2. The Roadmap: Evolution of Single Window

The objective of this section is to present an evolution model of how Single Windows develop that can serve as a roadmap for the long-term development of a national Single Window. Because of the complexity of the projects and the required changes in business processes and trading practice, most economies will choose incremental implementation of their national Single Window.

The roadmap divides the evolution of a national single window into five different maturity levels. It should be used as a reference model. Policymakers can determine the current state of their Single Window in the model. They can then define objectives, prioritize and suggest the next stage they want to reach.

This section also describes the roles of a regional Single Window and a national Single Window in contributing to regional trade integration and trade competitiveness.

2.1 Gradually migrating from paper-documents to electronic-document environments

In many economies, companies involved in international trade normally have to prepare and submit large volumes of information and documents to governmental authorities to comply with import, export and transit-related regulatory requirements. This information and documentation often have to be submitted to several agencies, each with their own specific systems and paper forms. These extensive paper-based requirements, together with their associated complex and slow procedures, constitute a serious burden to the development of export and import. Governments and business around the world are, therefore, gradually migrating from these paper-based working environments into more efficient paperless-based environments by adopting information and communication technologies.

If paper documents are transformed into electronic documents, international trade can save billions of dollars in its supply chains. However, it takes several years to set up such a system and it can still be continuously improved and developed further with even more benefits. For example, the paperless customs system that the Royal Thai Customs uses for facilitating the issuance of export declaration through electronic means significantly reduced the export process from 24 to 14 days and, the export cost for 213 USD per container\cite{11}, resulting in the national total cost saving of 750 million\cite{12} USD a year.

\textsuperscript{11} Comparing the World Bank’s Trading-Across-Borders Indicators of Thailand between 2007 and 2009.
\textsuperscript{12} Calculation with 3.5 million 20-feet exporting containers per year from Thailand.
The system was a migration from a traditional electronic data interchange (EDI) environment where traders submitted both electronic customs declarations and paper declarations. The paperless system now provides a fully paperless environment without the need for physical visits and without the need to submit any physical papers.

It took about three years to initiate the project and to implement the core information technology parts, and another three years for deploying this system to be fully utilized at all major seaports, air ports and cross-border ports throughout the country.

In the next step, the paperless Customs system is now extended by integrating other Government agencies issuing different kinds of electronic export/import permits and certificates. A further step foresees the exchange of transport-related electronic documents with other cargo-related stakeholders at the major seaports and airports.

The evolutionary development approaches adopted in other economies are quite similar, since the migration from a paper-based environment to an electronic-based environment demands time, costs, efforts, and careful change management mainly because of its sheer complexity and the many stakeholders involved. Transforming physical papers to electronic documents has to be done gradually for each set of documents and the associated procedures at a time.

2.2 A Single Window roadmap based on five evolutionary stages

Simplification and automation of documents and procedures in a Single Window takes place incrementally stage by stage. In 2005, a UNECE forum on “Paperless Trade in International Supply Chains: Enhancing Efficiency and Security” collected lessons learnt from many economies around the world and already presented a recommended roadmap for developing Single Window taking into account the evolutionary nature of these projects. The evolutionary concept of Single Window was confirmed and further detailed in the background paper of the Global UN Trade Facilitation Conference, “Ten Years of Single Window Implementation: Lessons Learned for the Future,” held in 2011 in Geneva, taking into account the global experiences made in the last 10 years. This Guide adopts the same concept with some slight modification, as shown in Figure 2.1.

---

13 Legacy EDI systems in some economies allow traders to submit customs declaration electronically but still need physical paper submission later in import/export procedures, this is due to the lack of electronic-transaction supporting laws and the electronic system is not fully securely developed.

14 Referring to “Thailand NSW” presentation, Mr. SINMAHAT Kiatjanon, Thai Customs Department - February 2010, Nepal (hosted by UNESCAP).

The evolution of the Single Window implementation can be described in five incremental development levels as follows:

**Level 1: Paperless Customs**

**Development of paperless customs declaration system**

Because every import-export must be declared to Customs, most countries introduce electronic trade facilitation by first starting with electronic Customs declaration systems. The electronic Customs declaration system usually evolves from a paper-based Customs environment or from the use of traditional Electronic Data Interchange (EDI) systems where traders submit both electronic customs declarations and paper declarations. Paperless Customs environments use only electronic customs documents through secure Value Added Networks (VANS) without requiring physical visit and without submitting physical papers at a later stage.

Often the functionality of paperless Customs declaration systems is extended to cover other Customs-related activities—e.g. online duty payment, electronic risk assessment and risk based inspection strategies, electronic container loading documents to electronically associate between Customs declarations and physical containers of those declared goods, and some basic

---

16 The graphics were presented also during the 2011 UN Global Trade Facilitation Conference in Geneva, http://www.unce.org/swglobalconference2011.

17 Legacy EDI systems in some economies allow traders to submit customs declaration electronically but still need physical paper submission later in import/export procedures, this is due to the lack of electronic-transaction laws and/or the electronic system is not fully securely developed.
electronic information exchange between Customs Department and terminal operators for facilitating and speeding up customs release operations at the port or at the border area.

Today, although many economies have already established paperless Customs environments in developing countries and transition economies many Customs systems have not yet reached this level. According to the World Bank’s Trading Across Borders report 2011, countries such as Belize, Chile, Estonia, Pakistan and Turkey have already implemented the Electronic Data Interchange for Customs Declaration. But countries including Morocco, Nigeria, Palau, Suriname and Viet Nam use risk-based inspections. In Thailand, the Customs Department utilizes the paperless Customs with electronic risk-based inspection, and online Customs duty payment.

A paperless Customs system is the first and initial start for the development of the national Single Window. If a national paperless Customs system is not yet available, the development plan should secure funding and implement such a project as the first priority. This system should covering other supporting functionalities, e.g. paper-free Customs declaration submission, e-payment for Customs duty, automated risk assessment and risk-based inspections, and deployment of the systems at all major seaports, airports and land border crossings.

**Level 2: Regulatory Single Window**
Integration of Paperless Customs with other regulatory bodies issuing trade/import/export/transit-related permits and certificates, and other related documents

After linking traders and Customs electronically, countries can develop a Single Window e-document exchange system linking several or all Government agencies dealing with the regulation of imports and exports. This system allows application for and issuance of electronic import/export-related permits and certificates and their exchange between Government agencies.

With such a facility, traders don’t need to pay physical visits to many different regulatory locations. For example, in Malaysia, electronic import/export permit documents issued by several other Government agencies can be sent electronically to the Customs Department for faster checking and clearance. The systems in Columbia, Israel, Senegal and Thailand are other examples of this level of Single Window development.

The more challenging feature is a regulatory Single Window with single submission where traders submit their export or import data only once to the Single Window. Such a regulatory Single Window Entry facility is then able to communicate with several authorities to obtain any necessary permits and certificates. An example of this type of Single Window is TradeNet of Singapore, where traders submit electronic data in a single window to obtain all necessary import/export-related permit/certificate and customs declarations.
In most regulatory Single Windows, submission isn’t yet being done through a single entry point. Instead, traders still need to submit their data separately for each Government agency through the Single Window. Such a SW case may have a central national G2G e-document exchange hub but with multiple electronic data entry windows, one for a different set of application forms associated within each Government agency. The challenges here depend mainly on jurisdiction issues, the willingness of many independent Government agencies and also constraints for system integration set by the existing legacy systems in the administrations.

In Recommendation No. 33, UNECE defines the Single Window as a “facility that allows parties involved in trade and transport to lodge standardized trade-related information and/or documents to be submitted once at a single entry point to fulfil all import, export, and transit-related regulatory requirements.” This particular definition of Single Window can be closely classified as equivalent to a Single Window with single submission and with all agencies connected.

However, many countries have up to 20-40 regulatory agencies involved in import-export and transport procedures. In such cases, it is preferable to develop the regulatory SW gradually depending upon the willingness and collaboration of individual agencies, and the cost-benefit justification. For example, those regulatory agencies responsible for the most frequent transactions and the most numbers of documents, or involving somehow with national development agendas—e.g. those agencies issuing certificates of origin and export permits of some strategic agriculture-based products within a certain economy—should be called for collaboration as the priority because of their considerable numbers of documents involved per day and their economic impacts.

**Level 3: Port Single Window or B2B Port Community System**

*Extension of the Single Window to serve entire trade and logistics communities within the airports, seaports and/or dry ports*

The next stage in developing a Single Window is to integrate the private-sector stakeholders and intermediaries at major airports, seaports, or borders. The systems are sometimes referred to as Port Community Systems (PCS) or Port SWs. There is no clear distinction between the two terms: often PCS have a stronger B2B focus and Port SWs have a stronger focus on B2B components.

The European Port Community System Association (EPCSA)\(^{18}\) defines a PCS as a neutral and open electronic platform enabling intelligent and secure exchange of information between public and private stakeholders to improve efficiency and competitiveness within the sea and airport communities. Documents and information can be linked up electronically for better and faster coordination among all those stakeholders in the port community. A Port Single Window normally connects to the electronic Customs declaration system and to other regulatory authorities. The system should optimize, manage and automate smooth port and logistics procedures through a single submission of data and by connecting transport and logistics chains.

---

\(^{18}\) EPCSA, 2011, "How to Develop a Port Community System".
The challenge in extending the Single Window at this level is to cover the operations and services suitable for all stakeholders within a port community, and if possible to also extend or the Single Window facilities to each and all major ports within the economy. Many economies may have several major ports and each port normally has different sets of stakeholders. Stakeholders and the nature of the required documents and procedures are different between airports, seaports and dry ports. It will therefore require much time to implement and deploy the Single Window system for each different port. For example, the systems for the airports are much different from those of the seaports because of the different modes of transportation and different environments. As most ports are normally managed by independent local bodies and may have several private terminal operators, there is no objective or recommendation here to implement the same system for every port.

Many economies, especially in Europe, have established such port community systems in most of their major ports to connect the multiple systems operated by a variety of organizations that make up a seaport and airport community. An example of this type of Single Window is the DAKOSY system, an electronic document-exchange system for sea seaport operations in the port of Hamburg, Germany. It was estimated that the system saves approximately €22.5 million per annum simply by reducing labour costs associated with correcting errors during the preparation and submission of trade and transport documents. In Germany, different ports have developed their own Port Community Systems independent from each other, while most of the ports in Finland have deployed the same Port Community System.

One interesting note for this Single Window level of development is that the regulatory G2G Single Window as mentioned in Level 2 and the port-community Single Window within an economy may or may not be closely interconnected to each other. For example, the regulatory Single Window system of Singapore, TradeNet, is not directly interconnected with PortNet, the Singapore’s sea port Single Window. However, these two separate windows for electronic data entry and transactions seem to be relatively good enough for efficient trade and transport facilitation and operations in the case of Singapore. However, many economies especially in the regional context—as in the European Union—are now interested in integrating their port community SW systems with the regulatory G2G SW for better efficiency and control, as for example is discussed in a white paper by EPCSA (2011).

Also, in many economies mostly noticeable in Europe, PCS as described in Level 3 were fully developed and deployed long before the regulatory national SW described in Level 2.

Therefore, if an economy has already established a paperless Customs and a regulatory SW system, and there are also mayor ports or airports with many local stakeholders and complex processes, this offers opportunities to interconnect these stakeholders and Government agencies by establishing Port Single Window at the major ports, airports and border crossings.

19 European Port Community Systems Association (EPCSA) - “The Role of Port Community Systems in the development of Single Window,” 15 June 2011.
**Level 4: Fully Integrated Single Window**

Creation of an integrated national logistics platform interlinking the administrations, companies and the service sectors to better manage the entire chain of import-export operations.

One of the most advanced National Single Window systems, such as the electronic trade portal in the Republic of Korea, called Korea u-Trade, connects not only traders, customs and other regulatory authorities, but also private-sector participants such as banks, customs brokers, insurance companies, freight forwarders and other logistics service providers.

The level of connectivity at this level normally includes the linkage as of Level 1 and Level 2 (paperless Customs and other regulatory SW) with the extension to cover more business sectors such as bank and trade finance, cargo insurance companies, traders, freight forwarders, ship agents and carriers.

Fully integrated Single Windows may or may not link to the port community Single Window, as in the case of Korea u-Trade, for example, which hasn’t electronically and fully linked up with the marine community information-exchange system, KL-Net.

This Guide recommends that if an economy has already established a regulatory SW and Port Community Systems within major ports it may consider to develop a fully integrated SW. This could be an advantage, for example is there are still many small and medium sized enterprises that lack access to SW services or if there are large electronic systems, for example systems for trade finance and cargo insurance that are not yet connected to the SW.

However, this Guide does not necessarily recommend that every economy develop a fully integrated SW. As with any decision about the next level of SW development, there should be a careful cost-benefit analysis.

**Level 5: Cross-border Single Window Exchange Platform**

Interconnection and integration of national single windows into a bi-lateral or regional cross-border e-information exchange platform.

Electronic cross-border information exchange is an important instrument for regional integration and increased security, trust and collaboration between trading countries.

As an example in this category, the New Zealand Food and Safety Authority (NZFSA) and the Australian Quarantine and Inspection Authority (AQIS) already exchange their electronic sanitary and phyto-sanitary certificates for facilitating import and export procedures by allowing electronic data cross-checking between those two agencies. The systems help easing and speeding up trade and improving regulatory control of agriculture and food products between the two economies.

Electronic certificate of origin documents are exchanged between associated authorities of the Republic of Korea and Hong Kong SAR as another example of cross-border e-document exchange. This cross-border data exchange platform helps reducing risks and document fraud related to certificates of origin.
The 10 member nations of the Association of Southeast Asian Nations (ASEAN) have been working on an ASEAN-wide Single Window initiative\(^{21}\) since 2004 with the aim for not only developing National Single Windows within the member economies but also for interconnection and electronic documents exchange among the ASEAN members’ NSWs and with other ASEAN’s trading partner economies. The paperless or less-paper cross-border e-document exchange between ASEAN trade partners, including the exchange of electronic customs declaration, and electronic ASEAN CEPT (Common Effective Preferential Tariff) Form D then and now ATIGA (ASEAN Trade in Goods Agreement) Form D used instead, had been piloted and expected to be fully deployed soon. The ASEAN Single Window initiative is fully recognized and supported by ASEAN leaders and member economies as the enabling and flagship strategic project to fulfil the vision of ASEAN Economic Community within 2015\(^{22}\).

National single windows, especially with a cross-border e-document exchange platform between two economies and among several economies within a regional grouping contribute and enable the economic integration process by easing the flow of goods but with better risk management between and among those economies. The Single Window can enhance the availability and authenticity of information thereby reducing fraud, expedite and simplify information flows between trade and Government and can result in a greater harmonization and sharing of the relevant data across Governmental systems, bringing meaningful gains to all parties involved in cross-border trade. The use of such a facility can result in improved efficiency and effectiveness of security and official controls, and can reduce costs for both Governments and traders due to better use of resources.

Cross border information exchange can actually start at any stage after the implementation of paperless Customs. The type of data that the SW can exchange depends on its development stage. A paperless customs system can only provide Customs data for cross border data exchange while a fully integrated SW can also provide transport and commercial transaction data.

Therefore, this Guide recommends that if a country has already established the Paperless Customs, and/or the regulatory SW, and/or Port SWs, and bi-lateral or sub-regional trade agreements have also been established, to collaborate with other regional SW operators and to develop a cross-border information exchange between and among those regional members, i.e. establishing a bi-lateral or regional information-exchange platform in as described in this development Level 5.

---

\(^{21}\) [http://www.aseansec.org/18005.htm](http://www.aseansec.org/18005.htm).

\(^{22}\) [http://www.aseansec.org/18757.htm](http://www.aseansec.org/18757.htm).
2.3 Assessing the National Situation against the Single Window Roadmap

Single Window planners can use the evolutionary model of Single Window Development described in section 2.2 as a reference model to a reference model\textsuperscript{23} to derive a strategic roadmap\textsuperscript{24} for the evolution of their national and SW. This means they can assess, compare and analyse the level of the national SW development by comparing the “as-is” condition in the country and determine their current position in the SW reference model (from Level 1 up to Level 5). They can then discuss which is the next of “to-be” level of SW development they want to achieve.

For example, upon an assessment of an economy’s current situation by comparing with those five SW levels, and finding that the economy has not established any paperless Customs system yet. Then, according to the suggested roadmap as described in section 2.2, Level 1 paperless Customs declaration submission and electronic Customs clearance should be its first priority for this economy’s development. If a paperless Customs system, as suggested in Level 1, has already and fully been established, then the integration with other regulatory bodies issuing different import/export-related permits and certificates, as described in Level 2, should be the target of the SW development of that economy. Or perhaps, if a particular economy has major air and seaports involving several stakeholders with some complicated procedures and documentation handlings, then the extension of the Single Window to serve the entire trade and logistics community at the port(s) should be the SW development scope as described in the Level 3 SW development.

As discussed in Level 4, the economies with the advanced development of paperless customs environment, regulatory e-document Single Window, and port community systems, are still interested in further developing their competitiveness by integrating and extending beyond those 3 mentioned evolutionary levels. With the SW development at the Level 4, the economy may target to efficiently manage the entire chain of import/export operations including all stakeholders namely traders, logistics and transport service providers, regulatory agencies, banks and cargo insurances.

Along with the established or to-be-established national SW development, many economies are working towards cross-border information exchange between economies and the regional Single Window interconnection as suggested the development Level 5, for better regional economic growth and regional integration.

Higher levels of Single Window development do not automatically translate into a net benefit for the national economy. Before each decision on SW development a careful cost-benefit analysis must be done. This must take into account the objectives in implementing the next

\textsuperscript{23} A reference model generally means an abstract framework or domain-specific ontology consisting of an interlinked set of clearly defined concepts in order to encourage clear communication and comparisons. Therefore, this proposed SW frame of reference can then be used not only to communicate ideas clearly among members of the same community, but also to allow comparisons of different scopes or different levels of SW maturity development.

\textsuperscript{24} A strategic roadmap normally provides long-term plans and directions for an organization or a nation from where it is now to where it would like to be in five, ten or more years.
step, their benefits for the economy and their costs. A decision on developing the Single Window to the next level should only be taken if the cost-benefit analysis support such a step.

In conclusion, there are several different meanings and different scopes in the term Single Window used around the globe which cause some confusion in the world community. The five evolutionary levels of Single Window can be used as a reference model and also at the same time as a roadmap for the economy and a region of collaborative economies interested in planning and implementing the project. By assessing and comparing the current situation of the economy with these different development levels, one can propose the scope of the Single Window project to achieve at least the level next to its current environment.

This section described a framework to assess the current situation of a national SW and to decide on the next level of Single Window development. If it is decided to further develop the Single Window, the national stakeholders will need to address the challenges of managing such a large-scale project. The next section introduces a framework for Single Window implementation, providing a systematic approach to the management of the project. A proposed framework to assist in and ease the tasks of planning and overseeing a complicated and large-scale Single Window project is explained in the next section.