SINGLE WINDOW PLANNING

AND IMPLEMENTATION GUIDE

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and Implementation Guide

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This publication is available in English, French and Russian.

ECE/TRADE/404

Foreword

For many Governments, the Single Window system has become a core instrument to facilitate trade, simplify procedures and implement electronic business. Today 49 countries around the world have reported the implementation of Single Window Systems of varying complexity.

A Single Window automates the information exchanges that control the flow of goods across national borders. The conditions under which this information is exchanged and shared, its accessibility, accuracy, the data formats and the technologies used, are crucial for global trade efficiency. Managing this information skilfully, leveraging its potential, finding new ways to generate, manage, process and use this information is vitally important for Governments, the private sector and citizens.

When implementing a Single Window, all Governments face similar challenges. These relate to the technical aspects of the systems, as well as the organizational and inter-organizational, managerial, financial, political, legal, national and international settings.

Policymakers and persons in charge of conceptualizing, planning, implementing and overseeing Single Window projects need to manage the many aspects of the project and create an environment in which the project can succeed. This requires advanced managerial competencies in very different domains—such as trade policies, business process analysis, change management, electronic business and information technology management and standards, legal issues and Single Window architectures.

The *Single Window Planning and Implementation Guide* was developed in collaboration with international experts and academics. Experienced Single Window project managers from both developing and highly developed countries contributed their wealth of experience in managing projects. Researchers developed an integrated high-level managerial framework based on international best practice and the latest management techniques.

The *Guide* addresses the needs of managers and policymakers who are entrusted with planning and overseeing Single Window systems in our member countries. It provides managerial strategies; all guidance on practical issues as well as in the specialised knowledge areas required to plan and oversee such a complex undertaking.

We hope that this *Guide* will contribute to swift project implementation, better services to Government agencies and private-sector enterprises that are the stakeholders in Single Windows and, ultimately, enhance the regional and global integration of the economies in our regions.

This *Guide* complements a set of UNNExT tools to support Single Window and trade facilitation implementation: the *Business Process Analysis Guide to Simplify Trade Procedures;* the *Data Harmonization and Modelling Guide for Single Window Environments;* the *Guide for Alignment of Trade Forms* and the *Capacity-Building Guide on Electronic Single Window Legal Issues.* It is recommended to use this *Guide* together with these other tools in order to derive the maximum benefit.

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Preface

The *Single Window Planning and Implementation Guide* contains managerial guidelines for policy managers, policymakers and those who are tasked to plan and manage the information technology-enabled Single Window development projects for simplifying cross-border trade procedures and document requirements within developing economies and transition economies.

The objective of the *Guide* is to assist the decision makers, Government officials and private stakeholders to address managerial issues that may affect the planning, the development and operation of Single Window systems, including their cross-border interoperability. The *Guide* also serves as background reading for capacity-building workshops, especially those supported by United Nations regional commissions and other international funding agencies. Such workshops aim at building the managerial competence of Government officials and relevant stakeholders to plan, manage and oversee the Single Window projects within their economies or within a region of collaborative economies.

Therefore, **the target audiences** of this *Guide* are policy managers, Government officials and other stakeholders especially those who are tasked to lead, coordinate and/or involve in initiating, planning and managing Single Window projects.

Improving trade and transport-related procedures and documentation with some forms of electronic-based Single Window environments is well recognized as one of the most important development visions for increasing trade competitiveness of many economies. However, how to transform these visions into reality is neither simple nor obvious.

Therefore, a holistic and systematic framework for guiding the planning and implementation of the SW vision into reality is proposed. An architecture-based approach, called **Single Window Implementation Framework (SWIF),** as recommended in the *Guide*, provides policy managers and decision makers with guidelines on how to systematically structure many complicated challenges of Single Window implementation into less complicated and more manageable sub-components.

The *Guide* also suggests a stepwise project management process and practical steps on how to initiate a project, how to analyse the current environment, how to propose the target architectures from different viewpoints, and then how to formulate the high-level master plan for implementation.

The *Guide* also discusses key ideas on some approaches to secure political will with its clear vision and how to formulate an effective collaborative platform. We discuss the importance of other critical success issues including the necessity of business process analysis, data harmonization, development of electronic messages, and commonly agreed functions of its application architecture. A case study at the end of this guide summarizes the implementation experiences and history of a national Single Window project using the described implementation framework.

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ADM	Architecture Development Method
APEC	Asia-Pacific Economic Cooperation
AQIS	Australian Quarantine and Inspection Service
ASEAN	Association of Southeast Asian Nations
ATIGA	ASEAN Trade in Goods Agreement
B2B	Business-to-Business
B2G	Business-to-Government
B/L	Bill of Lading
CA	Certifying Authority
CCL	Core Component Library
CEPT	Common Effective Preferential Tariff
DTTN	Digital Trade and Transportation Network
ebXML	Electronic Business eXtensible Markup Language
EC	European Commission
EDI	Electronic Data Interchange
EDIFACT	United Nations/Electronic Data Interchange for Administration, Commerce and Transport
EU	European Union
FFM	Freight Forwarding Manifest
FIATA	International Federation of Freight Forwarders Associations
G2B	Government-to-Business
G2G	Government-to-Government
GDP	Gross domestic product
IATA	International Air Transport Association
ICT	information and communication technology
IMO	International Maritime Organization
IS	information systems
IT	information technology
ISO	International Organization for Standardization
KPI	key performance indicator
MICT	Ministry of Information and Communication Technology
NSW	national Single Window
NZFSA	New Zealand Food and Safety Authority
OAGIS	Open Applications Group Integration Specification
OASIS	Organization for the Advancement of Structured Information Standards
OECD	Organisation for Economic Co-operation and Development
PCS	Port Community System
PKI	Public Key Infrastructure
PMBOK	Project Management Body of Knowledge
ROI	return on investment

SOA	Service-oriented architecture
SW	Single Window
SWIF	Single Window Implementation Framework
TOGAF	The Open Group Architecture Framework
UCR	Unique Consignment Reference
UN	United Nations
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNNExT	United Nations Network of Experts for Paperless Trade
UNTDED	United Nations Trade Data Elements Directory
USD	United States dollars
VAN	Value added network
VAS	Value added services
WB	World Bank
WCO	World Customs Organization
XML	Extensible markup language

1. Introduction

The objective of this section is to convey a message to policy planners, policy decision makers and relevant stakeholders about opportunities available for many economies, particularly developing economies and transition economies. Improvement opportunities related to their trade and transport procedures, documentation handling and supporting environments have the great potentials to increase their national trade participations and competitiveness in the globalized world.

Policy managers especially those who are involved in policy planning should realize that they are tasked with a very important role of finding and conveying the right messages to their higher-level policy makers, if possible, also with appropriate quantitative indicators and objective evidences, to alarm and capture the interest of policy makers on economy development. These indicators and evidences may be presented as both threats but also opportunities for improvement. For example, documentation of complicated import, export and transit procedures and quantitative indicators such as cost, time, number of procedures required for export and import, should be utilized to capture the interest, and buy-in of policy decision makers and stakeholders to mandate and support trade facilitation initiatives.

Today, the companies and administrations that participate in international trade have developed automated systems to manage their internal information required for their business processes. Many countries have now started to move a step further and develop a Single Window (SW) system that links Customs, traders and the regulatory authorities involved in international trade for exchanging information and simplifying business processes.

This section explains what a Single Window is, why a planning and implementation guide is needed, objectives and scope of this guide, what will not be covered, target audiences, related perspectives of UN regional commissions and the structures of this guide.

1.1 The Vision - Improving Trade Procedures and Documentation as a Strategy for Increasing National Trade Competitiveness

In a world of globalization, making trade across borders easier and safer is essential for business. Many Governments around the world recognize this and have set up strategies for trade-facilitation improvement so as to increase national trade participations and competitiveness by simplifying their trade and transport procedures and document requirements but meanwhile meeting safety and security concerns.

The World Bank's *Trading Across Border* study[1] has measured the time and cost (excluding tariffs) associated with exporting and importing goods through ocean transport, and the number of documents necessary to complete the transaction in many economies. These indicators represent procedural requirements by customs and other regulatory agencies, as well as at the port. Every official procedure involved is recorded starting from the conclusion of the contractual agreement between the two trading parties. The study also includes the time and

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[1]   World Bank, 2012.*Trading Across Borders* within the Doing Business Report 2012.

cost of inland transport logistics to the largest business city. Studies[2] have shown that by reduction of time for export by one day can increase export volume by up to 10%. The time to complete export and import operations and the number of documents required is a good indicator for the difficulties and costs that the national exporters and importers are facing. These direct and indirect costs have a significant impact on the national competitiveness of the national economy.

Figure 1.1 - Regional averages in trading-across-borders indicators
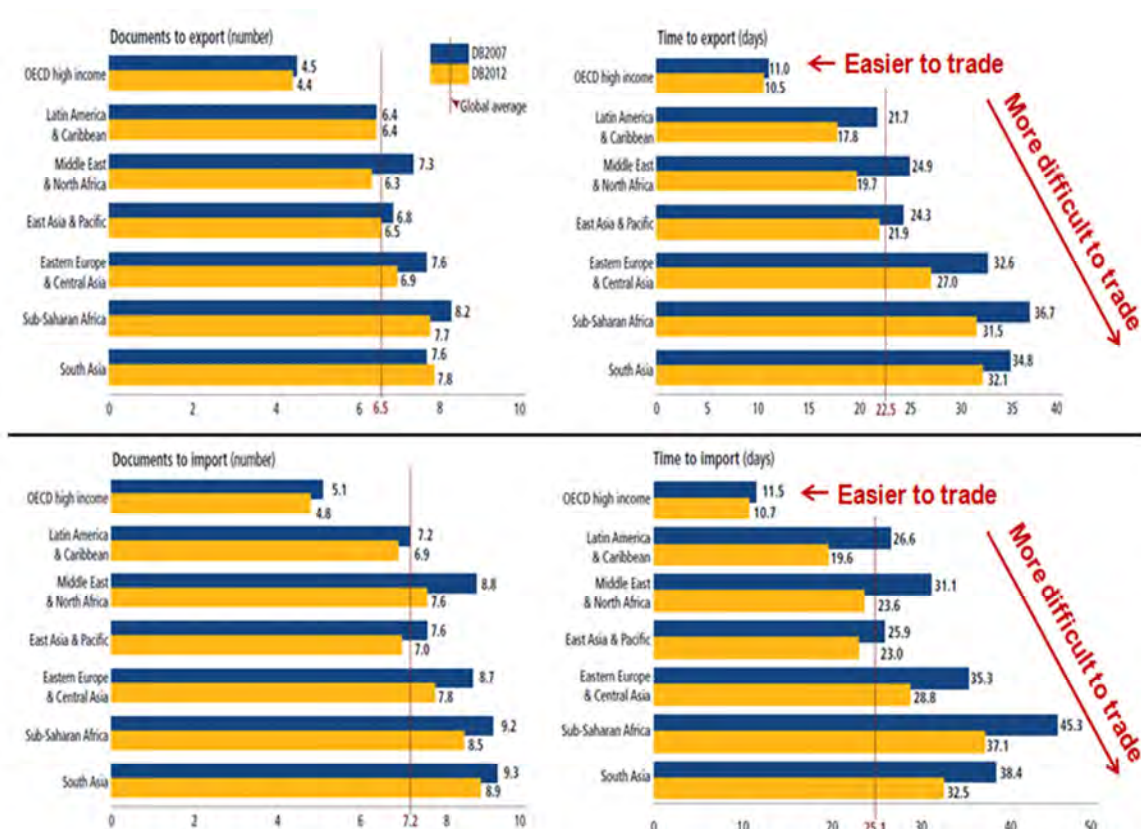
Note: The data sample in the World Bank's Doing Business or DB2007 report (data collected in 2006) includes 178 economies. The sample for the DB2012 report (data collected in 2011) also includes The Bahamas, Bahrain, Cyprus, Kosovo and Qatar, for a total of 183 economies.

According to the *Trading Across Borders* indicators from the Doing-Business *2012* Report comparing 183 economies as illustrated in Figure 1.1, traders in OECD high-income economies have a competitive advantage as export and import take about 10.5 days and fewer than 5 documents on average. Trade is slowest and most expensive in Sub-Saharan Africa, where traders typically face delays 3 times as long, with the time to export averaging 31.5 days and the time to import 37.1 days.

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2   Source: Simeon Djankov, Caroline Freund, and Cong S. Pham. (2007). Trading on Time. Washington, D.C.: World Bank.

In East Asia & Pacific, Middle East & North Africa, and Latin America & Caribbean, traders usually will take two times longer for their export of import to complete than that in the OECD high-income economies.

When comparing the data published in the 2007 report (blue bars) with the 2012 report (orange bars) one can observe a global reduction in transaction time and required number of trade documents which testifies for the implementation of trade facilitation procedures. However, there are still significant discrepancies between the regions and therefore opportunities for improvement in the non-OECD economies.

According to the experience of many economies, improvement can gradually be achieved by continuously simplifying import, export and transit procedures and documentation while ensuring the safety and security interests of involved States, economies and citizens. The World Bank study shows that OECD economies with extensive legislation for trade safety and security[3], e.g. EU, USA, and Japan, were still able to reduce time and documents required for export and import.

Indicators such as export/import time and cost can be used to alarm and capture the interest of policymakers. They highlight difficulties that traders face notably because of complicated legislation, procedures or document requirements. They indicate potential and areas of improvement and thus opportunities for the development of the national economy.

Figure 1.2 - Indicators related to time, cost, number of documents and procedures involved in exporting a standardized shipment of goods through the nearest seaport.

Indicators can help decision makers to understand the importance of trade procedures and their efficiency for improving the national trade competitiveness

Indicators	Kazakhstan	Lao PDR	Thailand
Documents to export (number)	9	9	5
Time to export (days)	76	44	14
Cost to export (US$ per container)	3,130	1,880	625

Reference - World Bank's Doing Business – Trading Across Border Report 2012 (www.doingbusiness.org).

Comparing among 183 countries, the costs and procedures involved in exporting (and importing) a standardized shipment of goods are studied. Every official procedure involved is recorded – starting from the final contractual agreement between the two parties, and ending with the delivery of the goods.

Figure 1.2 shows that the handling of procedures, including fulfilling documentation requirements and inland transport, to export a 20-feet container of goods from Kazakhstan and the Lao People's Democratic Republic to their nearest seaports takes time about 76 days and 44 days respectively, and cost 3,130 USD and 1,880 USD respectively. Comparatively, the time and cost to export from Thailand also to its own nearest seaport are merely 14 days and 625 USD per a container. Since both Kazakhstan and the Lao People's Democratic Republic are landlocked

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[3]   e.g. referring to the EU Regulation on Advanced Cargo Declaration - The 1st January 2011 is the effective date for implementing the safety and security requirements, made mandatory by the EU Commission in 2005 (EU Regulation 648/2005), e.g. "paper" communication is no longer tolerated by the European Commission, to import and export to any EU economy, pre-arrival and pre-departure declarations must be electronically submitted to the Customs.

economies, traders face high inland transport costs to reach the nearest seaports and delays at border posts.

Figure 1.3 provides even more detailed indicators to analyse the reasons behind the comparative trade disadvantages or competitiveness of the Lao People's Democratic Republic and Thailand. The preparation of export documents in the Lao People's Democratic Republic takes 29 days, but only 8 in Thailand. Lao PDR is a landlocked economy, consequently its cost for inland transportation and handling must be higher than Thailand. However, the data also shows that traders from Lao PDR also need to provide more export documents which in turn requires more physical visits to several Government agencies and more procedures, time and cost.

Figure 1.3 - Comparing between Lao PDR and Thailand[4] , official required procedures, documents, time and cost for exporting a standardized cargo of goods[5]

Nature of Export Procedure	Lao PDR		Thailand	
	Duration (days)	Cost (USD)	Duration (days)	Cost (USD)
Document preparation	29	90	8	290
Customs clearance and technical control	3	60	1	50
Port and terminal handling	4	130	3	85
Inland transportation and handling	8	1600	2	200
Total	44	1880	14	625

Regulatory-required Export Documents of Lao PDR	Regulatory-required Export Documents of Thailand
Bill of Lading	Bill of Lading
Certificate of Origin	Certificate of Origin
Commercial Invoice	Commercial Invoice
Customs Export Declaration	Customs Export Declaration
Equipment Interchange Receipt	Terminal Handling Receipt
Export license	
Packing list	
Pre-shipment Inspection Clean Report of Findings	
Technical Standard/Health Certificate	

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4   Referring to the World Bank's Trading *Across* Borders Report 2012 (www.doingbusines.org, as of March 25, 2012).
5   Note that more documents and steps may be required for other special products, e.g. dangerous goods or agricultures goods.

It is essential to analyse the current business processes and information flows to identify areas that cause the inefficiency and then to propose and implement a simplified future trading environment with efficient processes and data flows.

In this process of improvement it is the responsibility of the decision makers of the Government agencies, business sectors and relevant stakeholders to analyse export and import procedures and trade documents as the time and cost associated with those operations determine the trade competitiveness, safety and security of the economy.

It is also the key responsibility of these decision makers to communicate and convince the political leadership of the country to understand and support national initiatives for improving these procedures and information flows to create a more competitive economy.

The use Key Performance Indicators as shown in this section and comparison of indicators between economies is one way to capture the interest and buy-in of the leadership and to mandate the necessary trade facilitation initiatives.

1.2   Single Window to Facilitate Trading Across Borders

Many countries have already begun to transform their paper-based Customs processes towards paperless Customs. Electronic systems for filing, transferring, processing and exchanging regulatory and trade information for export and import have become an important tool to manage cross border trade.

Chile and Malaysia, for instance, allow traders to submit their export and import declarations, manifests and their trade-related documents to customs authorities electronically[6].

Some economies go a step further by linking not only traders and customs but also other agencies involved in trade through the national Single Window. A Single Window system[7] allows traders to submit their export or import data in a virtual location that communicates with the relevant regulatory authorities for obtaining permits, certificates and approvals electronically. To increase efficiency the internal procedures in these agencies are simplified and the agencies coordinate their activities on regulating the trade transaction.

With a Single Window facility, traders no longer need to visit many different physical locations. The most advanced systems, such as the electronic trade portal in Korea and Hong Kong, also connect private sector participants such as banks, customs brokers, insurance companies and freight forwarders. If implemented effectively, a Single Window can significantly reduce the time for export and import and the document requirements.

For example, several economies have reported positively from the implementation of electronic Single Window systems. In the Republic of Korea, the Customs Service[8] estimates that in 2010, introducing its Single Window system brought some 18 million USD in benefits, part of the overall economic benefits that year of up to 3.47 billion USD from the agency's trade facilitation efforts.

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[6]   Reference - the UN/CEFACT Single Window Repository, http://www.unece.org/cefact/single_window/welcome.htm, and World Bank's Trading Across Borders 2011.

[7]   As defined by the UNECE Recommendation 33 – "Guidelines on Establishing a Single Window," 2004.

[8]   Korea Customs Service, 2011, and WB's Trade Across Border Report 2012.

For other companies based in the Republic of Korea, such as Samsung and LG, global leaders in the electronics industry, achieving rapid and predictable turnaround times because of this Single Window system is an important part of their competitiveness advantages. In Singapore, in 1989, the Government set up the world's first national Single Window for trade called TradeNet, bringing together more than 35 border agencies. This Single Window led to big gains in Government productivity. Singapore Customs claims that for every one United States dollar earned in Customs revenue it spends only 1 cent—a profit margin of 9,900%.[9]

1.3 Why do we need a Guide for Single Window Planning and Implementation?

The many challenges of setting up a Single Window system, some of which are shown in Figure 1.4, concern not only issues of technology but also include:
- political support
- long-term commitment from top management
- reliable institutional platform for interagency collaboration
- effective management of stakeholders' expectations and perceptions
- workable business procedures
- architectural models
- data and business interoperability
- laws and regulations
- financial issues.

Policymakers and managers need a strategic framework to systematically address the challenges and manage the project. This *Guide* provides such an integrated concept, called Enterprise Architecture,[10] for structuring, planning and managing Single Window implementation.

Figure 1.4 - Complicated Challenges in Single Window Planning and Implementation

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[9] Singapore Customs Service, 2007, and WB's Trade Across Border Report 2012.

[10] An Enterprise Architecture describes the interplay between business processes and information technology. The term "enterprise" includes public and private sector organizations and government administrations. It takes into account all relevant components of the "enterprise" such as laws and regulations, business processes, people and the social and political environment. EA is typically used to manage large scale information technology projects that include many stakeholders. For more information refer to Wikipedia at en.wikipedia.org/wiki/Enterprise_architecture .

1.4   Target audiences and objective of this *Guide*

The target audiences of this *Guide* are managers who have to lead, coordinate or participate in preparing, planning and managing a Single Window project. These are mainly policy managers, project managers, Government officials and other stakeholders who need to understand and to address managerial issues on planning and overseeing a national or regional Single Window project.

This *Guide* provides an Enterprise Architecture framework that has been adapted to the specific challenges of Single Window planning and implementation. This framework, the **Single Window Implementation Framework (SWIF)**, helps decision makers to understand and address managerial issues that may affect the development and operations of Single Window systems.

The ***Guide*** leads to systematically decompose and structure the SW implementation challenges, describe steps how to derive the target or "to-be" Single Window architecture and then formulate the master plan for the implementation. It provides action items for policy managers and project managers to plan and secure the necessary political support and collaboration from key stakeholders.

This guide has been developed by UNECE and UNESCAP to complement the **UNNExT workshop on Single Window Project planning and implementation**. The guide and associated training workshop aim at building the capacity of Government officials and relevant stakeholders in planning, managing and overseeing the Single Window (SW) projects.

The guide will not, however, cover issues related to information-technology development, e.g. software, hardware and systems. Those issues can be handled by technical solution providers.

1.5   Outline of this *Guide*

Section 1 described the opportunities still opening to many economies to increase their national trade efficiency, and at the same time also to improve their safety and security control by improving trade and transport procedures and documentation. This section also briefly discussed that electronic trade facilitation and Single Window have the potential as an enabling flagship development project, and policy managers should have some good indicators and rationale for showing the value proposition of Single Window implementation to their policy decision makers.

The objective of section 2 is to show that national Single Window systems are built in an incremental manner, gradually evolve over a long duration in time. One consequence is that at one given time the different national Single Windows in a region can have different scopes and functionalities. The section describes five evolutionary levels of SW development which can be used as a suggested long-term strategic roadmap and a reference model for SW development.

Using this model, project managers can compare the current situation of the national economy with these different development levels. A gap analysis can be conducted by this comparison,

and then for instance, the evolutionary stage next to the current situation could be the target Single Window environment to be further analysed, planned and developed. The model can also be used to compare the evolution of the national SW project with SW projects in other countries, for example when planning for regional Single Windows.

Section 3 recommends an architecture framework for Single Window planning and implementation to assist policy managers and their associated working team to understand and systematically address complicated challenges in planning and implementing Single Window. A recommended SW Development Methodology including step-by-step phases, key activities and deliverables for SW implementation is also discussed in this section.

Section 4 suggests practical steps for planning and implementing a Single Window project from the perspective of policy managers and policymakers. The objective of this section is to propose a project management process including five practical phases and guidelines on how to adopt the Single Window Development Methodology, as described in section 3, in an actual SW project.

Section 5 discusses about the necessity of conducting financial and business model analysis related to several issues such as investment and operation cost, potential benefits and its sustainability. A summary of this guide is provided in section 6. A National Single Window case study is provided in the annex.

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[11], resulting in the national total cost saving of 750 million[12] USD a year.

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[11]   Comparing the World Bank's Trading-Across-Borders Indicators of Thailand between 2007 and 2009.
[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 were traders submitted both electronic customs declarations and paper declarations[13]. 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[14].

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[15] 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.

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[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).

[15]   Referring to "Ten Years of Single Window Implementation: Lessons Learned for the Future," a discussion paper by Jonathan Koh Tat Tsen, during the 2011 Global Trade Facilitation Conference, http://www.unece.org/fileadmin/DAM/trade/Trade_Facilitation_Forum/BkgrdDocs/TenYearsSingleWindow.pdf .

Figure 2.1 - A Single Window Roadmap in five evolutionary stages[16]
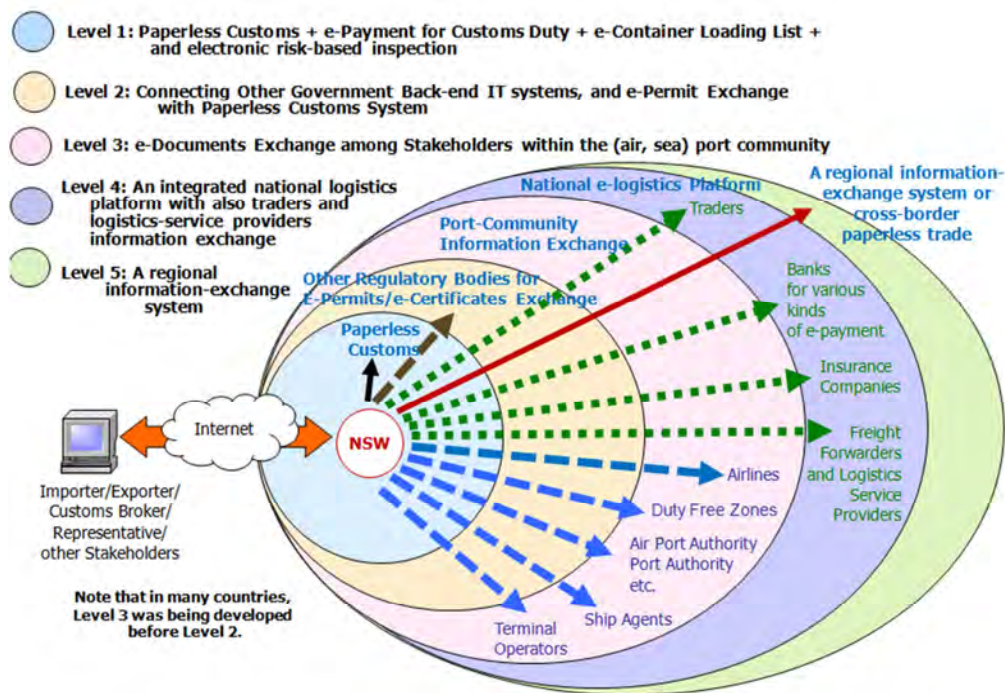
The evolution of the Single Window implementation can be described in five incremental development levels as follows:

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[17]. 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

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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.

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[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[19] 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[20], an electronic document-exchange system for sea seaportport 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.

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[19]   European Port Community Systems Association (EPCSA) - "The Role of Port Community Systems in the development of Single Window," 15 June 2011.

[20]   Reference - the UNECE Single Window Repository, http://www.unece.org/cefact/single_window/welcome.htm .

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.

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[21]   http://www.aseansec.org/18005.htm .
[22]   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**[23] **to** derive a **strategic roadmap**[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

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[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.

[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.

3. Single Window Implementation Framework

The objective of this section is to show the Single Window Implementation Framework (SWIF) as a recommended approach for systematically structuring the implementation challenges into several smaller and easier manageable components. Key project management instruments such as decomposition, viewpoints and blueprints; architecture domains; and the development cycle for Single Window are discussed. They are the basis for the recommended practical step-by-step approach for analysis, planning and implementation of Single Window which will be further discussed in the next section.

3.1 Enterprise Architecture to systematically decompose SW project challenges

An electronic trade facilitation and Single Window project is complicated due to the many facets and challenges, e.g. inter-agency collaborative issues among different stakeholders and agencies, complicated procedures and document requirements, organizational and human resistance to change, islands of non-interoperable information systems, electronic-document system development, laws and legal challenges, security and business continuity issues as earlier mentioned and illustrated in Figure 1.4. An effective and intuitive approach to handle such a situation is to systematically break down those large and complex problems into smaller components.

The holistic Single Window Implementation Framework (SWIF)[25] provides the instruments to analyse these problems. It can support policy managers and stakeholders in their decision-making and in managing Single Window planning.

SWIF itself is an adaptation of an enterprise architecture concept. The enterprise architecture model that provided the basis of this *Guide* is "The Open Group Enterprise Architecture Framework", TOGAF[26] , an internationally recognized framework to manage large-scale information projects.

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[25] The Single Window Implementation Framework (SWIF) has been developed in cooperation by Markus Pikart (UNECE), Thayanan Phuaphanthong and Somnuk Keretho (Kasetsart University, Thailand), Wout Hofman (TNO), and Eveline van Stijn and Yao-Hua Tan (Vrije Universiteit Amsterdam) and is presented as the ITAIDE deliverable 5.0.4b, 2010. http://www.itaide.org/forms/document.asp?Q=14330 .

[26] The Open Group Enterprise Architecture Framework-TOGAF, www.opengroup.org/togaf/, suggests 4 architecture components, called Business Architecture, Data Architecture, Application Architecture, and Technology Architecture. In the literature Data Architecture and Application Architecture are referred to as Information System Architecture. The TOGAF Business Architecture includes business strategy, governance and organization, and business processes. For SWIF, we choose to split those challenges into 10 components.

3.2   Decomposition, Viewpoints and Blueprints

Similar to architectural concepts used for physical construction, SWIF suggests three key principles to guide the planning and implementation of complicated and large-scale projects, namely, decomposition, viewpoints and blueprints to be used for analysing existing environments and then proposing better future environments.

The "**decomposition**" concept is a very intuitive technique. A complicated and large-scale problem is systematically divided into several smaller and easier manageable components. When appropriate, it is recommended to visualize these components, the relationships among the components and other related governing issues, in **diagrams**, or so-called **blueprints.** These blueprints usually illustrate the current environment and/or the proposed future and improved environment**.**

As in construction and architectural design[27], the concept of **viewpoints** is a simple approach of showing and explaining the same topic but with different levels of detail and adapted to different target audiences. For example, viewpoints of the policy decision makers should not cover any technical descriptions but should rather concentrate on policy directions and economic benefits. Viewpoints for operational managers can include provide more information about business operations and management issues. Viewpoints for IT solution developers include detailed technology issues and are not suitable for policymakers.

When constructing a building, the architect will use different blueprints each with different levels of details to explain the same construction to different stakeholders. For example, a blueprint intended for non-technical users shows the interior design and functionality of the building. Another more complicated diagram may show the static building structure for communicating with civil engineers. Another sets of diagrams and blueprints explaining about the same building but with the information related to electricity and wiring are more suitable, of course, to communicate with electrical engineers. Likewise, in designing a National Single Window, several key components along with their associated diagrams and written descriptions should also be presented with the viewpoints suitable for the target audiences. Inspired by the concept of viewpoints, key critical development components of Single Window will be explained in the next section.

In applying the viewpoint concept, we can use different blueprints or just several types of diagrams/pictures for visualizing different angles of the Single Window project. Each diagram illustrates and emphasizes a specific target viewpoint. In particular for policy makers the viewpoint should be stable and it should convey a message that is easier to understand by the target stakeholders at their levels of interest.

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[27]   Blueprints (or diagrams) drawn by architects normally have several levels of details. Each blueprint may show different aspects of the same building construction but with just enough details for different target audience.

3.3   Key Components of Single Window

The SWIF suggests dividing the Single Window implementation challenges into 10 major components, where each component deals with a set of related issues relevant to different viewpoints.

To manage and implement the vision, e.g. the Single Window vision for better, faster, and cheaper trading across borders, into the realization of that vision, we need to understand the current conditions of these components, and then propose the blueprints for the target conditions of the 10 components.

The 10 components

- Stakeholder Requirements Identification and Management

- Stakeholder Collaborative Platform Establishment

- Single Window Vision Articulation

- Business Process Analysis and Simplification

- Data Harmonization and Documents Simplification

- Service Functions Design (or called Application Architecture Design)

- Technical Architecture Establishment including Standards and Interoperability

- Legal Infrastructure Institution

- Business and Governance Models Enforcement including Finance, Implementation and Operation Governance

- IT Infrastructure and Solutions Execution.

Figure 3.1 – Ten Critical Components for Single Window Development
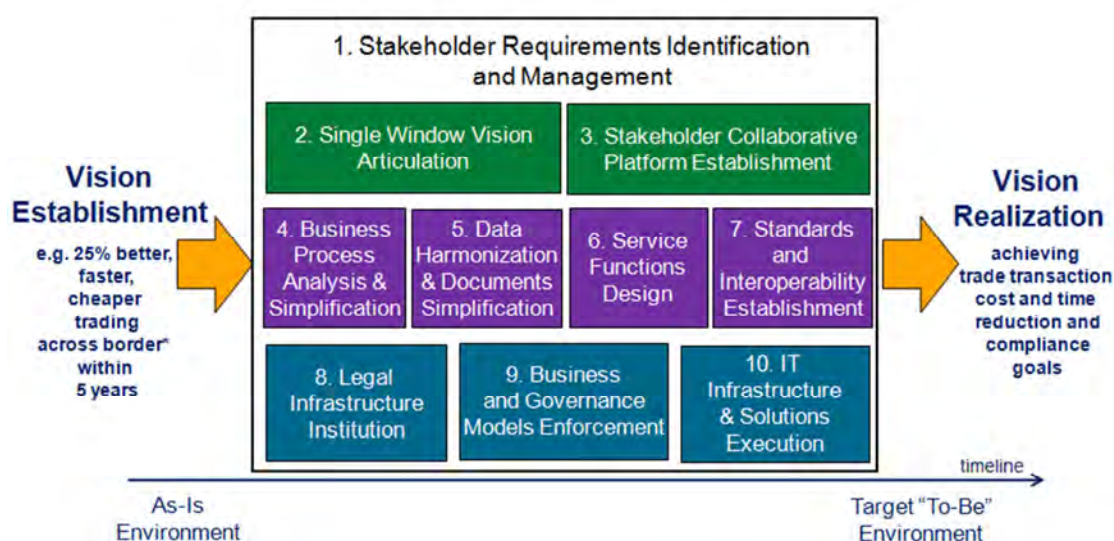
1) **Stakeholder Requirements Identification and Management**
   needs and requirements of stakeholders must be identified and managed effectively.

Stakeholders include policymakers, Government administrations, private-sector participants and citizens that have stakes in the cross-border trade. Typically, not all can be included in the first phase of Single Window development. Project managers will have to prioritize the different Government agencies and private sectors for inclusion in a specific project phase. For example, if the scope of envisioned Single Window is to interconnect electronic Customs Clearance systems with other Government agencies responsible for issuing different kinds of export/import-related permits and certificates, the requirements and objectives of these agencies needs to be analysed and their management must be involved in the project planning and steering. In the course of establishing the Single Window environment, all of the stakeholders' needs and requirements must be explicitly identified, negotiated, agreed and fed into all development phases of the Single Window.

2) **Single Window Vision Articulation**
   vision and value proposition, political will and the strategy must be well articulated, validated for its substantive value, and then securely mandated by the right authorities and sponsors.

The Single Window vision must be proposed, agreed and articulated by high-level policy managers. The continuity of strong political will of the Government and the business community to implement a Single Window is one of the most critical factors for the success of the project.

Sustained support from high-level policymakers is very important for a long-term project as of Single Window as the availability and adequacy of resources to establish a Single Window is often directly related to the level of political will and commitment to the project. Establishing the

necessary political will is the foundation stone upon which all the other success factors rest.

Obtaining this political will requires proper dissemination of clear information on vision, objectives and value propositions, including implications, benefits and possible obstacles.

Using the architecture concept, we need to understand the current policy direction, analyse its gaps and weaknesses, and propose a better direction. For example, if no vision related to trade facilitation and Single Window initiative has been formulated and approved by the high-level policy decision makers, the policy managers must develop and propose such a vision.

3) Stakeholder Collaborative Platform Establishment
establishment of a lead agency, inclusive membership and participation and effective inter-agency collaborative platform and participation of the business community.

Apart from the need for political will, the project will need a strong, resourceful and empowered lead organization to launch it and see it through its various phases. This organization must have the appropriate political support, legal authority, human and financial resources, and links with other relevant Government agencies and the business community. In addition, it is essential to have a strong individual within the organization who will be the project "champion".

A Single Window is a practical model for cooperation between agencies within Government and also between Government and trade. It presents a good opportunity for a public-private partnership in setting up and operating the system. Consequently, representatives from all relevant public- and private-sector agencies should be invited to participate in developing the system from the outset.

This should include participation in all levels of the project, from developing the objectives, situational analysis, and project design right through to implementation. The ultimate success of the Single Window will depend critically on the involvement, commitment and readiness of these parties to ensure that the system becomes a regular feature of their business process.

The most powerful stakeholders must be identified early such that their input can be used to shape the future direction of the Single Window. Support from the powerful stakeholders will help the engagement win more resources, thus making the implementation more likely to succeed.

Communication with other stakeholders early and frequently is very important. A more formal collaborative platform, e.g. a SW steering committee including supportive working groups with representatives from concerned regulatory agencies and related business associations should be established to create an environment for effective interagency coordination and collaboration[28].

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[28] For more information about inter-agency collaboration, please refer **to "Harnessing Interagency Collaboration in Inter-organizational Systems Development: Lessons Learned from an E-government Project for Trade and Transport Facilitation,"** **authored by Thayanan Phuaphanthong, Tung Bui, and So**mnuk Keretho, the International Journal of Electronic Government Research (IJEGR), Vol. 6, No. 3, July-September 2010.

4) Business Process Analysis and Simplification
current business process are analysed, and target business process for easier and more
compliance trading across borders are proposed, agreed upon and implemented.

Business Process Analysis is the first step towards automating processes and documents.[29] It
comprises the systematic analysis of the procedures and information flows in cross-border
trade, an analysis of their weak points and delays, recommendations for improvement, and a
description of the business processes and information flows after the improvement.

The proposed future procedures are well documented, simplified, faster, and more secure. This
is a precondition for the introduction of electronic-based transactions with electronic
documents submission, automatic information exchange and information management through
the SW.

5) Document Simplification and Data Harmonization
analysis simplification and standardization of trade documents and trade data,
development of data models and electronic documents and messages.

According to statistics published by the APEC Business Advisory Council (1996), each
international trade transaction requires an average of 40 documents to meet rules and
regulations set for international trade and transport. These documents are made up of
approximately 200 data elements of which 15% are repeated at least 30 times and 60-70% are
repeated more than once.

Such requirements are costly and a major cause of delays in international trade transactions. A
study by the European Commission states that the costs of complying with document
requirements account for 3.5-7 % of the value of goods (OECD, 2002). It can be as high as 10%-
15%, if there are typing and other errors (UNCTAD, 1994).

Simplifying and harmonizing trade documents and data can significantly reduce time and costs
of international transactions. Simplification of the trade documents includes an analysis of
whether a document is really needed to perform a given business process and whether several
distinct trade documents with a similar function can be combined into one single document.

Document alignment is the standardization of the information in the trade documents to
international terms and descriptions, the use of international code lists such as country and
currency codes for the information and the alignment of the layout of the trade document to
international standards.

Data harmonization is the analysis of information in a set of trade documents to identify those
information objects which are shared between Government agencies. It leads to the use of
common definitions (semantic) for the information objects which are recorded in a data
dictionary. The definitions are from the viewpoint of business domain managers. The data

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[29] *"Business Process Analysis to Simplify Trade Procedures",* UNNExT-UNESCAP/UNECE publication, 2010.

model is a holistic view of all information that is processed by the different agencies private-sector companies that participate in the Single Window.

The definition and structures used in a data model are based on the data dictionary but are on a much more detailed and precise level. They represent the viewpoint of IT solution providers and software engineers. The data model is then used to develop the data structures for the electronic trade documents and messages that are exchanged through the Single Window and for the connectivity of the in-house IT systems in the Government agencies with the Single Window.

The outputs of the document simplification and data harmonization component provide a stable platform for developing IT solutions. They are also a precondition for creating common understanding on the exact type of information that needs to be exchanged between the different private sector parties and Government agencies that participate in the cross border trade. It is therefore also an important tool to enhance collaboration between the stakeholders.

Data harmonization is a complex subject area which is new to many decision makers in Government agencies. UNECE and UNESCAP have developed Guides and specific training programmes on document simplification[30] and data harmonization[31] for the Single Window to support policymakers in designing and managing data harmonization projects.

6) Service functions design
    design, agree and develop services and functions provided by software applications
    of the Single Window

Service functions design is often also referred to as application architecture.[32] It provides a blueprint for describing services and functions of the Single Window software systems. This blueprint includes the different sub-systems and components of the software solution, their interactions, and their relationships to the core business processes of the Government agencies and business users.

This blueprint, shown preferably with diagrams and associated descriptions, can be used for easier discussion, refinement and agreement among key stakeholders and target users. Then the master plan for implementation and deployment can be further developed with reference to this baseline.

The more detailed design of the system needs to be attuned to the real ICT capacities of the traders and the Government agencies. The maximum number of users should be able to access the Single Window from the moment it is launched. In many cases, this may dictate the use of a semi paper-based and electronic system or a dual paper/on-line approach.

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[30] UNNExT Guide for the Design of Aligned Trade Forms for Paperless Trade (ECE/TRADE/372) at
     http://www.unece.org/fileadmin/DAM/trade/Publications/ece_372_ManualForDesignAlignedTradeForms.pdf .

[31] UNNExT Data Harmonization and Modelling Guide for Single Window Environment at
     http://www.unescap.org/unnext/tools/data_harmonization.asp .

[32] A very high-level application architecture example is shown in Figure A.1.

Accessibility and user-friendliness are also key factors for the success of the project. Comprehensive operating instructions and guidelines should be created for users. Help Desk and user support services including training should also be created, especially in the early implementation phase of the project. The Help Desk can be a useful means for collecting feedback information on areas of difficulty and bottlenecks. The need for and value of practical training courses for users cannot be over-emphasized, especially in the early stage of deployment. In some economies, the issue of multilingual requirements might need to be addressed.

The development of a Single Window does not presuppose the existence of or requirements for a sophisticated computerized information system for receiving, storing and sharing information. Clearly, information technology can have a huge positive impact on the potential for sharing information in a Single Window context, and this is the more common approach in Single Windows. When considering the technical requirements for a Single Window, the value of and investment in existing legacy systems should be respected. Although it may sometimes be necessary to replace such systems, a practical approach for sharing and exchanging information between agencies may well be to create a central portal or gateway.

7) Technical Architecture Establishment including Standards and Interoperability
   open and internationally recognized technical standards, interoperability and communication protocols must be adopted.

The success of a Single Window greatly depends on the ability of its components to interoperate and exchange information with each other electronically. Document simplification and data harmonization already provide an important standardization component. Common standards, data protocols and approaches are required to ensure data and procedural interoperability between the different IT platforms connected to the Single Window. This requires agreements on standards for communication protocols[33], security and authentication and electronic information structures such as semantic standards, data models and message structures.

8) Legal Infrastructure Institution
   enabling electronic transaction laws and related regulations to ensure the legitimacy, trust and confidence in electronic transactions must be institutionalized.

Establishing the necessary legal environment is a prerequisite for Single Window implementation. Related laws and legal restrictions must be identified and carefully analysed. For example, changes in legislation can sometimes be required in order to facilitate electronic data submission/exchange and/or an electronic signature system. Further, restrictions concerning the sharing of information among authorities and agencies, as well as organizational arrangements for the operation of a Single Window, may need to be overcome. Also, the legal issues involved in delegating power and authority to a lead agency need some analysis and appropriate resolution.

The legalization of electronic documents and data exchange needs to be established. Many economies with Single Window facilities have enacted several related laws and regulations, e.g. Electronic Transaction Law, Digital Signature Law, Computer Crime Law, and Data Privacy Law.

The Electronic Transaction Law should be enacted within an economy to promote the use of electronic transactions as another legal method of transaction and to recognize the legitimacy of the electronic documents as well as other processes including the endorsement of the methods of sending and receiving electronic documents, the use of electronic signature, and the admissibility of evidence in the form of electronic documents.

The legal concepts of the Electronic Transaction Law can be based on the UNCITRAL Model Law on Electronic Commerce and the UNITRAL Modal Law on Electronic Signature[34]. The compelling reasons for enactment were to get rid of legal obstacles to the use of modern means of transactions and to lay down legal principles for computer-based communications.

9) Business and Governance Models Enforcement
   financial and business model decisions involving cost-benefit analysis, investment and operation cost, and the sustainability of Single Window, including governance mechanism for monitoring, ensuring and enforcing the implementation and operation of Single Window systems must be analysed, designed and implemented.

The financial and business model must support sustained operation of the Single Window at the required service level. Relevant issues include proper mode of investment; analysis of appropriate funding models and investors (e.g. options of investment by public sector only, private sector only, or joint public and private partnership, or international organizations), fees for services, decision on the agencies providing the services and their managerial and institutional structure, estimation of budget and overall benefits to be arising from investment on the national and regional levels.

A mechanism must be created for monitoring the implementation, deployment, and operation of the Single Window and its subcomponents to ensure the successful establishment and also the conformance with the agreed requirements, policies and plans. Section 5 of this guide provides an introduction to financial and business model analysis for Single Window projects.

10) Information Technology Infrastructure and Solutions Execution
   technology infrastructure, system and hardware development, software development, deployment and security are designed, implemented and executed.

Technology architecture describes the software and hardware development and deployment for the systems described in the Application Architecture. The technology architecture includes a detailed and technical description of business processes, electronic data and documents, and application services of the future Single Window platform.

Policy managers and policy decision makers may not deal in many details with the complex issues of designing and implementing the IT infrastructure and software systems. Usually this task is left to highly specialized IT solution providers.

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[34] The UNCITRAL Guide to Enactment of the Model Law on Electronic Commerce 1986 and the UNCITRAL Guide to Enactment to the Model Law on Electronic Signatures 2001.

However, policy managers need to identify and monitor key issues in the IT infrastructure development. Important technical tasks in developing a Single Window system are for example reviewing existing technical systems in Government agencies and PCS for receiving, storing and exchanging the relevant information, determining overall technical requirements, development of interfaces to existing legacy systems for Single Window connectivity, determining if the existing systems will be able to handle increased in the data volume, and examining issues related to the storage, verification and authentication of data.

This section has discussed the critical components to develop a Single Window and some of the challenges linked to them. In the next section, we present an approach how to implement these components.

3.4   A methodology to develop the components of the Single Window

This Single Window Implementation Framework (SWIF) recommends implementing the project by establishing a development cycle, concentrating around those 10 critical components as described in the previous section. SWIF explains how these 10 components can be developed. This cycle is graphically shown in Figure 3.2[35]. It consists of the same 10 components as discussed in section 3.2, and an additional preliminary component that describes the start of the SW project idea.

Figure 3.2 – SWIF Single Window Development Methodology

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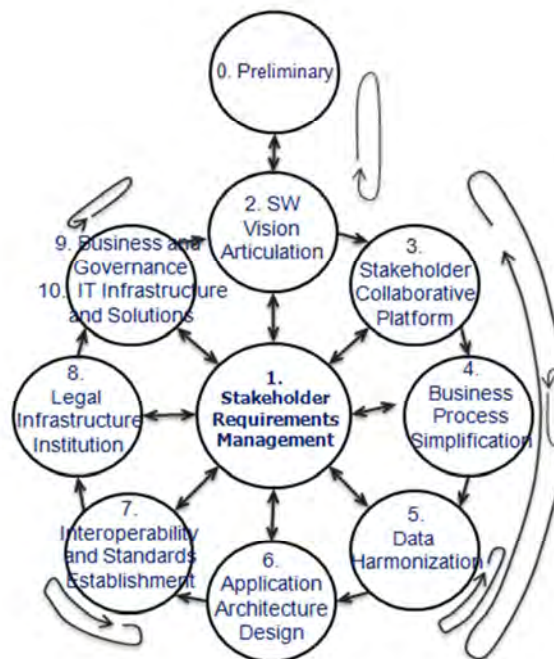
[35]   The same 10 components as described in section 3.2, but Component 0 – the Preliminary component is added for the obvious reason (meaning for preliminary, of course).

In Table 3.2 at the end of this section we have listed the different objectives, activities and outputs for each SWIF component.

Objectives, Activities and Outputs

Table 3.1 summarizes key objectives, activities and outputs in the development of each component. All of those objectives and outputs are not necessarily implemented by policy managers but by specialists in different areas. It is, however, the policy managers' responsibility to commission each of these activities to experts with the relevant skills and to monitor progress and ensure compliance with relevant policy directives, the Single Window Master Plan, and recommendations. The managers need to understand at least what the activities and outputs are and why they are important. They will not necessarily know about the "how-to" which normally can be led by specialists. As already mentioned, UNECE and ESCAP can also provide specialized training and advisory services to Governments for selected components of the SWIF.

Table 3.1 - Single Window Development Components, Key Activities and Deliverables

Components	Objectives	Activities	Deliverables/Expected Results
0 **Preliminary**	• Undertake the preparation and initiation activities, set up the initial task force, and conduct a preliminary study on the existing environment and exploring possible Single Window environment and its initial value propositions	• Designate an initial task force to conduct a preliminary study on the existing environment and exploring possible Single Window environment and expecting benefits, e.g. those enabling by transforming some concerned paper-based transactions into e-documents and information-exchange platform • Make use of existing facts and figures on benefits of trade and transport facilitation and Single Window • Draw on relevant policy directives and recommendations of international and regional forums • Obtain initial political will for Single Window Engagement	• A concept paper with the purpose to facilitate initial discussion on the topic and obtain approval to go forward for a more in-depth study into the need for, approach to and feasibility of a Single Window. • Identification of key benefits of the Single Window • Top level performance indicators for Single Window • Lead agency appointed to develop a more detailed feasibility study including the SW Vision, and other key components

Components	Objectives	Activities	Deliverables/Expected Results
1 Stakeholder Requirements Identification and Management	• Identify and manage the requirements of stakeholders such that every stage of the Single Window development project is based on and validated against its requirements and target objectives	• Identify stakeholders' requirements • Manage stakeholders' and other requirements change requests and assess their impact • Determine whether to implement change or defer it to the later Single Window development cycle • Ensure consistencies of related work products, developed architectures and components with the requirements and objectives of the Single Window	• List of stakeholders' requirements • Consistency and validation of stakeholders' requirements with actual Single Window implementation is achieved.

Components	Objectives	Activities	Deliverables/Expected Results
2 **Single Window Vision Articulation**	• Create and articulate joint vision, goals and scope of Single Window • Secure the political will and necessary resources	• Elaborate and refine broad vision, strategy, objectives, and goals of the Single Window • Define the scope of Single Window Implementation and constraints in terms of resources and competence availability • Define value proposition of the Single Window and demonstrate its relations to stakeholders priorities • Identify a set of key performance indicators that will serve as target quantitative goals to measure the success of the Single Window implementation • Develop a high level master plan that describes overarching strategies for the overall project execution and a series of sub-projects that will gradually enable the full-scale operation of Single Window • Obtain the political will and commitment from the Government authority and key business representatives for Single Window Implementation • Secure formal approval and initial funding for project implementation	• A high-level project management group with key stakeholders established • An initial high level master plan that defines project components, activities and deliverables • Key performance indicators that measure project performance established • A high-level master plan approved • Top level mandate to develop a Single Window, for example, by a formal decision of Prime Minister, President or the Cabinet • Initial finding for funding project components secured

Components	Objectives	Activities	Deliverables/Expected Results
3 Stakeholder Collaborative Platform Establishment	• Establish necessary environment for stakeholders' coordination and collaboration throughout the Single Window project lifecycle • Ensure that major stakeholders are committed to make the project a success	• Identify stakeholders of the supply chain • Define roles and responsibilities of stakeholders as well as their individual objectives, requirements, and concerns • Create the environment for interagency coordination and collaboration in the later phases of Single Window implementation • Assess stakeholders' readiness for Single Window implementation • Conduct a review on stakeholder IT systems that are of relevance to the project	• An effective stakeholder/interagency collaborative platform is established, e.g. Single Window steering committee, and working groups with representatives from key Government and business stakeholders.

Components	Objectives	Activities	Deliverables/Expected Results
4 **Business Process Analysis and Simplification**	• Analyse existing business processes • Identify bottlenecks • Redesign, simplify, propose and seek approval of the relevant business processes	• Elicit, document, and analyse the existing a export, import, and transit business processes as well as corresponding information flows and the trade documents used • Develop business case scenarios and analyse potential benefits to convey to stakeholders • Develop, propose, and seek approval for efficient business processes and a list of actions required to be carried out prior to adopting them • Start initial activities to establish an enabling legal infrastructure for Single Window	• Analysis of Business Processes and documents used by the Government agencies and private sector • Agreements on simplification of processes and related documents • Agreements on the business processes and data to be automated

Components	Objectives	Activities	Deliverables/Expected Results
5 **Data Harmonization and Document Simplification**	• Simplify, harmonize and standardize data and documents used in the business processes • Develop the structures for electronic • Messages	• Identify relevant standards for harmonization and standardization of data • Identify data elements used in the business processes that are supported by the SW • Describe each data element in terms of their definition, source, type, representation format, and constraint using relevant international standards • Simplify and align data requirements used in different but related documents • Analyse data elements across various documents/messages and organize them in a comparable manner • Map data elements to a reference data model (e.g. WCO data model as appropriated)	• Agreements on standards, tools and techniques to develop, publish and maintain data elements and document templates. • Simplified and aligned documents • Published national data model and message structures for electronic data interchange with the Single Window

Components	Objectives	Activities	Deliverables/Expected Results
6 Service Functions Design (Application Architecture Design)	• Design and agree on the major functions of the proposed application architecture that should be provided by the application software necessary to process the data and support business processes	• Provide a detailed analysis of the main existing (if any) in-house application systems including their relevant functions, and capabilities that will be linked to the Single Window • Identify main services to be provided by the Single Window for the connected agencies • Design a high level Application Architecture (or the overall Single Window subsystems and their interconnection) that will deliver the Single Window services • Formulate a basis for estimating resources needed for implementing, deploying, and operating the Single Window	• Documentation of the existing application architecture • Agreed Descriptions with Diagrams (so called blueprints) of the target "to-be" Single Window Applications Architecture, at least at the high level, then to be further developed in details at the technical solution architecture execution.
7 Standards and Interoperability Establishment	• Establish common technical standards, e.g. communication protocols, security and authenticity mechanism, and data schemas, to ensure the interoperability and electronic information exchange among systems with different IT platforms.	• Identify technical interoperability requirements • Select open and international standards to enable technical interoperability among different involved ICT platforms • Agree and mandate the usage of these interoperability and security standards and technical protocols for the implementation of any Single Window subsystems	• Commonly-agreed technical interoperability protocols and standards

Components	Objectives	Activities	Deliverables/Expected Results
8 Legal Infrastructure Institution	• Create and institutionalize the required legal environment for the operation of a Single Window	• Assess existing legal environment and identify gaps • Initiate changes in the legal environment • Develop and enact any necessary legal laws and regulations for the Single Window, e.g. e-Transaction Law, Digital Signature Law, Data Privacy and Security, and Cyber Crime Law.	• Necessary laws and regulations, e.g. electronic transaction laws and computer crimes laws and regulations are enacted along with necessary cyber-law-related practical guides, if needed.
9 Business and Governance Models Enforcement	• Conduct business model analysis including finance, cost-benefit analysis, risk analysis, and governance mechanism. • Develop the high level implementation plan • Secure the necessary budget and drive the implementation of the plan • Provide oversight for the Single Window implementation and operation.	• Analyse cost benefits, risks, financial and operational models for the establishment and sustainability of the Single Window • Develop the high level implementation plan • Secure the necessary budget for implementation • Oversee the project management groups who manage the allocation of budget and administer the implementation of the Single Window sub-systems • Formulate policies and recommendations (i.e. those related to procurement, contractual agreement, service quality, and charges) to govern the implementation, deployment, and operation of Single Window • Perform governance functions while Single Window sub-systems are being developed and deployed	• Cost benefit study analysis including business models, investment cost, operational cost, cost-benefit analysis, and governing mechanisms for Single Window implementation and operation, and then the final decision on the appropriate model should be reached and mandated by the right authorities. • High-level master plan developed and agreed. • Governing mechanisms to manage and oversee the Single Window implementation and operations

Components	Objectives	Activities	Deliverables/Expected Results
10 IT Infrastructure and Solutions Execution	• To oversee and monitor the design of the hardware and software solutions of the Single Window which will be the basis for implementation • Commission and/or oversee the procurement, development and operation of the IT systems and software solutions	• Oversee the analysis and design of logical software, hardware, as well as IT and network infrastructure required to support the implementation, deployment, and operation of Single Window	• Blueprint of the future Single Window applications and technology architecture to be implemented • The Single Window plan is implemented and monitored.

In conclusion, this section describes Single Window Implementation Framework (SWIF), an architecture concept that decomposes the challenge of decomposing a Single Window into 10 key components. SWIF also provides a development methodology along with objectives, activities and deliverables to plan and oversee the implementation of the Single Window.

However, in real life projects the development of the Single Window components is not smooth and straight according to plan and sequence as described in the table. Deliverables or the expected results of each component are unlikely to be completed and commonly agreed in just one shot or just one workout. Due to the size and complexity of the project and the particular interests of the many stakeholders and the resource constrains and policy dependencies it is likely that there will be parallel activities and iterations in the development of Single Window components and outputs. The development cycle or loop, intentionally as shown in Figure 3.2, is iterative in nature, over the whole cycle, between two components, and within each component.

This iterative development provides an additional challenge that the managers of the SW project need to address in their approach. The next section recommends an iterative and phase-by-phase Single Window project management strategy which helps policy managers to deal with the dynamic of the project and ensure the delivery of the Single Window components that have been described in this section.

4. Single Window Project Management

The objective of this section is to propose an overall Single Window project management process with five recommended phases to assist the policy managers in the policy formulation, planning and overseeing of the electronic Single Window projects. This stepwise process consists of five phases and their associated deliverables. In each phase, the 10 key components as described in the Single Window Development Framework (Section 3) will be revisited and further refined iteratively.

Because of the iterative nature of Single Window development, Figure 4.1 recommends a stepwise project-management approach to assist policy managers in how to manage the analysis and design, how to formulate a high-level Single Window project master plan, and how to monitor and oversee the implementation of a Single Window project.

Referring to Figure 4.1, a preliminary study (inception in Phase 1) and then a more detailed feasibility analysis (elaboration in Phase 2) are recommended. After these two phases of analysis, a high-level master plan (planning in Phase 3) for Single Window implementation could be confidently formulated in the third phase to define clear paths for development and deployment of the target Single Window. The oversight phase for the execution of the Single Window project development plan is to be conducted in the fourth phase (development/deployment oversight in Phase 4). The fifth phase addresses the issues about lessons learned and feedback for possible future improvement (lessons-learned and feedback for future improvement in Phase 5).

Figure 4.1 - SW Project Management Process in Five Phases
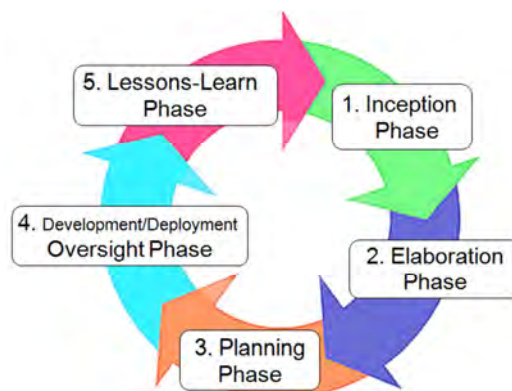
A **preliminary study**, the so-called **Inception Phase** (described in section 4.1), is recommended to be conducted as an initial preparation when an economy starts to think about the possible implementation of a Single Window or its further improvement. A concept paper is developed to facilitate initial discussion on the National Single Window among key stakeholders and sponsors, and to obtain approval for an in-depth study on the need for, approach to and feasibility of a Single Window.

This initial concept paper is not intended to seek agreement for the implementation of a Single Window. Based on the concept paper, a meeting or more should be conducted among high-level key Government representatives, relevant business associations and potential sponsors to discuss the Single Window concept.

In the following **Elaboration Phase** (described in section 4.2), a more detailed Single Window feasibility study is developed and a Project Management Group set up comprising senior representatives of the key agencies who will be directly involved in implementing and utilizing the Single Window is established.

In the **Planning Phase** (described in section 4.3) a high-level Single Window master plan is developed that describes the objectives of the Single Window project, their key performance indicators and the strategies and outputs for developing the Single Window components.

The **Deployment Oversight Phase** (described in section 4.4) focuses on the oversight of the implementation of the system components.

During the **Lessons Learned and Feedback Phase** (described in section 4.5) the project participants review their experiences and discuss opportunities for improvement for the next phase of the SW development.

4.1   Phase 1: Inception for Developing the Initial Concept Paper[36]

An inception phase (preliminary study) should be conducted as an initial preparation at least for two occasions, i.e. when an economy starts to think about initiating an electronic trade facilitation and Single Window project, and when an economy thinks about the possible extensions of the existing Single Window.

The inception phase often starts with the preparation of a concept or briefing paper, based on some initial research. This work is usually undertaken by the lead Governmental authority or agency, consultants, private organization or a special task force, likely to be heavily involved in the eventual implementation of the project.

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[36]   This part is adapted from UN/CEFACT Recommendation No. 33 (2005), but also includes references to the SW development cycle of section 3.3.

Such a paper usually describes the overall objectives and potential benefits of a Single Window. It would present a general overview, an initial vision and scope of what would be involved in the implementation. The paper typically focuses on the practical issues involved and would avoid excessive technical jargon or in-depth discussion of technical concepts.

Figure 4.2 - During the inception phase, several components related to SW implementation will be analysed but with light depths of coverage as illustrated graphically.

As illustrated in Figure 4.2, the preliminary study of the inception phase normally covers the analysis of several components of the Single Window on a rather high level. Stakeholder requirements, value proposition, possible collaboration among stakeholders, analysis of some key business processes and documents handling, and expected benefits of a Single Window are among the topics that need to be addressed in the concept paper. The other components as shown in Figure 4.2 should also be analysed but normally at even higher levels of perspective.

To be able to suggest any reasonable vision and scope, an initial analysis should be conducted to understand the current environment concerning few but strategically important import/export, transit and transport processes and documentation requirements by a designated task force. This is an attempt to identify bottlenecks in some trade and transport procedures, delays and any complicated documentation, and looking particularly for areas of possible improvement.

The policy managers and concerned stakeholders within the task force can compare the current trade environment of the target economy with some best practices—for example, by comparing the key performance indicators of the national economy with the performance indicators of other countries as explained in section 1 or the current evolution stage of the national Single Window with a roadmap as explained in section 2.

Following the preparation of the concept paper, a meeting would typically be organized for high-level representatives from all relevant trade-related organizations, and Governmental authorities and agencies to discuss the Single Window concept on the basis of the concept paper. The objective of such a meeting is to obtain agreement on the project concept and to launch a detailed feasibility study that would include more detailed needs analysis and a technological assessment.

The political will to support the implementation of a Single Window is a prerequisite for its success. Presuming that a positive decision is reached to proceed with the feasibility study, the meeting should establish a **Project Management Group** made up of senior representatives of the key agencies who will be directly involved in implementing and utilizing the Single Window.

This Group should have the power to commit funds to the project, make resource allocation decisions and commit their organizations to participating in the project. A draft text of "Objectives, Responsibilities and Terms of Reference" should be drawn up for the Project Management Group ahead of time, and agreed upon at the meeting.

One of the recommended techniques to convince the high-level policy decision makers is **to align the vision**, scope and benefits of the implementation project with the national economic and social development goals.

A good strategy to propose a convincing vision to the high-level policy decision makers is to provide some quantitative indicators and goals along with some compelling reasons why electronic Single Window projects should be supported, mainly as a vision-enabling solution. Best practices and good case examples of many economies could be used, and then the feasibility study could be conducted for the specific context within the economy.

An example of the vision is following.

> *The national economic development goals for the electronic National Single Window Project:*
>
> ***25% Better, Faster, and Cheaper in Trading Across Border Indicators within 5 years***
> *(indicators as collected by World Bank's Doing Business Survey).*
>
> > *25% better means more effective and efficient in security, control and compliance*
> > *25% faster means fewer days, and fewer steps - simplification in export/import/transit-related procedures and documentation,*
> > *25% cheaper means fewer trade and transport transactions, and operation costs*

For example, a quantitative target of reducing the number of days for exporting a standardized cargo (referencing to the World Bank's Trading Across Border indicators) to reduce from 24 to 15 days within 5 years, was mandated by the Cabinet of Thailand in 2005, and the trade transaction cost reduction target proposed was 0.5 per cent of GDP[37].

Noticeably, at the initial and early level of conceptualization, the vision and scope of the national Single Window project are just a rough approximation. More clear vision, goals and scope needs to be further examined. A detailed feasibility study can be conducted and then the working team revisits and readjusts the vision and its quantitative goals, this time with more supporting evidence.

In conclusion, **the objective of the inception phase** is to develop a conceptual paper and to facilitate initial discussion on the topic and obtain approval for a more in-depth feasibility study into the need for, approach to and feasibility of a Single Window. Several key components need to be studied and described at least at the high-level perspective, e.g. including the current and future business processes, document requirements, legal infrastructure, initial application architecture, as well as some management and technical issues.

4.2 **Phase 2: Elaboration phase** for Conducting the Detailed Feasibility Study

The detailed feasibility study is a key element of the overall Single Window analysis and development. It should determine the potential scope, the user needs, possible scenarios for implementation, potential for and nature of a pilot implementation, resources required (financial, human, technical, etc.), potential benefits and risks, a time frame, and an implementation and management strategy. It is strongly recommended that this study should be based on direct face-to-face interviews with key players in both Government and trade, complemented by questionnaires to collect information from a wider circle of potential participants and users.

The objective of the elaboration phase is to conduct a detailed feasibility study to provide decision-makers with an insight into the options available and their impact. The study should:

- provide advice on which option is preferable and feasible for the economy;
- point out how the implementation should take place
  (i.e. full or phased implementation)
- indicate the possible steps for a phased implementation;
- describe the nature and extent of an initial pilot implementation;
- present the potential for revenue collection (fees, duties, etc.);
- identify key deliverables;
- recommend a timetable for development and implementation.

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[37] The target was reached by the year 2009 because of the paperless Customs and partial deployment of National Single Window, as also described in "**The Single Window Implementation Framework (SWIF),**" Markus Pikart (UNECE), Thayanan Phuaphanthong and Somnuk Keretho (Kasetsart University, Thailand), Wout Hofman (TNO), and Eveline van Stijn and Yao-Hua Tan (Vrije Universiteit Amsterdam), and ITAIDE deliverable 5.0.4b, 2010. http://www.itaide.org/forms/document.asp?Q=14330.

Figure 4.3 - During a detailed feasibility study in the elaboration phase, all components related to SW implementation will be analysed again but in greater detail than in the inception phase.
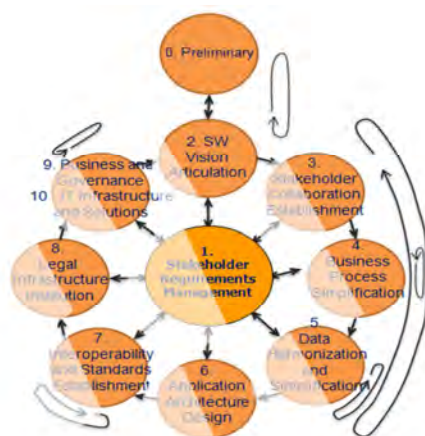
As illustrated in Figure 4.3, all key components suggested in the Single Window development methodology should be included in the detailed feasibility study. The topics of the study should include these 10 components. In particular, they should look into the current state of these components and provide a picture of how they need to be developed for implementing the project.

The findings of the feasibility study will have to be reviewed and approved by t**he Project Management Group**. Sufficient time should be allowed for this process as it is essential to have the maximum input and agreement before the report is finalized.

After the study has been accepted by the Project Management Group, and a preferred Single Window option and the accompanying implementation option chosen, these decisions should be presented to the wider Government and trade community. A good approach is to organize **a national symposium** on establishing a Single Window, where the findings and the options are presented and discussed. Such an exercise will help to ensure that important areas were not missed in the analysis and that the option proposed, including proposed pilots and/or phased implementation, has the support of the user community, before the final decisions are taken.

Table 4.1 - Suggested key topics and contents within a feasibility study report

Key topics	Suggested contents
Potential benefits of a Single Window	• Examine existing requirements and procedures for submitting import, export and transit documents and information to Government to: 　– Identify key Governmental authorities and agencies that can potentially be involved in the system. 　– Determine the extent to which it is possible to harmonize and simplify these requirements, procedures, information flows and documents. In particular, explore possibilities for ensuring the single submission of documents and information. • Consider the potential of the Single Window for addressing trade security issues. • Identify the needs of potential users, especially regarding the design of the eventual services and associated interfaces (either electronic or physical). • Consider "best practice" methods in existing Single Windows (e.g. as discussed in section 2 – the Single Window Reference Model). This may involve visits to operational Single Windows. • Consider the need for and approach to generating the required political support for the project.
Organizational aspects and collaborative platform	• Examine the overall organizational aspects of the proposed Single Window to determine: - Which Governmental authorities and agencies should be involved • Which Governmental authority/agency, or private organization should lead the running of the Single Window project - Government, private owner under Government contract or completely privately-owned by business (service provider - Should the Single Window be centralized or decentralized? - Should it be an active or passive program? - Should it include a payment system? - Should participation be voluntary or mandatory? - Should common risk profiles/compliance assessments be part of the system and should they be developed and/or shared? - If something goes wrong, who bears the risk? - Should implementation be phased?

Key topics	Suggested contents
Human resources and training	• Review and document existing human resources within the relevant Governmental authorities and agencies for the project development, implementation, and operation, and consider training additional staffing and management requirements related to the implementation of the Single Window
Legal infrastructure	• Review the legal issues, privacy legislation and data-protection laws associated with implementing a Single Window, including the submission of electronic information by traders, the exchange of information between Governmental authorities and agencies, and issues related to the use of electronic signatures . Note: Exchange of information between Governmental authorities or agencies requires an appropriate statutory gateway. Exchange of information between Governmental authorities or agencies is often restricted to trader consent, disclosure by order of a court, or in the public interest. Also, data protection legislation may affect the obtaining, use and disclosure of personal data.
Technical aspects	• Review existing technical systems for receiving, storing and exchanging the above information • Determine the overall technical requirements, including specific requirements for additional systems development, interfaces, outlets and the possible development of interface systems to existing legacy systems for the proposed scenarios. Determine if existing systems will be able to handle increases in the volume and flow of data. Examine issues related to the verification and authentication of data. Note: Creating a Single Window presents an ideal opportunity to consider the benefit of implementing related changes in the collection of information, such as those related to web-based technology

Key topics	Suggested contents
Information and documentation	• Review the existing set of trade documents in use and determine whether these need to be aligned, harmonized and/or simplified (preferably according to the UN Layout Key[38]). Determine what data will be required; how the data will be submitted; and in what format (electronic (EDI, XML or other) or paper) • Determine who can submit the data or documents (importers/exporters, Customs brokers, agents) • Determine how the data should be shared amongst participating Governmental authorities and agencies and where it should be stored, etc. • Consider how the data could be exchanged with administrations in other economies • Consider how the data could be used for risk analysis and other related purposes • Quantify the potential benefits of making better use of data held in commercial systems and records in meeting Government requirements and helping to reduce business compliance costs in the transmission of information Note: A minimum data set must be agreed upon among all parties, including the format, data fields and data elements. These should be in conformity with international standards (e.g. UNECE/ISO UNTDED and the World Customs Organization data model)[39].
Impact assessment	• Examine the potential impact of the project on existing systems, procedures, employment, job descriptions, etc. • Consider potential social and cultural issues that may arise in connection with creating the Single Window • Consider the potential response of groups or organizations that may perceive the Single Window as a threat (groups or organizations that may have a vested interest in maintaining the status quo) • Consider the possible impact of the Single Window on reducing corruption and the effect this may have • Recommend an appropriate change management strategy for the project

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[38]   **UNNExT *Guide for the Design of Aligned Trade Forms for Paperless Trade*,** UNNExT Publication, December 2011.

[39]   **UNNExT *Data Harmonization and Data Modeling Guide*,** UNNExT Publication, 2012.

Key topics	Suggested contents

Implementation options	• Develop implementation options, specifying proposed operational models, relevant Governmental authorities and agencies that would be involved, suggested lead Governmental authority or agency, or private organization, services to be provided, potential costs and benefits, and time frames for implementation
	• Suggest whether a full or partial implementation process should be undertaken. Factors to be considered relate to the availability (or lack thereof) of resources for full project implementation (financial, human, technical, etc), different levels of need of the relevant Governmental authorities and agencies and the significant difference in time and or resources required by different agencies to:
	    - Achieve the required legislative changes to operate a Single Window
	    - Develop, or modify existing legacy systems
	    - Generate the required level of commitment for project implementation
	• Make recommendations regarding a pilot implementation for the project.
	
	Note: In some cases, it may be worthwhile to opt for "staggered" implementation, with short-term enhancements that still deliver adequate benefits to make the project attractive to the trade, while moving closer to the desired (electronic) Government/trade system in the longer term. However, when adopting an approach in stages, initial infrastructural changes must support the long-term solution identified in the needs analysis and feasibility study. Also, short- or medium-term solutions must be properly and financially evaluated and assessed against strategic criteria before any decision is taken regarding implementation.

Business model (more details are suggested in section 5)	• Develop a business case for creating a Single Window under each proposed scenario, including an estimate of the initial and operating costs, value of the benefits, sustainability, possible mechanisms for revenue collection and sources of project financing • Determine the resources needed to complete the project from research to operation • Assess the extent to which resources from Governmental authorities and agencies, including central funding, would be required to develop a full project plan, the time scales needed to develop that plan and implement the project • Examine the potential for a public-private partnership approach to the implementation of the project, including revenue streams • Identify the key risks that the Single Window project may face; in particular, operational, legal, and infrastructural issues that could make it extremely difficult to deliver a solution at both a reasonable cost and a sufficiently attractive service level to encourage trade take-up.
Promotion and communications	• Recommend a promotion and communications strategy for developing and operating the Single Window. This is essential to keep all stakeholders informed and engaged throughout the project

Key topics	Suggested contents
Legal Infrastructure	• Review the legal issues, privacy legislation and data protection laws associated with the implementation of a Single Window, including the submission of electronic information by traders, the exchange of information between various Governmental authorities and agencies, and issues related to the use of electronic signatures Note: Exchange of information between Governmental authorities or agencies requires an appropriate statutory gateway. Exchange of information between Governmental authorities or agencies is often restricted to trader consent, disclosure by order of a court, or in the public interest. Also, data protection legislation may affect the obtaining, use and disclosure of personal data
Technical aspects	• Review existing technical systems for receiving, storing and exchanging the above information • Determine overall technical requirements, including specific requirements for additional systems development, interfaces, outlets and the possible development of interface systems to existing legacy systems for the proposed scenarios; Determine if existing systems will be able to handle (likely) increases in the volume and flow of data; Examine issues related to the verification and authentication of data Note: The development of a Single Window presents an ideal opportunity to consider the benefit of implementing related changes in the collection of information, such as those related to web-based technology

Key topics	Suggested contents
Information and documentation	• Review the existing set of trade documents in use and determine whether these need to be aligned, harmonized and/or simplified (preferably according to the UN Layout Key[40]). Determine what data will be required; how it will be submitted; and in what format (electronic (EDI, XML or Other) or paper) • Determine who can submit the data or documents (importers/exporters, Customs brokers, agents) • Determine how the data should be shared among participating Governmental authorities and agencies and where it should be stored, etc. • Consider how the data could be exchanged with administrations in other economies • Consider how the data could be used for risk analysis and other related purposes • Quantify the potential benefits of making better use of data held in commercial systems and records in meeting Government requirements and helping to reduce business compliance costs in the transmission of information Note: A minimum data set must be agreed upon amongst all parties, including the format, data fields and data elements. These should be in conformity with international standards (e.g. UNECE/ISO UNTDED and the World Customs Organization data model)[41]
Impact assessment	• Examine the potential impact of the project on existing systems, procedures, employment, job descriptions, etc. • Consider potential social and cultural issues that may arise in connection with the establishment of the Single Window • Consider the potential response of groups or organizations that may perceive the Single Window as a threat (groups or organizations that may have a vested interest in maintaining the status quo) • Consider the possible impact of the Single Window on reducing corruption • Recommend an appropriate change-management strategy for the project.

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[40] **UNNExT Guide for the Design of Aligned Trade Forms for Paperless Trade,** UNNExT Publication, December 2011.
[41] **UNNExT Data Harmonization and Data Modeling Guide,** UNNExT Publication, 2012.

Key topics	Suggested contents

Implementation Options	• Develop implementation options, specifying proposed operational models, relevant Governmental authorities and agencies that would be involved, suggested lead Governmental authority or agency, or private organization, services to be provided, potential costs and benefits, and time frames
	• Suggest whether full or partial implementation should be undertaken. Factors to be considered relate to the availability of resources for full project implementation (financial, human, technical, etc), different levels of need of the relevant Governmental authorities and agencies and the significant difference in time and or resources required by different agencies to:
	    - Achieve the required legislative changes to operate a Single Window
	    - Develop, or modify where necessary, existing legacy systems
	    - Generate the required level of commitment
	• Make recommendations regarding a pilot implementation for the project
	
	Note: In some cases, it may be worthwhile to opt for 'staggered' implementation, with short-term enhancements that still deliver adequate benefits to make the project attractive to the trade, while moving closer to the desired (electronic) 'joined up' Government/trade system in the longer term. However, when implementing an approach in stages, it is essential that initial infrastructural changes support the long-term solution identified in the needs analysis and feasibility study. Also, short- or medium-term solutions must be properly and financially evaluated and assessed against strategic criteria before any decision is taken regarding implementation.

Business Model (more details are suggested in section 5)	• Develop business case for establishing a Single Window under each proposed scenario, including an estimate of the initial and operating costs, value of the benefits, sustainability, possible mechanisms for collecting revenue and sources of project financing • Determine the resources needed to complete the project from research to operation • Assess the extent to which resources from Governmental authorities and agencies, including central funding, would be required to develop a full project plan, the timescales needed to develop that plan and to implement the project • Examine the potential for a public-private partnership approach to implementing the project, including revenue streams • Identify the key risks that the Single Window project may face. In particular, operational, legal, and infrastructural issues that could make it extremely difficult to deliver a solution at both a reasonable cost and a sufficiently attractive service level to encourage trade take-up should be identified
Promotion and Communications	• Recommend a promotion and communications strategy for developing and operating the Single Window. This is essential to keep all stakeholders informed and engaged throughout the project

4.3   Phase 3: Planning for formulating a Single Window high-level master plan

In the preliminary study and the detailed feasibility study, conducted in Phase 1 and 2. The Single Window vision, objectives, step, target states and associated issues have been commonly clarified and agreed. Thus, at the present phase the analysis of key Single Window components has already been conducted and some agreements about the desired functions and application architecture should be reached. We should now build on this agreements and common understanding and put them into sub-projects with tasks to define what to do and also with their appropriate schedules. A high-level or strategic master plan should be formulated to define clear paths for the development and deployment of the Single Window.

Over time, this master plan should be periodically aligned with changes in business objectives in order to remain as a strategic reference.

Figure 4.4 - During the SW high-level planning phase, all key components related to SW implementation will be revisited again but with perspectives of planning.
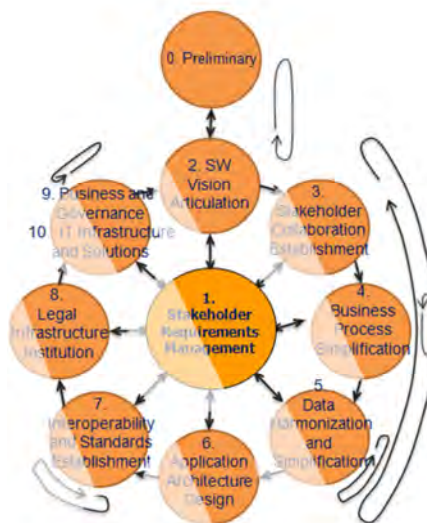
The Project Management Group should at this stage have already an approved feasibility study that provides a high-level implementation strategy for the architecture components. The high-level master plan builds on these components and provides a detailed plan and strategy on how to develop and implement these components.

The master plan is an important project management tool to plan, execute, monitor, evaluate, and adjust the project implementation. It should address the following:

- A clear statement of the project's scope, goals and objectives.

- A description of the architecture components to be developed and the deliverables, responsibility for delivery, time frame and milestones for completion.

- Definition of the roles and responsibilities of the various participants, including a clear agreement on who is in charge of the project (the project manager) and the level of authority of this manager.

- Specification of the management and monitoring responsibilities of the project manager and the line of authority and communication between the project manager, Project Management Group and the Task Force.

- A clear communication strategy for communicating with project stakeholders and potential users on a regular basis throughout the implementation, including an agreement on what information needs to be communicated with what groups and in what manner and at what frequency.

- A clear and agreed project budget, including financial and human resources; it is essential that the necessary funds and personnel be allocated to the project from the outset.

- A clear statement of the project risks (such as a cutback in budget, delay in required legal reforms, etc.) and an agreed response plan (to the best extent possible) to manage these risks, including contingency plans for high-level risks.

- Agreement on the criteria for measuring the project success.

- An agreed project review and feedback mechanism to provide on-going monitoring of the project process and to deal with any changes in the implementation that may be required.

As with the needs analysis and feasibility study, a decision on planning activities will have to be taken as to whether the work will be carried out by internal or external resources.

For external contracts, the tendering process will have to comply with existing governmental regulations, which vary from economy to economy. However, it is suggested that the process should be open, should have clear evaluation criteria agreed by the Project Management Group before the tender is issued (and included in the actual tender documentation), and the tender committee should include representatives of all key organizations involved in the project.

Suggested topics for the high-level master plan

Normally, a high-level master plan should cover the following:

- Analysis (as already covered in section 4.1 and 4.2)

    o Inception delivering a preliminary Analysis

    o Elaboration, delivering detailed and agreed feasibility study

- Development

    o Vision and objectives

    o Mapping business objectives and business processes to the environment

    o Data architecture

    o Application architecture

    o Technology solutions

    o Legal infrastructure

- Deployment

    o Change management

The analysis phase consisting of the preliminary study and the feasibility analysis are already discussed in some detail in the previous project management phases. At the time the high-level master plan is developed, the Single Window vision, key objectives, the high-level architecture and other related conditions have already been agreed upon. It will be sufficient to reconfirm and include them into the high-level master plan. Therefore the master plan will focus on the subprojects, tasks and schedules related to the development and deployment and the operational work.

Development includes formal design of strategy elements such as business objectives, process mappings to the current environments and the future environments, technical architecture and architectural principles. Especially, important elements of the strategy are the establishment of Single Window facilities, information and data exchange, new business procedures and electronic service functions. The master plan has to be formally specified for those mentioned topics.

Deployment includes organization commitment and change management to make this SW vision and its plan becomes reality. That includes production roll up, user training and adoption of the Single Window facilities.

Sample table of contents of a high-level Single Window master plan

The following list is a sample for a table of contents of a high-level Single Window Master Plan:

1. Executive Summary

2. Overview of the Single Window

   2.1.   Scope and objectives of the Single Window project
   2.2.   Expected benefits
   2.3.   Major components of the Single Window
   2.4.   Participating agencies

3. Implementation Strategies

   3.1.   Incremental development
   3.2.   Use of international best practices, recommendations, and standards
   3.3.   Business process improvement
   3.4.   Harmonization of data requirements
   3.5.   Provision of legal infrastructure
   3.6.   Stakeholder coordination

4. Stocktaking of Single-Window-related development so far

   4.1.   Single Window exchange systems
   4.2.   Business process analysis and simplification
   4.3.   Business model
   4.4.   Harmonization of data requirements

5. Institutional arrangements for project implementation, management and governance

   5.1.   Implementation
   5.2.   Management
   5.3.   Governance

6. Project schedule and budgets

The master plan can be drafted by a team of consultants or a designated task force, but should be reviewed and refined by stakeholders through several rounds of communication and discussions. The final version should be commonly understood by all relevant stakeholders, and then agreed by the senior-level project management group. It should be approved and funded by the government authorities or those high-level policy decision makers who have the resources and can grant sponsorship to the project.

4.4   Phase 4: Development and deployment oversight

In Phase 4 of the project management process, we suggest some approaches and tips on how to monitor and oversee the progress being made so that if there are any significant deviations from the project plan, corrective action could be taken. Within this *Guide*, we cover the discussion only from the perspective of policy managers.

After the master plan has been officially approved and funded, several levels of project management offices (PMOs) must be established and mandated to coordinate, manage and/or implement the different levels of the programmes and sub-projects to ensure long-term institutional support and operations. For a normal national Single Window project, this *Guide* recommends creating project management offices on at least three major levels:

1. political
2. strategic
3. operational

1. **Political level.** In many cases, the national economic and social development agency, or an organization in charge of overall national development planning and coordination, normally acts as the PMO or as the secretariat office for the political level with the main tasks of collaboratively planning and overseeing the progress of the overall Single Window implementation. The PMO team at this level takes the important role of monitoring the progress of the key deliverables of the SW project, providing quality checks and feedbacks, and reporting back to the senior-level stakeholders.

2. **Strategic level.** In many economies, the Customs Department (or other designated leading agency) is mandated to be the focal point at the strategic level. In this specific example, the Customs Department should establish a PMO team to manage and coordinate the various projects with other government agencies and business sectors. The master plan needs to be further refined and divided into several detailed plans led and coordinated by this strategic-level PMO. In this way, each participating government/agency will procure, implement and deploy its systems along with associated reforms that must align with the overall Single Window architecture.

3. **Operational level.** Each agency in charge of any specific sub-projects needs to have its own PMO to manage its individual projects, including detailed planning, implementation, deployment and operations of those projects.

Best practice in project oversight

A few tips and techniques could be used to monitor and control the development and deployment project. Basically, the project's documented plan is the basis for (a) monitoring

activities, progress and their deliverables; (b) communicating the status of the project especially those significant deviations if any, and (c) taking corrective action as appropriate.

Progress is primarily determined by comparing the actual work products, tasks, cost and schedule with the planned ones at prescribed milestones within the project schedule or with the work breakdown structures in the project plan.

Appropriate visibility showing the actual progress comparing with the planned items enables timely corrective action to be taken when performance deviates significantly from the plan. Normally, a deviation is considered to be significant if, when left unsolved, it precludes the project from meeting its objective. If the actual progress of the project deviates significantly from what is expected or if any alarming concern arises, the necessary corrective action must be taken.

Possible choices of corrective action may include simply communicating and escalating the issues to the policy makers; or "re-planning", which may involve agreeing on a new, revised plan including new schedules, establishing new agreements, and also preparing mitigation activities within this new current plan.

4.5 Phase 5: Lessons learned and feedback

The objective of Phase 5 is to collect the experiences and lessons learned of the project and to suggest improvements for the next part of the project. Since developing a Single Window environment is a long-term project, a concept of continuous improvement should be adopted using the experiences of the completed project phases.

4.6 Lessons learned: Advice from experienced Single Window project managers

The following contributions were made during United Nations workshops and seminars on Single Window, in particular the UNNExT workshops organized by UNECE and UNESCAP and the UN Global Conference on Single Window, which was organized by all five UN regional commissions.

We have summarized managerial experiences under three critical management issues. These issues often determine whether the project will succeed or fail, and also how fast or how effectively it will proceed.

Firstly, the national commitment or policy mandate is the most critical factor for the successful implementation of a Single Window.

Secondly, the policy mandate needs to be institutionalized. It is crucial that it be transformed into routine management mechanisms along with operational and financial support for those stakeholders involved in implementing and operating the Single Window.

Thirdly, an effective mechanism needs to be established for inter-agency collaboration and coordination among government agencies and private-sector stakeholders.

1. Securing the Single Window policy mandate

Political will related to the Single Window engagement and implementation must be created and mandated by the highest-level institution of the economy. This national commitment can be secured, if possible, by developing a national strategic plan related to national economic development, and obtaining endorsement by the highest political institution, e.g. the Prime Minister, the Cabinet, or the Head of State.

Another effective approach to gaining the interest and participation from the economy's leaders, high-ranking politicians and government officials, and also from key business leaders, is for the economy to access to regional, sub-regional or bi-lateral trade agreements and cooperation. For example, the signing of the Memorandum of Understanding (MOU) among the Heads of State to develop national Single Windows and a regional Single Window can secure the political commitment, necessary mandates, resources and funds at the national level.

The Single Window system should not only be embraced at the national level but also by regional organizations. For example, the 10 member nations of the Association of Southeast Asian Nations (ASEAN) have set an ambitious goal of establishing an ASEAN-wide Single Window. Plans call for integrating members' national Single Windows so that a single submission of data and information would suffice for the entire ASEAN region.

2. Institutionalization by transforming the political will into normal routine management

It is crucial to transform the policy mandates into normal routine management. Its practical implementation depends on the legal environment and institutional setting in a country. For example, the project management office at the political level may take a legal approach to institutionalize a national high-level committee or project management group for steering and overseeing the implementation. This institutionalization may be secured through the enforcement by the Cabinet's mandates and by laws. The national high-level committee may be supported by several working groups, government agencies, business sectors and academia. With the above national commitment and organizational mandates, the policy vision can be carried out and realized through the budgets to finance the project.

3. Establishing an effective inter-agency collaboration platform

Factors that are critical to ensuring the effectiveness of the interagency/stakeholder collaborative platform, as shown in Figure 4.5[42], include

1. shared goals and vision

2. a number of platforms for interaction both formal communication and informal communication

3. awareness-raising events

4. regular monitoring and reporting

5. formal commitments in terms of budget and investment

6. diplomatic and interpersonal skills of lead consultants.

Only some of these factors will be briefly discussed below.

Figure 4.5 - Factors that influencing an effective inter-agency collaboration platform
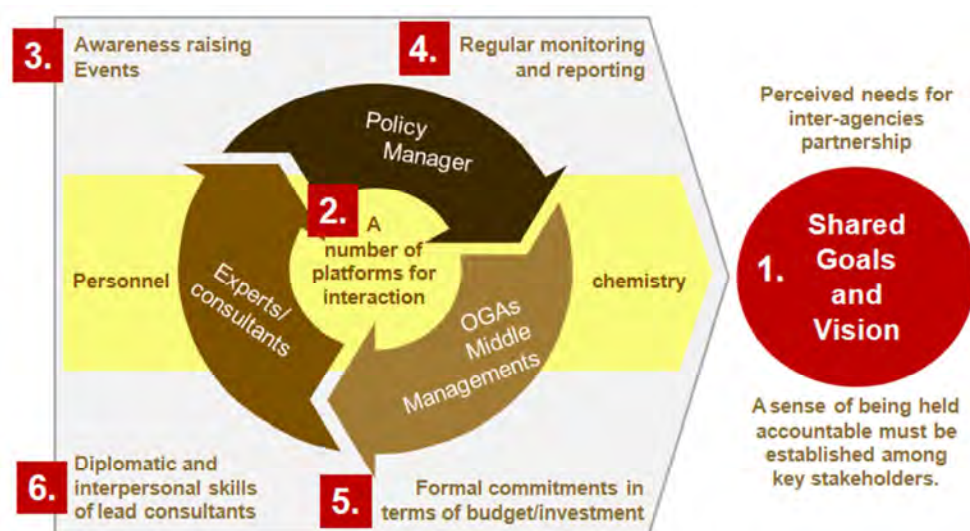
Shared goals and vision

A sense of being held accountable must be established among key stakeholders. One of the most pertinent needs that may drive the motivation to participate are grounded in economic rationale and perceived threats in the international trade and potential benefits of the project

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[42] **Source:** Adapted from Suriyon T., NESDB, 2010, and **"Harnessing Interagency Collaboration in Inter-organizational Systems Development: Lessons Learned from an E-government Project for Trade and Transport Facilitation,"** authored by Thayanan Phuaphanthong, Tung Bui, and Somnuk Keretho, International Journal of Electronic Government Research (IJEGR), Vol. 6, No. 3, July-September 2010.

towards increasing national competitiveness. A statement regarding these issues should be repeatedly addressed on various occasions, particularly in awareness-raising seminars and conferences.

Official mandate and legitimacy

In the Single Window project, a formal interagency collaborative platform must be established. At the strategic level, high-level policymakers play the important role of conveners who use their authority to establish, legitimize, and guide the collaborative alliances. Mandate designation is used as a means to identify and induce stakeholders to collaborate. At the political level and strategic level, the establishment of the national high-level committee and the appointment of lead agencies are a critical requirement that can keep the formal collaboration working. At the operational level, the appointment of responsive working groups has a positive impact on maintaining collaborative activities and relationship.

Formal and Informal Aspects of Communication

Formal collaboration helps align expectations and solidify commitments. Through formal communication channels, stakeholders learn about mandate and benefits of the project. While the mandate can inform stakeholders about their roles and responsibilities in the project, the perceived benefits that the project would bring increases stakeholder motivation to participate. As we move along the project, the support from the high-level policymakers may not be as stable as project stakeholders would want. Sometimes the political situation in the economy may cause discontinuity of support from high-level policymakers without officially changing the commitment.

Informal communication often contributes to fine-tuning collaborative relationship, keeps stakeholders informed of the project progress, and secures cooperation at the operational level.

In summary, the national commitment is one of the most critical factors for the success of a Single Window. But this political will needs to be institutionalized, i.e. transforming the policy mandate into routine management mechanisms among those stakeholders involving in the implementation and operations of SW, and also thereby securing sustained human resources and funding. Inter-agency and stakeholder collaboration and coordination mechanism among governments and traders is also one of the most challenging issues. These three main issues above often determine whether the SW project will succeed or fail, and will also determine how fast or how effective the SW project will proceed.

5. Financial and business model analysis

This section discusses the rationale and content of a financial and business model analysis especially on issues related to the investment and sustainability of Single Window development and operations. While the detailed analysis can be carried out by specialists, policy managers and policy makers need to know what topics should be included in the analysis, and their implications. The outcome of the study including advantages and disadvantages of several options, and recommendations for the best possible model provide a basis for a focused discussion among the stakeholders. Then, the decision on the appropriate financial and business model should be agreed and mandated by the right level of authorities and sponsors.

5.1   Why is the financial and business model analysis needed?

Finding an appropriate cost and investment model for setting up and operating a Single Window is a concern for many developing economies. The possible options could range from a system totally financed by government (such as in Finland, Netherlands, Sweden and the United States) to an entirely self-sustainable model (Germany and Guatemala). Possibilities for public-private partnerships (China, Malaysia, Mauritius, Senegal and Singapore) could also be explored, if this is considered suitable for the particular economy.[43] Clarity on this point can significantly influence decision-makers towards supporting the Single Window system.[44]

Other topics should also be included in a financial and business model analysis; in particular, the expected direct and indirect costs and benefits of the system, different institutional and organizational models for the implementation, operation and extension of its services, and the long-term sustainability of those services.

Normally, those who are in charge of planning and operating the Single Window project will conduct or commission a study to evaluate different funding and investment options and also the business models for delivering services to the users of the Single Window environment. This analysis could form part of the overall detailed feasibility study as described in Section 4.2 or become a separate document.

The outcome of the study, including advantages and disadvantages of several options, and recommendations for the best possible scenario, will be used to discuss among relevant stakeholders and the decision on the appropriate financial and business model should be reached and mandated by the right level of authorities and/or the authorized sponsor.

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[43]   Referring to http://www.unece.org/cefact/single_window/welcome.html.

[44]   This topic was also discussed in the UNECE Recommendation No. 33 on Guidelines for Establishing a Single Window, 2005.

5.2   What should be covered in the analysis?

The following topics should be included in the analysis:[45]

Business and governance models

- *What are the possible business and governance model options and their rationale?* – Which public and private agencies will be involved in the facility? Which parts of the Single Window system should belong to the government as a whole and/or to which government agencies; and which parts should belong to the private sector? Are there any substantive sub-systems that should be hosted by any public-private partnership scheme? The above analysis should also include the rationale, advantages and disadvantages of those different options where necessary.

- The application architecture as described in section 3 helps to distinguish the different components of the future system. The architecture diagrams and associated descriptions can assist in the analysis and decision-making process of the above options specifically on deciding which of the different parts of the SW facility should be governed or administratively managed by which agency.

Cost and financial analysis

- How should the different parts of a Single Window be financed (totally by the government, the private sector, or a public-private partnership)?

- What is the required investment?

- What will be the ongoing operational costs (normally estimated annually and for a series of years)?

- How will the system be financially sustained (totally by the government, the private sector, or a public-private partnership, and/or by some user fees and revenues)?

- What should be the appropriate user fees (if any) and annual revenue? What will be the basis for calculating the fees (fixed price per year, price per transaction, combination, or other model)?

- Who will be the main users/clients?

- Should the use of Single Window facilities be compulsory or voluntary?

- What are the documents and information that will be electronically processed? How many transactions per day that the facility will expectedly handle?

- When will the revenues generated cover operational costs or will it eventually make a profit?

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[45]   Suggested topics here are adapted from the UNECE Single Window Repository,
http://www.unece.org/cefact/single_window/welcome.html.

- What are the risks and how to manage and minimize those risks or threats that may jeopardize the realization of the project goals? – to be discussed further in section 5.4.

- There are several costs associated with the implementation of a Single Window system both directly and indirectly. They include network investment costs, hardware/software investment costs, cost of requirement analysis and design, continuous software development, operational support, research and development, training, change management, and new requirements. Cost issues related to government inter-agency communication and institutional cooperation may also be included.

- Many factors impact on the estimation of the cost of such a system, including:[46]

    - Size of economy

    - Extent of existing systems

    - Support through public-private partnerships

    - Geographical diversity

    - Openness for change

    - Sophistication of design in terms of technology and equipment

    - Need for network development and infrastructure

    - Existing Customs automation

    - Need for software licences

    - Training costs

    - Marketing and promotion of the system.

Example:

- A United Nations study and estimation[47] reveals that, depending on the size of the economy and the complexity of the system, a Single Window project can cost between 11 million and 56 million USD for implementation alone. Operation costs can range from 227,208 USD per annum to 9.2 million USD.

- The use of Single Window facilities is compulsory in Finland, Guatemala, Mauritius and Senegal. In China, Germany, Malaysia, Sweden and the United States, it is voluntary. Single Window services vary and are provided free of charge in Finland, Sweden and the United

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[46] Single Window: Assessment of the Costs of Trade-Related Regulatory Requirements In Ireland, March 2010, FORFÁS.
[47] UN/CEFACT (2009a): UN/CEFACT Single Window Repository, Geneva.

States. While in Guatemala, Germany, China, Malaysia, Mauritius, Senegal and Singapore, there are service fees based on various payment schemes[48].

Benefit analysis

- What would be the benefits to users/clients and to the participating agencies?

- How will the target Single Window facility benefit the trading community and the Government?

- What is the impact on Customs revenues?

- What problems will the Single Window facility solve?

Cost-benefit analysis

- What are the comparisons between the costs and benefits (both quantitative and quality values) to business and to the government from the implementation and usage of the target Single Window?

- The cost-benefit analysis can be carried out on several levels, for example:

  a) National or economy level – consideration of what the Single Window can do for an economy with expected trade transaction cost reduction, faster transaction, better security and compliance.

  b) Government level – consideration of what are costs, savings and other possible benefits from an administrative perspective, e.g. more effective and efficient deployment of resources, correct and/or increased revenue yield, improved trader compliance, enhanced security, increased integrity and transparency.

  c) Service provider/business level – consideration of revenue potential versus establishment and operating/running costs.

  d) Community participant level – consideration of probably separate cost/benefit analysis for different business sectors, when necessary.

For national Single Window development and operation, it is important that the measurable cost/benefit projection for the Single Window vision is established at the national level. This projection could be extended on the regional level. For example, the national Single Window vision of each APEC member economy should be designed to align with the APEC Ease of Doing Business Goals to achieve 25% better, faster and cheaper trading-across-border indicators within five years (by 2015)[49].

There is no unique model for a Single Window as the system needs to be adapted to the specific national or regional conditions and requirements. This reinforces the recommendation that a comprehensive financial and business model analysis study is required to assess the potential

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48   UNECE Case Studies on Implementing a Single Window, 2005.

49   Referring to http://publications.apec.org/publication-detail.php?pub_id=1217.

cost benefits that would accrue from implementation, operations and utilization of a particular Single Window model.

5.3   Some approaches and techniques on how to conduct the analysis

The financial and business model analysis is normally commissioned to professionals. The objective of this section is to briefly discuss some approaches and techniques that the professionals may use for the analysis.

The financial and business model analysis could be undertaken with regard to the costs and benefits to business and to the government from the implementation, usage and sustainability of a Single Window. An analysis through case studies, for example, could be carried out related to some strategic goods and/or major modes of transportation. Also, the costs between the current procedures and the more efficient future procedures can be compared. Complicated export and import procedures can be examined to highlight the maximum cost in various circumstances.

A simple tool such as **what-if analysis** or some **basic mathematic models** could be used to give some guidance on doing the actual calculations and on the sort of information to collect. A simple model for calculating the return-on-investment (ROI) scenario, for example the Internal Rate of Return (IRR), can be applied. In doing the analysis, not only addressing specific numbers for costs and benefits, some specific case scenarios and qualitative analysis could also be included.

The analysis should include the cost effectiveness of different alternatives in order to see whether the benefits outweigh the costs, and by how much. The costs and benefits of Single Window implementation to be calculated are usually financial and time. The overall benefits of a government project are often evaluated in terms of the public's willingness to pay for them, minus their willingness to pay to avoid any adverse effects. The guiding principle in evaluating benefits is to list all parties affected by a project and place a value, usually monetary, on the (positive or negative) effect it has on their welfare as it would be valued by them.

The analysis would include calculation of tangible costs and benefits (i.e. direct costs and benefits such as hardware/software instalment, training, reduction in time and trade transaction cost and fee) and intangible costs and benefits (i.e. indirect costs and benefits such as human resource development, business opportunities, and better compliance) to identify all of the significant costs and benefits.

In making an estimation of a possible benefit and cost that will occur in the future, the scale of uncertainty about the actual values and the future value of costs and benefits has to be considered. Comparing costs and benefits to determine the net rate of return is needed. Also, comparing net rate of return from different options may be conducted with the scenario that

the government and private sectors may have limited funds at their disposal and therefore need to prioritize.

Cost-benefit analysis can be carried out using only tangible financial costs and financial benefits. A more sophisticated approach to cost-benefit measurement models is to try to put a financial value on intangible costs and benefits. However, the inclusion of intangible items within the analysis needs to be carefully assessed as the estimation of a value for intangible items inevitably brings an element of subjectivity into the analysis.

Hypothetical Example of a "What-If Analysis"

To exemplify the cost and benefit analysis, the calculation of possible benefits from trade transaction improvement in Lao People's Democratic Republic is presented. The measurement of trade transaction cost for both export and import, at the macro level analysis, could be calculated by the following formula

> *Trade transaction cost (at the national level) per year =*
> > *(export cost per container x total number of export containers per year) +*
> > *(import cost per container x total number of import containers per year)*

If we rely on and use the quantitative indicators from the World Banks' Doing-Business report 2011, the cost of exporting and importing a 20-foot container of standardized cargos of Lao PDR is 1,860 USD and 2,040 USD respectively. With trade statistics related to export/import of fiscal year 2009-2010[50], the number of containers for export and import in that country is 961,794 and 928,317 respectively, we can calculate the export/import trade transaction cost as following

> *Trade transaction cost per year (in Lao PDR) = (1,860 x 961,794) + (2,040 x 928,317)*
> > *= ~ 3,800 million USD per year*

We could assume that a suitable Single Window project reduces the trade transaction costs for Lao PDR by 5%. or 190 million USD per year[51]. This cost reduction is tremendously beneficial since it contributes about 3% of the country's GDP[52] and is much higher than the likely costs for implementation and operation of the Single Window.

In addition, the Single Window would be beneficial not only to business community but also to the government because of its other impacts, e.g. better and more effective regulatory control and more visible information management by the government.
Of course, the above analysis is only viable if the project management succeeds in implementing the project and the Single Window can deliver a 5% reduction in transaction costs.

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[50] Trade Statistics: Export & Import of Fiscal year 2009- 2010 by economies of destination and by group of products, Ministry of Industry and Commerce, Lao PDR, http://www.moc.gov.la/statistic.asp .

[51] Note that this is a hypothetical scenario just for the sake of example.

[52] Lao PDR's GDP 6.26 billion USD in 2010, http://www.tradingeconomics.com/lao/indicators .

Table 5.1 - Trading across borders improvement from 2007 to 2009 after reforms enabled by paperless Customs and national Single Window partially implemented in Thailand

Trading Across Borders data	Doing Business 2007	Doing Business 2008	Doing Business 2009
Rank		51	10
Documents for export (number)	9	7	4
Time for export (days)	24	17	14
Cost to export (US$ per container)	848	615	625
Documents for import (number)	12	9	3
Time for import (days)	22	14	13
Cost to import (US$ per container)	1042	786	795

Real case example

Another calculation scenario about import and export transactions and documentation fulfilments in Thailand, comparing between 2007 and 2009 (World Bank's Doing Business Reports) as shown in Table 5.1, can be demonstrated. This case shows actual benefits and impacts after the real implementation of paperless Customs and partial Single Window development. From the cost-to-export and cost-to-import indicators of 2007 and 2009 within Table 5.1, the trade transaction cost reduction for export and import is 223 USD and 247 USD respectively per container. In 2009, there were about 3.5 million containers for export, and roughly an equal number for import in Thailand. Therefore the overall trade transaction cost reduction per year contributing to the economy as the whole is as follow: s

Trade transaction cost reduction per year = (223 x 3.5 million) + (247 x 3.5 million)
= ~ 1,600 million USD

This transaction cost reduction already contributes and provides economic gain to Thailand for about 1% of the economy's GDP[53].

One warning is that this is a very rough approximation at the macro level. The World Bank survey covers only the import and export of standardized cargos with minimum set of documents by not including specialized cargos, e.g. agriculture and dangerous goods that require more procedures and special permits and certificates. Nevertheless, this calculation gives a good approximate figure that could capture the interest and support of high-level policy decision makers and stakeholders.

During the course of analysis, the study team may organize workshops to discuss the findings and possibly inviting Single Window operators from other economies to share lessons. The workshops should cover at least about business model options and how the Single Window

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[53] Use an approximate GDP of about 300 billion USD for Thailand for ease of calculation, http://www.tradingeconomics.com/thailand/indicators.

should be financed (e.g. by government, private, or public-private partnerships), what were the costs of establishing the facility, what are the operational costs, how will the system be sustained over the coming years, how much should be the user fees and annual revenues–if any, and what are the recommended financial and business model for the economy.

5.4   Risk assessment

The Single Window vision is well accepted in many economies but to turn this vision into reality is not simple as there are several risks and issues involved.

According to the World Intellectual Property Organization, the main business risk factors relevant to almost all organizations and the mark assigned to them can be summarized as below[54].

- *Financial risk*   35%
- *Strategic risk*   25%
- *Operational risk*   25%
- *Legal and compliance risk*   15%

Financial risk is related to money and the uncertainty associated with how and will the SW facility be adequately financed.

Strategic risk is the current and prospective impact on earnings or capital arising from adverse business decisions, improper implementation of decisions, or lack of responsiveness to changes of requirements. This risk is a function of the compatibility of an organization's strategic goals, the business strategies developed to achieve those goals, the resources deployed against these goals, and the quality of implementation.

Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events.

Legal and Compliance Risk is the risk arising from failure to comply with statutory or regulatory obligations. It also arises if the rights and obligations of parties involved in a payment are subject to considerable uncertainty, for example if a payment participant declares bankruptcy.

It is evident that the financial risk is given the highest rank as it has a significant effect on the organization's financial viability if it occurs. Then the risks that can put in jeopardy the organization's established strategy, goals and objectives are ranked second. Operational risks as part of the daily operational activities are marked third, and finally, any legal and compliance risk that can occur.

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[54]   Risk Assessment Methodology, World Intellectual Property Organization,
http://www.wipo.int/about-wipo/en/oversight/audit/risk_assessment.html

Policy and project managers of the Single Window need to identify, manage and minimize any possible risks or threats that may jeopardize the realization of the project goals. Risk assessment is a process for analysing risks, and determining what controls are necessary to protect sensitive or critical assets adequately and cost-effectively**.**

Possible risks that the Single Window projects can face are issues of market acceptance, law/regulations, human-related change management and infrastructure that could make it extremely difficult to deliver a solution at both a reasonable cost and a sufficiently attractive service level. Certain components of a financial and business model analysis, such as return-on-investment calculations, are elements of a risk assessment.

- A proper risk assessment would lead the project management group to make appropriate cost commitments and realistic benefits forecasts. The investment decisions will consequently be made better at preferred levels of risks by taking into account the best current knowledge of the future. It is recommended here that risk assessment and analysis should be done along with the financial and business model analysis.

In conclusion, this section describes the need for analysing financial and business models, especially in relation to the investment and sustainability issues of Single-Window development and operation. Policy managers and policy makers should understand at least what should be the main topics of the study so that the authorized decision makers will be able to make good decisions related to the outcomes and recommended models from the study and to drive further the appropriate Single Window implementation and sustainable option.

Summary

For many governments, the Single Window system has become a core instrument for facilitating trade, simplifying procedures and carrying out electronic business. Single Windows are also increasingly important in supporting security, regulatory compliance and the regional integration of trade.

When implementing the Single Window, many economies face similar challenges. These relate not only to the technical aspects of the Single Window system but also to the organizational and inter-organizational, managerial, financial, political, legal, and national and international settings.

Dealing with these challenges requires strong political will, long-term commitment and support from top management, a reliable institutional platform for collaboration, effective management of stakeholders' expectations and perceptions, workable business and architectural models, and necessary business and regulatory reforms (cf. UN/CEFACT, 2005).

Policy makers and managers charged with the conceptualization, planning and oversight of Single Windows projects need to manage all these aspects of a Single Window project to create an environment in which the project can succeed.

This requires advanced managerial competence in very different domains such as trade policies, business process analysis, change management, electronic business and information technology management and standards, and Single Window architectures.

This *Guide* introduces several of the latest international standards, techniques and approaches used for managing large inter-organizational information-management systems, which were adapted to the planning and managing of a Single Window project:

- The understanding of how the improvement of trade procedures and documentation can increase an economy's trade competitiveness.

- Why the use of Single Window systems for filing, transferring, processing and exchanging regulatory and trade information has become an important tool for managing information flows for facilitating trade across the borders. Many economies aim to transform their paper-document trade environments into more efficient paperless-trade environments, enabled by electronic means.

- An evolutionary concept for the development and expansion of a national Single Window is proposed. This evolutionary model serves as a long-term roadmap (reference model) that an economy could use to compare a country's current situation, so that a gap analysis and a target Single Window environment can be easily envisioned. With this reference roadmap, the vision, objectives and scope of a future Single Window could be easier analysed and discussed.

- A holistic Single Window Implementation Framework (SWIF) and its development cycle are recommended as an approach to systematically address several challenges in the analysis, planning and implementation of Single Window projects. It builds upon the concept of

architecture to break down and, where appropriate, visualize the 10 key components that accompany any Single Window project.

- The 10 project components that must be analysed and included in the electronic SW projects are:

    (1) stakeholder requirements identification and management. (2) stakeholder/ inter-agency collaborative platform establishment; (3) SW vision articulation, including its value propositions and political will establishment; (4) business process analysis and simplification; (5) data harmonization and document simplification; (6) service functions (application architecture) design; (7) technical architecture including standards and interoperability establishment; (8) legal infrastructure institution; (9) business and governance model design including finance, implementation and operational governance; and (10) IT infrastructure and solutions execution.

- However, in real Single Window projects, the development of components is unlikely to be fully completed and commonly agreed at once. This is mainly because the establishment of an electronic Single Window environment is a complex project involving so many different stakeholders leading to the need for several rounds of consultation, discussion and refinement Therefore, the project implementation is iterative. Because of this iterative nature of Single Window development, a stepwise project-management process, with five recommended phases, is proposed to assist the policy managers in conducting the policy formulation, planning and overseeing of the project. This *Guide* emphasizes that, within these five phases and their associated deliverables, the 10 key project components should be revisited and further refined iteratively.

- Within those five project-management phases, the *Guide* provides some suggestions on how to conduct the initial concept and the feasibility analysis, how to develop a high-level master plan, and how to monitor and oversee the progress of the project.

- Some other important managerial issues addressed in the *Guide* include discussions on how to secure sustained support of key policymakers; the need for institutionalization in transforming the political will into routine management, normal budgeting and more permanent organizational structures; and how to put in place the effective inter-agency stakeholder collaborative mechanisms.

- The *Guide* also discusses the importance of and what should be included in conducting a financial and business-model study to analyse options on the investment and sustainability of Single Window development and operations.

Glossary

Activity:

A set of tasks to be undertaken to achieve meaningful results.

Application:

A deployed and operational IT system that supports business functions and services. [TOGAF]

Application architecture:

A description of the major logical grouping of capabilities that manage the data objects necessary to process the data and support the business. [TOGAF]

Architecture:

The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.

The term "architecture" is defined in accordance with ISO / IEC 42010:2007 Systems and software engineering - recommended practice for architectural description of software-intensive systems, as "the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution."

Architecture Vision:

1.   A high-level, aspirational view of the target architecture.
2.   A phase in the SWIF methodology, which delivers understanding and definition of the Architecture Vision.
3.   A specific deliverable describing the Architecture Vision. [TOGAF]

Business Architecture:

The business strategy, governance, organization, and key business processes, as well as the interaction between these concepts. [TOGAF]

Data:

A re-interpretable representation of information in a formalized manner suitable for communication, interpretation or processing by humans or automatic means. [ISO 2382-1]

Data Architecture:

The structure of an organization's logical and physical data assets and data management resources. [TOGAF]

Component:

A constituent part, element, or piece of a complex whole. [PMBOK]

Enterprise:

> The highest level (typically) of description of an organization and typically covers all missions and functions. An enterprise will often span multiple organizations. An "enterprise" can mean any collection of organizations that has a common set of goals. For example, an enterprise could be a regional economic forum of member economies, a national collaboration of several agencies and possibly collaborating with certain business sectors, a government agency, a federation of business entities, a whole corporation, a division of a corporation, or a single department. [TOGAF]

Enterprise architecture:

> A conceptual blueprint that defines the structure and operation of an organization. [SearchCIO.com]

Information Systems Architecture:

> The combination of the Data Architecture and the Application Architecture.

Iteration:

> A complete development loop resulting in a release of an executable component, a subset of the system under development, which grows incrementally from iteration to iteration to become the final system.

Interoperability:

> 1) The ability to share information and services.
> 2) The ability of two or more systems or components to exchange and use information.
> 3) The ability of systems to provide and receive services from other systems and to use the services so interchanged to enable them to operate effectively together. [TOGAF]

Legal framework:

> A set of measures that may need to be taken to address legal issues related to national and cross-border exchange of trade data required for Single Window operations. [UN/CEFACT]

Master Plan:

> A document that defines how the overall programme and a series of projects under its domain are executed, monitored, and controlled.

Organization:

> A collection of persons organized for some purpose or to perform some type of work within an enterprise. [PMBOK]

Programme:

> A group of related projects managed in a centralized and coordinated way. [PMBOK]

Programme management office:

> An organizational body responsible for managing a programme or a group of related projects under its domain in a centralized and coordinated way to obtain benefits from the control and sharing of resources, methodologies, tools, and techniques that are not available from managing each project individually. [PMBOK]

Project:

> A temporary undertaking to create a unique product, service, or result. [PMBOK]

Regional Single Window:

A Single Window that is established between two or more economies.

Requirements:

A quantitative or qualitative statement of a business need that must be met by artifacts.

Requirements Management:

A process of managing requirements throughout the overall development phases of Single Window Implementation, including the ability to deal with changes in requirements.

Single Window:

A facility that allows parties involved in the international supply chain to lodge data in a standardized format at a single entry point to fulfil all import, export and transit-related regulatory requirements. If the data are electronic, they should be submitted only once. [UN/CEFACT]

Single Window Implementation Framework (SWIF):

A framework that guides policy managers in the process of initiating, setting up, and managing the implementation of a Single Window.

Single Window Steering Committee:

A group established to oversee the Single Window implementation and consider an urgent issue or to set the directives for the execution of the Single Window Programme and projects under its domain in a relatively short span of time. [OECD]

Stakeholder:

Person or organization actively involved in the Single Window programme, who may exert influence over the Programme, or whose interests may be positively or negatively affected by its execution or completion. [PMBOK]

Strategic architecture:

A summary formal description of the enterprise, providing an organizing framework for operational and change activity, and an executive-level, long-term view for direction setting. [TOGAF]

Sub-project:

A smaller portion of the project created when the project is subdivided so that the scope is more manageable. [PMBOK]

Sub-system:

A set of components which serves as a part of a system. [Wikipedia]

System:

1. An integrated set of regularly interacting or interdependent components created to accomplish a defined objective, with defined and maintained relationships among its components, and the whole producing or operating better than the simple sum of its components. [PMBOK]

2. An integrated set of interdependent sub-systems or components created to accomplish a set of pre-defined functions. [PMBOK, TOGAF]

Technology Architecture:

> The logical software and hardware capabilities required to support deployment of business, data, and application services. This includes IT infrastructure, middleware, networks, communications, processing, and standards. [TOGAF]

View:

> The representation of a related set of concerns. A view is what is seen from a viewpoint. An architecture view may be represented by a model to demonstrate to stakeholders their areas of interest in the architecture. A view does not have to be visual or graphical in nature. [TOGAF]

Viewpoint:

> A definition of the perspective from which a view is taken. It is a specification of the conventions for constructing and using a view (often by means of an appropriate schema or template). A view is what you see; a viewpoint is where you are looking from — the vantage point or perspective that determines what you see. [TOGAF]

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Appendix

A National Single Window Case Study[55]

1. Introduction

This report briefly discusses the progress and status of an e-Logistics initiative, or so-called national Single Window (NSW) in Thailand. The establishment of a national Single Window is recognized as an important national strategy to improve the efficiency in documentary procedures required to expedite the movement of goods in and out of Thailand. It allows Thailand to pursue its agenda on Trade Facilitation Enhancement within the National Logistics Development Strategy (2007-2011) and its associated national long-term vision to become the world-class logistics hub for Indochina as firstly identified in Thailand Logistics Master Plan (2005-2009) with an aim to achieve:

- A reduction in average trade transaction cycle time from 24 (World Bank's Trading Across Border Report, 2004) to 14 days by 2011.
- A reduction in trade logistics costs from 19% of GDP in 2005 to 16% by 2011.

In addition to the responses toward national policy directives, the NSW implementation in Thailand also reflects the need to foster regional integration and realization of an ASEAN Economic Community by 2015. In this regard, the Thai government together with governments of ASEAN member economies signed the "Agreement to Establish and Implement the ASEAN Single Window". According to the Agreement, Thailand is obligated to develop the system as well as make necessary procedural changes and regulatory reforms to enable the operation of National Single Window by the year 2008.

The collaborative effort of Thai Customs Department, Ministry of Information and Communication Technology, Ministry of Commerce, Ministry of Agriculture and many other government agencies and business stakeholders in simplifying procedural and documentary requirements as well as automating all import/export-related process as part of National Single Window initiative since 2004 yields remarkable outcomes, including an annual cost saving of about 1,600 million USD[56]. Table A.1 summarizes Thailand's achievement in its attempt to increase efficiency and compliance in the facilitation of cross-border trade comparing between 2007 and 2009.

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[55] **Disclaimer** - This case study on Thailand's Single-Window initiative was prepared by an independent author. The discussion of this case does not represent an official message of any organizations, administration or government agencies. It is based on the author experience and involvement as a consultant with several NSW stakeholders.

[56] The calculation is discussed in Section 5.3.

Table A.1 - Thailand on Trading across Border (World Bank, Doing Business Report 2007 and 2009)

Year	Ranking (among 183 economies)	Export			Import		
		Document*	Time**	Cost***	Document*	Time**	Cost****
2007	103	9	24	848	12	22	1,042
2009	12	4	14	625	3	13	795

*   Number of official documents involved in exporting (and importing) a standardized shipment of goods (this statistics does not cover other special control goods, e.g. agriculture products, or dangerous goods in which more documents, more time and costs will be needed.)

**   Number of days needed starting from the final contractual agreement between the two parties, and ending with the delivery of the goods

***   US$ per Container

The implementation of National Single Window nevertheless faced a number of challenges that lied in:

- The seeking of cooperation and support from all relevant stakeholders

- The establishment of common understanding in all aspects of the initiative among all stakeholders

- The simplification and standardization of procedural requirements as they often require the changes in existing laws and regulations;

- The selection of standards for the harmonization of documentary requirements and approaches for electronic exchange of information; and

- The harmonization of documentary requirements especially when the approved standard is not readily available.

2.   Key components of national Single Window

Consistent with the ASEAN's view of National Single Windows, Thailand's NSW is designed to support a single entry of identical data; a single synchronous processing of data; a decision-making for the clearance and release of cargoes at a single point; and a compilation of statistics for economic analysis and management. According to a study report commissioned by Ministry of ICT (2008), Thailand's NSW consists of ten key components outlined below. Figure A.1 demonstrates how these components fit together.

- NSW exchange system that mainly serves as the national hub for electronic documents sharing and exchange, especially for G2G, G2B, and B2B interconnectivity. Its key features

include an interface for sending and receiving e-documents/messages in different protocols with the features of authentication, non-repudiation, semantic translator, syntax validation, and ebXML Messaging Service (ebMS)[57].

- About 40 import/export-relate permit/license/certificate systems issuing by many government and regulatory agencies with additional modules that facilitate back-end integration and service arrangements with the NSW central exchange hub. The Paperless Customs system is included.

- Information systems that serve as communication interface between domestic traders, trade/transport intermediaries, and government agencies

- Information system that facilitates the application and issuance of permit/license/certificate for controlling government agencies who do not have permit/license/certificate issuing systems, trade/transport intermediaries

- Modules that facilitate the interconnectivity between domestic permit/license/certificate issuing systems and those overseas NSW systems, e.g. ASEAN member economies

- Modules that facilitate the interconnectivity between members of domestic trade/transport community and their counterparts

- National Standard Data Set

- Message Implementation Guides

- Governance mechanism and criteria for the determination of transaction fee and quality of service

- IT physical infrastructure, Thailand's e-Government Interoperability Framework (TH e-GIF)[58], and the legal framework

The development of National Single Window in Thailand has been carried out in three phases.

- Phase 1 focuses on 1) the establishment of mutual understanding between Thai Customs Department and other participating 35 controlling agencies; 2) the simplification of procedural and documentary requirements; 3) the development of Paperless Customs or e-Customs system[59] that also facilitates the electronic payment of duty and fee; and 4) the development of system that facilitates secured integration of electronic information.

- Phase 2 aims at offering full services for Paperless Trade where local traders can 1) use the information that they prepare in one single form to acquire any permit/license/certificate needed as well as to seek approval for expediting the movement of goods across border;

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[57]   *ISO/*TS 15000-2:2004. Electronic business eXtensible Markup Language (ebXML) -- Part 2: Message service specification (*ebMS*).

[58]   TH e-GIF is the national interoperability policy framework including the methodology and a recommended set of standards and protocols for developing any collaborative e-government platforms in Thailand.

[59]   Thai Customs Department developed Paperless Customs using ebXML technology to replace its traditional EDI system which had been used since 1998.

and 2) track the status of documents and the movement of goods via internet. The secured integration of electronic information among domestic stakeholders and their counterparts in the region is achieved[60]. In this phase, it is also expected that National Standard Data Set is incorporated by all domestic stakeholders.

- Phase 3 enables the compilation of statistics for economic analysis and management.

3.   Critical Success Factors for NSW Development

3.1   Stakeholder management and interagency collaboration

Activities that aim at managing stakeholders and ensuring interagency collaboration span throughout the life cycle of NSW implementation. Efforts to achieve such objectives are one of the most critical success factors to realize this nation-wide scale of reforms.

3.1.1   National and regional collaboration

In year 2004, the National Competitiveness Development Committee (NCDC)[61] identified and reported to the Cabinet the needs to improve efficiency, reliability, security, and responsiveness of Thailand's logistics sector. The Cabinet consequently assigned top priority to the enhancement of the logistics sector and commissioned the development of the Thailand Logistics Master Plan (2005-2009). Thailand Logistics Master Plan (2005-2009) was later refined to better reflect economic and social changes and renamed as Thailand's Logistics Development Strategy (2007-2011).

In addition to the responses to the national policy directives, the NSW implementation in Thailand also reflects the need to foster regional integration and realization of an ASEAN Economic Community by 2015. The Thai government together with governments of ASEAN member economies signed the "Agreement to establish and implement the ASEAN Single Window" in 2005. Because of this Agreement, the government is obligated to develop the system. Such political commitment strengthened the need to implement NSW. It forced the creation of a platform for interagency collaboration and strengthened the justification for budget allocation.

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[60]   The interconnectivity between Paperless Customs and information systems of permit/license/ certificate agencies is the first target. The implementation timeline depends on the readiness of each individual agency, but now 35 agencies have already signed the official memorandum of commitments for this endeavour.

[61]   The National Competitiveness Development Committee (NCDC) is a high-level committee chaired by Thailand's Prime Minister. NCDC comprises all economic-related Ministers as well as representatives from key industry sectors.

3.1.2 Common architecture vision and who doing what

After the need was perceived, most stakeholders of the NSW were identified. The Cabinet appointed a National Committee on Logistics Development (NCLD). NCLD consists of permanent secretaries from economic-related Ministries and representatives from trade-related associations. While the engagement of NCDC in the project reinforced strategic integration and thus mutual commitment among high-level decision-makers, the appointment of NCLD brought together the high-level management to plan and monitor Single Window implementation. The commitment at this level made stakeholders accountable to the project and obligated them to render collaboration.

The National Economic and Social Development Board (NESDB) was appointed as NCDC's and NCLD's secretary. While NCDC and NCLD provided a certain level of formality to project realization, NESDB played an important role in ensuring project continuity even under the vacuum of leadership resulting from instable political situations.

The Cabinet was another actor who played an important role in fostering interagency collaboration and sponsorship. It appointed two government agencies, based on their organizational role, responsibility, and capability, to lead and manage cross-agency issues as well as project implementation.

- Recognizing that Thai Customs Department possesses in-depth knowledge of the business domain and relevant technologies, the Cabinet designated Thai Customs Department as a lead agency to coordinate and lead NSW implementation and drive the information exchange between Thailand's NSW and NSWs of other ASEAN economies.

- Given that Ministry of Information and Communication Technology (MICT) has a mandate to promote the development and uptake of e-government, the Cabinet designated it as an agency responsible for managing several related projects, handling initial budget allocation, providing necessary nation-wide government network infrastructure[62], interoperability standards[63] and legal infrastructure, and identifying the best appropriate business model[64] options in order to ensure a smooth operation of NSW.

As a lead agency, Thai Customs Department initiated a working group to serve as an organizational mechanism to facilitate communication and coordination among NSW stakeholders. The working group had representatives from controlling government agencies as well as relevant trade and transport community. Two sub-working groups were formed. One worked on streamlining business processes and aligning data requirements. The other dealt with technical communication protocols and related security issues. With close communication

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[62]   GIN, the Government Infrastructure Network project for high-speed G2G interconnected networks sponsored by Ministry of ICT.

[63]   TH e-GIF, the national e-government interoperability framework is one such attempt.

[64]   Business model defines the services that NSW offers to targeted customers, resources required to provide those services, how the provision of those services is financed, pricing strategies, and revenue stream.

among stakeholders, interests and expectations on the system were regularly addressed, managed and aligned by the lead agency.

The appropriate appointment of lead agencies and the formation of sub-working groups provided the foundation for operational integration. However, there was also confusion on how independent agencies could function as a single entity with authorities for problem-solving. The high-level architecture of Thailand's NSW in Figure A.1 was developed and used as means to clarify different project components, their scopes and roles of each stakeholder. It provided a clear overall picture and common vocabularies, promoted common understanding among stakeholders both business sectors and responsible government agencies particularly the budgeting bureau, and strengthened integration at the operational level.

Having one agency in charge of system implementation and another in charge of cross agency issues and project management, on one hand, is advantageous as the roles and areas of work of two lead agencies are complimentary. MICT pushed the development of artifacts necessary for cross-agency cooperation, such as an initial National Standard Data Set and Thailand e-Government Interoperability Framework (TH e-GIF), that Thai Customs Department was not ready to take early on in the project. Several findings from the studies related to the simplification of business processes as well as the development of NSW business models and governance mechanisms conducted by MICT provided information that served as crucial inputs for decision-making processes participated by Thai Customs Department and other stakeholders.

Having two lead agencies, on the other hand, has a disadvantage. The ministerial bureaucracy in MICT held back budget allocation. It led to project implementation delay.

The roles and areas of work of two lead agencies were somehow changed later on in the project implementation. Thai Customs Department expressed an intent to lead the revision and refinement in the following areas of work. The action plan was therefore adjusted accordingly.

- The development of guidelines for system implementation and integration

- The harmonization of data requirements

- The development of the National Standard Data Set for all related documents

- The development of governance mechanisms and the identification of criteria for the determination of transaction fee and quality of service

Figure A.1 - Thailand's NSW High-Level Architecture (MICT Report, and Keretho, 2009)
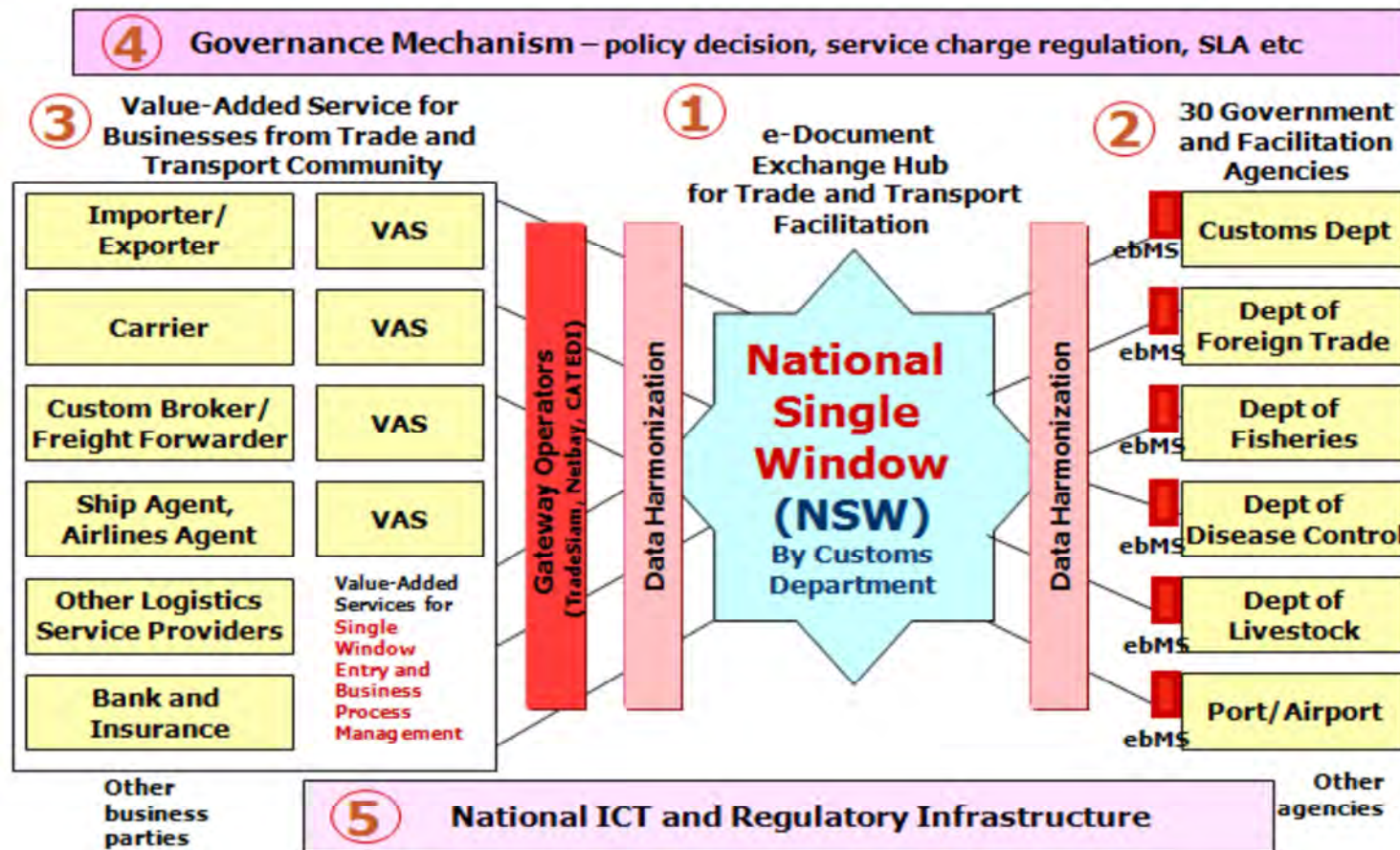
3.2 Business process analysis and simplification

Business process analysis has been conducted as one of key activities in various projects under the NSW initiative. Several studies and implementation projects have been conducted. For example, one study focused on processes that are common to all traders using four modes of transport (trains, trucks, ships, and airplane), and also the export and import of national strategic products. The outputs of business process serve as input for several activities including:

- The derivation of possible investment and revenue models

- The harmonization of data requirements and the development of guidelines for electronic messages

- The design for the architecture of the future information systems

- The development of recommendations for business process simplification

The automation of business processes is one form of business process simplification. It allows electronic declaration of goods, electronic application for permit/license/certificate, and receipt of approval online. The electronic approval of permit and the electronic integration of permit information and goods declaration information not only fasten the clearance process but also eliminate the need for traders to travel to collect a permit at an office of a permit issuing authority and to physically submit the permit at a corresponding office of Thai Customs Department. It thus abolishes some travel costs and time that traders have to spend to obtain documents required to expedite the movement of goods across borders. With electronic integration of such information, integrity and accuracy of trade information can also be improved.

It should be noted that recommendations to remove redundant and non-value added business processes cannot always be implemented as they often require the changes in certain laws and legislation. In fact, business processes that are burdensome in traders' perspective may be seen as critical and necessary in controlling government agencies' point of view. Close consultation with all relevant stakeholders are therefore crucial prior to implementing the simplification of business process.

3.3 Data harmonization

The data harmonization efforts contributing to the development of Thailand's NSW have been carried out in three phases (as commissioned by Ministry of Transport and Ministry of ICT).

- Phase 1: Transport-related data requirements from 58 documents

- Phase 2: Data requirements from 189 documents used in business processes associated with the issuance of permits, licenses, and certificates carried out by 21 government agencies.

- Phase 3: Data requirements from other government agencies and trade community including bank and insurance.

The harmonization of data requirements in Thailand was conducted at the time where only a few standards that provide generic semantic rules and that serve as a building block for aligning the definition, representation, as well as the cardinality and location in the electronic message of each data element were available. A selected guideline, so called Buy-Ship-Pay UN/CEFACT Business Subset for International Trade which is previously known as UNeDocs, for data harmonization in Thailand was generic yet sufficiently contextualized to cover documentary requirements of all stakeholders in the international supply chain. It was also based on dictionary entry names from UN/CEFACT Core Component Library (CCL) and complied with UN/CEFACT Core Component Technical Specification (CCTS: ISO 15000- 5/ebXML). As UNeDocs project of the UN/CEFACT working party has been discontinued, Thai Customs Department has now conducted the harmonization of those data requirements using WCO Data Model version 3.0 as a reference.

3.4 The use of open and international standards for interoperability

Thailand's e-Government Interoperability Framework (TH e-GIF) was developed to provide a policy framework that promotes the integration and exchange of electronic information among government agencies using information systems that are operated on different ICT platforms. It also recommends the Enterprise Architecture concept (similar to the SWIF as discussed in Section 3) as a methodology that guides the initiation and management of inter-organization systems implementation. It provides a set of guidelines that forms a basis of interoperability among applications in respect to process, data, and technical communication protocols.

TH e-GIF comprises two major parts. The first part deals with managerial aspect of applications integration and development. The second part provides a set of common rules that guides different phases of application development from the elicitation business requirements in terms of process and information to the derivation of XML Schema from the information model. The common rules are based on internationally-accepted standards. They include:

- UN/CEFACT's Modeling Methodology for an analysis and modeling of process and information requirements
- UN/CEFACT Core Components Technical Specification (ISO 15000-5) for the construction of information model
- UN/CEFACT Core Components Library (CCL) as a basis for harmonizing the definition and representation format of data requirements
- UN/CEFACT XML Naming and Design Rules for transforming CCTS-based information model to XML schema

- Technical specifications including communication protocols and security measures required to ensure secure and interoperable exchange of information are also provided in the second part of TH e-GIF, including the *ISO/*TS 15000-2:2004-Electronic business eXtensible Markup Language (ebXML) -- Part 2: Message service specification (*ebMS*) as the messaging protocol for paperless document exchange currently used in Paperless Customs and Paperless e-Permits and e-Licenses and now used to enable automatic interoperability among different ICT platforms of the 36 government agencies.

3.5   Legal framework

There has been a remarkable progress in the development of legal framework necessary to support the uptake of e-business and e-government transactions in Thailand. Following the effective enactment of Electronic Transaction Bill with an incorporation of Electronic Signature on April 3, 2002, Electronic Transaction Commission chaired by Minister of Information and Communication Technology was founded according to Article 102 of the Bill with below mandate:

- To make sound policy recommendations to the Cabinet regarding the promotion and development of e-business as well as resolutions for any hindrance occurred.
- To monitor the operation of e-commerce
- To propose the development of necessary royal decrees to support the enforcement of Electronic Transaction Bill
- To issue regulations relevant to the implementation of electronic signature
- To handle all other matters as indicated in Electronic Transaction Bill

Under Electronic Transaction Commission, several initiatives that provide critical foundation for the development of e-commerce have been carried out by the Sub-committee on Legal Infrastructure. Key initiatives include:

- The Royal Decree on Regulatory Practices in e-Government Implementation;
- The Royal Decree on Electronic Fund Transfer;
- The Royal Decree and Supplementary Regulation on Services Related to Electronic Certification; and
- Computer Crime Act.

4. Conclusion

During 2010-2011, Thailand is in the second phase of NSW implementation and deployment in which the Thai Customs Department is currently in the process of gathering, developing and reconciling, and implementing the next phase national action plan with the close collaboration of more than 36 government and regulatory agencies, and other business and transport-related stakeholders.

Figure A.2 provides a snapshot of achievement up to the year 2010 and some of the key ongoing works. Participating government agencies are however in different stages of development. Some agencies have already had the back office systems that are capable of interconnecting with e-Customs in place but still incapable of supporting the use of fully automate e-Signature at the user levels. Some are in the process of developing back office systems. Some are in the process of testing the interconnectivity with e-Customs. Some are now working with Thai Customs Department on identifying a set of data to be exchanged. Some expressed the need to use NSW as a channel to issue permit/license/certificate.

Value-added service providers (VAS) have developed software that supports the preparation of documents and the management of export and import procedures. The available services are unfortunately limited and do not respond fully to business needs, e.g. the single window entry services are still in the conceptualization and development phase.

The current development of Thailand's NSW as coordinated and lead by Customs Department can be closely classified as the regulatory SW (the SW Level 2 as discussed in the Five Evolutionary Development Levels of Section 2.2) involving the interconnectivity and information exchange among 36 regulatory agencies.

In an another initiative, the Port Authority of Thailand has completely implemented its e-Port system that resembles the concept of the Port SW (described as the SW Level 3) fully at the Bangkok Port and partially at the Leamchabang Sea Port. This e-Port system is in the deployment and user adoption phase during the first quarter of 2012. The users involve those stakeholders at the port like customs brokers, shipping agents, freight forwarders, and terminal operators. The features and functions of e-Port include electronic data submission and transactions for container management and terminal operations, warehouse management, and port security checking. The next logical level of development for the future is to interconnect and exchange electronic data between the regulatory NSW which already includes Paperless Customs system, with this e-Port community system to further improve and streamline the services for port operations and clearance.

Several software assisted tools for traders and logistics service providers should be further developed and promoted for wider usage. For example, among many ideas, government budgets should be allocated to develop open-source software including back-office and front-office IT systems with NSW connectivity for traders and freight forwarders to speed up the complicated documentary procedures between traders, between importers/exporters and freight forwarders, and between freight forwarders and other logistics providers like carries and port operators.

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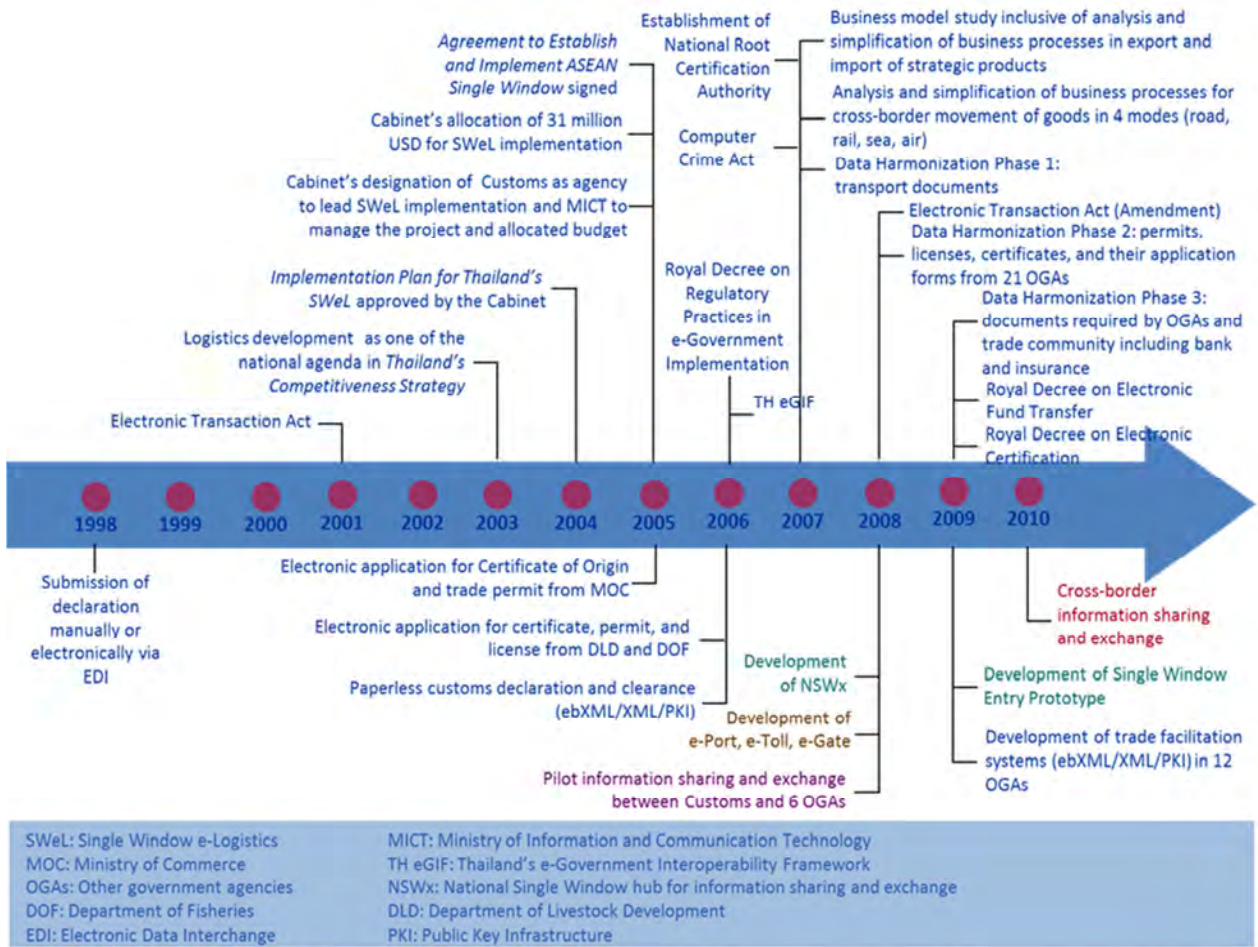NESDB (2007). *Thailand's Logistics Development Strategy (2007-2011)*, Bangkok: N

Figure A.2 Thailand's NSW Roadmap

Single Window Planning and Implementation Guide