</p> <ul style="list-style-type: none"> • Collaborate among the participating countries of SWI in analyzing legal issues so that any laws and regulations that need amendment or enactment can be identified and resolved, especially with regard to mutual recognition of electronic data exchanges across borders. • Analyze the legal interoperability issues in a broader sense, i.e., not only with regard to necessary laws and regulations, but also those related to operational and service level agreements of SWI facilities and their operators .This is because the purpose of legal interoperability is to ensure trust, confidence and necessary legal bindings that enable the seamless exchange of information between different agents and operators in the participating countries. • Consider and formally sign the Framework Agreement on the Facilitation of Cross-border Paperless Trade in Asia and the Pacific. |
| C. People organizational interoperability | <p>Organizational interoperability for cross-border Single Windows covering how different organizations of the participating countries collaborate to achieve their mutually agreed business needs of SWI, and how they work together to</p> | <p>Establish an intergovernmental governance and management structure among the participating countries, with mandated directives and supporting resources.</p> <ul style="list-style-type: none"> • Establish a National Trade Facilitation Committee)NTFC (as an organizational model for the governance of trade facilitation initiatives including the National Single Window. • Extend the NTFC’s mandate to include managing and working collaboratively on intergovernmental |

| Issues / challenges | Description | Recommended actions |
|---|--|---|
| | synchronize and establish cross-border SWI. | <p>cooperation on SWI among the participating countries.</p> <ul style="list-style-type: none"> Formulate an appropriate structure for intergovernmental collaboration, comprising the SWI intergovernmental steering committee, and at least two or more SWI working groups, e.g., working groups for business process redesign, legal issues, and technical issues. The steering committee and working groups should be mandated by the highest-level policy decision-makers of the participating countries. Designate a strong coordinating secretariat or a programme management office with adequate resources to manage and coordinate the work of the steering committee and the working groups. |
| | In this guide, people interoperability for cross-border SWI means the human resources and their capacity to work together across borders in designing, managing and dealing with new technology, innovation and change related to the development and operation of cross-border SWI. | <p>Build and improve people capacity to cope with new technology, innovation and change related to cross-border SWI.</p> <ul style="list-style-type: none"> Conduct and/or participate in capacity-building programmes for interoperability by using lessons learnt and experience sharing, and through conferences, seminars, training workshops. Capacity-building and awareness creation for common understanding should be continuously conducted for policy decision-makers, policy managers and technical teams involved in intergovernmental cooperation. Conduct awareness activities and specific training for a wider audience that includes government officials and trade-related operators, especially those involved in the design, implementation and the launch of cross-border operations. |
| D. Process and data interoperability | Process interoperability of cross-border SWs refers to the business processes, probably including import export and transit-related processes, transactions and information exchange requirements needed among regulatory agencies of the participating countries. | Analyze the current/as-is processes, design and agree on better target/to-be processes related to information exchanges across borders |
| | Data interoperability for cross-border SWI comprises the ability to ensure that the precise meaning of exchanged information is unambiguously | <p>Analyze, harmonize and agree on better to-be standardized data and documents in electronic form for paperless exchanges across borders of participating countries</p> <ul style="list-style-type: none"> Capture and analyze current/as-is documents, data elements and their meanings exchanged across borders. |

| Issues / challenges | Description | Recommended actions |
|---|---|--|
| | interpretable by National Single Windows and users. | <ul style="list-style-type: none"> • Develop, harmonize and agree on those data elements, and their meanings, that are to be converted to electronic form for use in cross-border information exchanges. • Design and agree on the syntax, formats or schema of electronic documents and data elements to be electronically exchanged between multiple Single Windows. |
| E. Platform and technical interoperability | <p>The platform for, and technical interoperability of cross-border Single Windows refers to a small but necessary set of common platform and technology aspects needed for SWs)mostly meaning different inside ICT systems (to connect and exchange information without the need for extra operator intervention .This includes aspects such as technical interface specifications, interconnection models and services, security specifications, data syntax structures, any necessary common development platforms, and a common ICT infrastructure if needed .The term “platform” used in this guide means a group of technologies that form a base upon which applications can be developed and used.</p> | <p>To analyze, design and agree on a small but necessary set of common platform and technical aspects, e.g., interface specifications and common ICT infrastructure where needed, so that Single Window facilities can connect and communicate with each other</p> <ul style="list-style-type: none"> • Design and agree on the connectivity model of SWI, e.g., a centralized model)one common SWI system for all participating countries (or a distributed model)each country having an NSW, and then having network connectivity among Single Windows .(• Design and agree on common technical interface specifications, e.g., communications protocols for system-to-system connectivity, and security protocols. • Establish any common ICT infrastructure, e.g., network linkage among Single Windows across participating countries. • Agree on the schedule and planning for the establishment of a common ICT infrastructure, SWI implementation, including conducting cross-border proof-of-concept implementation projects, sharing lessons learnt and assisting each other technically. |