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
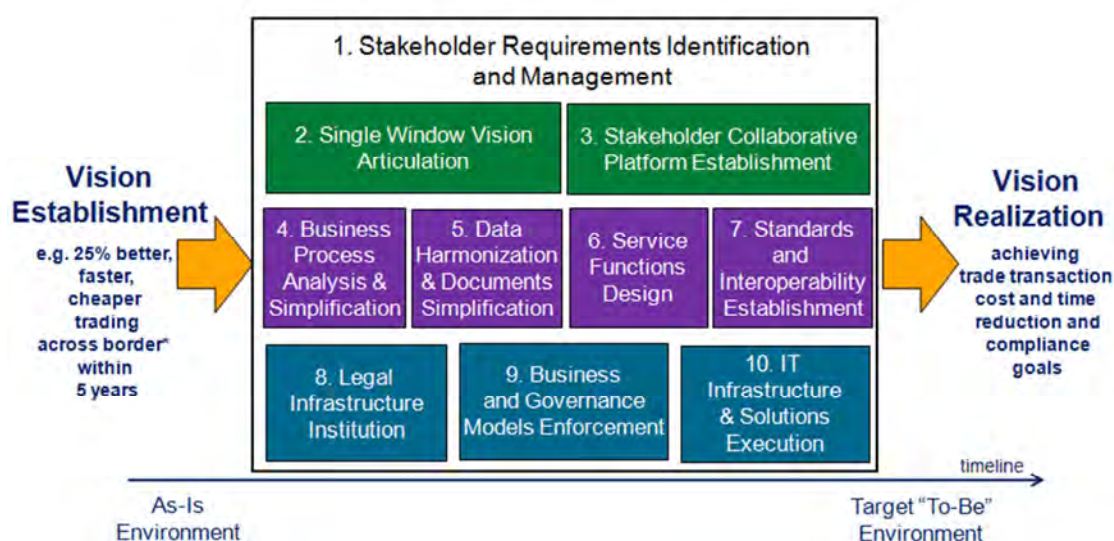
1) **Stakeholder Requirements Identification and Management**
   needs and requirements of stakeholders must be identified and managed effectively.

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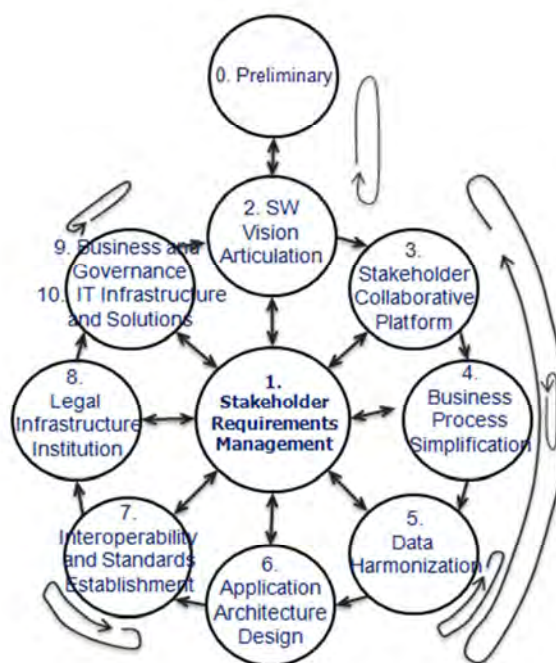
[35]   The same 10 components as described in section 3.2, but Component 0 – the Preliminary component is added for the obvious reason (meaning for preliminary, of course).

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.