



CHEMONICS INTERNATIONAL INC.

Electronic Document Submission Title Page

Contract No.: 278-C-00-02-00210-00

Contractor Name: Chemonics International, Inc.

USAID Cognizant Technical Office: Office of Economic Opportunities
USAID Jordan

Date of Product/Report: December 2005

Document Title: Replacing ASYCUDA IT System: Challenges,
Risks and Proposed Process

FINAL

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Activity Title and Number: Achievement of Market-Friendly Initiatives and Results
Program (AMIR 2.0 Program)

PSPI Component, "Scoping Exercise for New Customs
Software", Task No. 560

Name and Version of Application
Software Used to Create the File: *MS Word 2002*

Format of Graphic and/or Image File: *N/A*

Other Information: *WinZip Windows*

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**Replacing ASYCUDA IT System:
Challenges, Risks and Proposed Process**

Final Report
December 2005

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

Data Page

Name of Component: Private Sector Policy Initiative

Authors: Lubomir Dvorsky/The Services Group
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Practice Area: Trade and Investment

Service Offering: N/A

List of Key Words
Contained in Report: IT system procurement, best practice, international standards, reform and modernization

Abstract

The Jordan Customs Department (JCD) has decided to replace the current ASYCUDA++ system because of its technical deficiencies. The JCD established a steering committee to report by end-December 2005 on a review different options of replacing ASYCUDA and recommend a way forward. The report reviews the selected process against the international standards and best practices.

Abbreviations and Acronyms

ASEZ	Aqaba Special Economic Zone
BPR	Business process reengineering
CITS	Comprehensive Integrated Tariff System
HCDM	Human Capital Development and Management
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
IT	Information Technology
JCD	Jordan Customs Department
WCO	World Customs Organization

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Executive Summary

The Jordan Customs Department (JCD) has decided to replace the current ASYCUDA++ system because of its technical deficiencies such as difficulties to enhance the current system, no access to the ASYCUDA source code, ASYCUDA's insufficient ability to communicate with other systems, and the fact that ASYCUDA is not a web-based system. As a result, the JCD established a steering committee to review different options of replacing ASYCUDA.

The greatest benefits of the new IT system could be obtained if it supports a truly modern customs organization. Application of the new IT systems has often been successfully used as a catalyst to improve organizational performance by applying new standards, business models, policies, processes, and procedures. A new IT system provides an opportunity to review the current business model - how JCD conducts its business and how it interacts with its stakeholders, the business community, and other government agencies. This is also an opportunity to implement world best practices. Building or customizing a new customs IT system should be a business project, driven by the business needs of an organization. Accordingly, the customs business people (not the IT people) ought to define the system requirements and the expected benefits.

The steering committee has selected a sound approach to assess solutions on the basis of vendor presentations, visits at vendors' sites as well as a detailed analysis of a solution at the premises of JCD headquarters in Amman. The review options are as follows:

- UNCTAD's ASYCUDAWorld - Geneva
- PWC (Public Warehouse Company) Logistics' Microclear – Kuwait
- Dubai Customs' eMirsal – Dubai
- Singapore government's TradeNet – Singapore
- Developing the system in-house

High-level criteria used to evaluate different options cover most of the required functions as well as the technical requirements.

Shortcomings of the current process:

- JCD might not consider all viable vendors and solutions since, based on our understanding, there has not been any formal request for information process inviting other vendors to provide details about their customs IT solutions. However, the experience of other customs administrations suggests there is little choice in the market.
- It could be difficult to assess the amount of effort and resources required to customize or develop (based on the option selected) a particular solution when only looking at the availability of high-level functional modules. The true differences between evaluated options might only be revealed at the detailed business requirement level. Such business requirements would be the result of a thorough business analysis and review of the organisation, its policies, processes and procedures.

Recommendations

Recommendation 1

It is highly recommended that both JCD and the Aqaba Special Economic Zone (ASEZ) Customs coordinate their IT system selection activities and arrive at the same IT solution. It is critical that the sharing and exchange of the security and trade-related information between the two customs organizations are not impeded by the potential technical difficulties that could arise if the two customs organizations select different systems.

Recommendation 2

Select and follow a project management methodology - projects with a critical IT component share common management and delivery risks, issues and problems. It is necessary that a formal and proven project management methodology providing a framework for managing and delivery of such projects is selected, applied and followed throughout the whole life of the project.

There is an urgent need to substantially increase customs skills and capacity in IT project management and system development methodologies. Revisit customs recent projects with a large IT component (Human Capital Development and Management - HCDM, Comprehensive Integrated Tariff System - CITS) and apply the gained experience.

Recommendation 3

Revisit the current timelines and the selection process and apply an IT system procurement process recommended by the best practices and international standards. The true differences between evaluated options might only be revealed at the detailed business requirement level. Such business requirements would be the result of a thorough business analysis and review of the organisation, its policies, processes and procedures.

Recommendation 4

If the JCD decides to proceed with the current selection process and select an option by the end of December 2005, it is recommended that a first-phase evaluation piece – the detailed business requirements is completed by the selected organization (this approach would be valid even if deciding to build the IT system in-house) before a full contract to develop and deploy the whole IT system is awarded. The quality of the deliverable could help the JCD decide whether or how to continue with the organization for the whole project.

Recommendation 5

It is recommended that the JCD reviews its current business model - how JCD conducts its business and how it interacts with its stakeholders, the business community and other government agencies. This is an opportunity to implement world best practices, regional initiatives for standardisation and the agreements Jordan is signatory as well as guidelines from the World Customs Organization (WCO) such as the supply chain security, client accreditation, advanced processing or capacity building.

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Recommendation 6

It is recommended to engage the industry and other government agencies in the project from very early stages. Extensive consultation with industry and relevant government agencies would decrease the initial impact when deploying the new IT system.

Recommendation 7

It is highly recommended to review JCD's organizational structure, quality of internal cross-functional cooperation, policies, processes or procedures and go through the business requirement definition processes before engaging a vendor in building an IT system.

Recommendation 8

It is recommended that the risk management, risk monitoring and risk mitigation mechanisms and defined processes are in place. An appreciation of business risk management at all levels in an organisation will help to ensure that the impact of a project is fully understood and monitored throughout its life. JCD also needs to understand the potential risks to customs and other stakeholders if the project is not successful.

Recommendation 9

It is recommended that JCD defines measurable benefits of the project and establishes a framework for monitoring the delivery of the benefits.

1. Background

Automation of processes is a critical component of a truly modern customs administration. Automation in modern customs practice extends beyond the basic clearance of customs shipments to automated processes of:

- Human Capital Development and Management
- Training development and management
- Resource management
- Internal and external dissemination of information
- Financial management
- Fines, penalties and forfeitures processing
- Risk management and intelligence analysis

The main “business of customs” of the JCD’s automated system currently is ASYCUDA++. ASYCUDA is the world’s most widely used software by customs administrations because it has been distributed by UNCTAD to intended users in developing countries. ASYCUDA has been implemented in many countries as the first automated processing for their customs administrations. It has a basic and dependable processing engine for most customs regimes. It allows a customs administration to define rudimentary parameters for red, yellow, and green lane channels of transactions.

The lifecycle of ASYCUDA as an operating system appears to be declining. The articulated arguments for this statement include both a recognized business opportunity from the private sector to replace ASYCUDA and by UNCTAD itself. Currently, there are a number of IT solutions on the market generally grouped as potential ASYCUDA replacements. ASYCUDA itself has been going through a facelift process to a web enabled version, ASYCUDA World that is being deployed in a few countries.

The JCD has decided to replace the current ASYCUDA++ system because of its technical deficiencies, such as difficulties to enhance the current system because JCD does not have access to the ASYCUDA source code, ASYCUDA’s insufficient ability to communicate with other systems, and the fact that ASYCUDA is not a web-based system.

Recent experiences particularly on the Customs Integrated Tariff System (CITS) project currently being developed by USAID through the AMIR Program suggest that there is a need to substantially improve the IT capacity of JCD staff in IT project management and system development methodologies. The lack of such skills could become a problem if not recognized and addressed.

2. Consultancy

This report is prepared in accordance with the scope of work agreed under activity number 560 Customs Reform and Modernization - Scoping exercise for new customs software/ acting CRM manager. The objective of this consultancy is to conduct a scoping exercise of the environment in JCD and the inter-related border mandate agencies to identify the steps for a further justification for change in Jordan of the primary customs and border agency processing software

The purpose of this document is to provide a brief review, based on the international best practice and experience from other customs organizations, of the challenges, risks, options and the process of engaging in the process of replacing the customs core IT system.

The review of the current selection process at the JCD is based on interviews conducted with key members of the IT system selection committee, its chairman Mr. Mahmoud Wafa, Director of the Planning Directorate Mr. Marwan Gharaibeh, Director of the IT Directorate Ms. Somaya Al-Wahoush, Computer Affairs Director Mr. Khaled Ali Al-Zoubi, and Deputy Director of the IT Directorate Mr. Zakaria Al-Hamore.

3. System Selection

3.1 Current Approach

The Steering committee has selected a sound approach to assess solutions on the basis of vendor presentations, visits at vendors' sites as well as detailed analysis of a solution at JCD's premises. The review options are as follows:

- UNCTAD's ASYCUDAWorld - Geneva
- PWC (Public Warehouse Company) Logistics' Microclear – Kuwait
- Dubai Customs' eMirsal – Dubai
- Singapore government's TradeNet – Singapore
- Developing the system in-house

High-level criteria used to evaluate different options cover most of the required functions as well as technical requirements.

Shortcomings:

- JCD might not consider all viable vendors and solutions since, based on our understanding, there has not been any formal request for information process inviting other vendors to provide details about their customs IT solutions. Although the experience of other Customs suggests there is little out there to choose from.
- It could be difficult to assess the amount of effort and resources required to customize or develop (based on the option selected) a particular solution when only looking at the availability of high-level functional modules. The true differences between evaluated options might only be revealed at the detailed business requirement level. Such business requirements would be the result of a thorough business analysis and review of the organisation, its policies, processes and procedures.

Based on our understanding of JCD timelines (i.e., an option selected by the end of 2005) a possible option, before JCD signs a contract to develop and deploy the whole IT system, is to hire the selected organization (this approach would be valid even if deciding to build the IT system in-house) to undertake a first-phase evaluation piece – the detailed business requirements.¹ The experience and the quality of the deliverable could help the JCD decide whether or how to continue with the organization for the whole project. JCD would be losing no time as the detailed business requirements have to be completed for all of the evaluated options – system acquisition, in-house or outsourced development.

3.2 Reform and modernization

Building or customizing a new customs IT system should be a business project driven by the business needs of an organization and the customs business people (not the IT

¹ Defining detailed business requirements was a phase used in the selection of the new HCDM system and it is not an unknown concept within the JCD.

people) ought to define the system requirements and the expected benefits.² As stated by McLinden in the customs modernization handbook:³

“In recognition of the pivotal role computerization plays in modern customs administrations, many customs reform programs have placed a high priority on the selection and implementation of appropriate and effective technological solutions. Indeed, donors have often allocated large percentages of project funds to the upgrading or replacement of such computer systems. In recent years, however, there has been a growing acknowledgement of the problems and limitations of fully-technologically dominant modernization strategies and of the need to integrate technology into a wider and more comprehensive capacity-building effort across the entire organization.”

The greatest benefits of the new IT system could be obtained if it supports a truly modern customs organization. Application of the new IT systems has often been successfully used as a catalyst to improve organizational performance by applying new standards, business models, policies, processes and procedures.

3.3 Drivers

Reform and modernization programs in other customs organisations have often been instigated by some of the following drivers:

- Kyoto and the framework of standards on trade facilitation and security;
- Streamlining border management and security activities;
- Supply chain management – integration of customs systems and procedures with the advanced global logistics networks used by international trade and transport operators;
- Customs capacity building to cope with the growth of trade by working smarter;
- The need to integrate and modernize current customs IT applications to use it to deliver improved service;
- Commitment of the Jordanian Government to online service delivery;
- Electronic standardization and rapid expansion in internet usage by industry.

3.4 Challenges

Many organizations have experienced a great deal of difficulties when engaging in large scale IT projects. Organizations frequently underestimate the project complexity, its scope and size – this is usually understood during the process of defining detailed business requirements. It is highly recommended to review JCD’s

² As an example, the JCD is currently in the process of seeking mutual recognition from the United States under the WCO “Framework of Standards to Secure and Facilitate Trade.” Any new IT system should incorporate detailed business requirements to exchange secure data with other customs administrations.

³ 2005, The International Bank for Reconstruction and Development/The World Bank, *Customs Modernization Handbook*, edited by Luc de Wulf and José B. Sokol.

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organizational structure, quality of internal cross-functional cooperation, policies, processes or procedures and go through the business requirement definition processes before engaging a vendor in building an IT system.⁴ There is no need to start from zero - a lot of work addressing the above issues has already been or is being done.

Depending on the project scope, the new business requirements might force through changes of the Customs Law and other legislation and provide the basis for selecting an IT option. Certain issues raised by the project might require decisions from bodies outside the control of the JCD. Given the possible implications of the changes delivered by the new IT system, a lot of benefit can be gained from securing political support for the reform.

Changing or upgrading a customs transactional system will have a large impact on all stakeholders. The project could dramatically improve interagency collaboration related to the security, compliance and trade facilitation, as well as information exchange among agencies with the border management mandate. Based on the international standards, the project should standardise information exchange between Customs and industry (traders, shipping agents, customs brokers, airlines, express couriers, ports and airport authorities, etc). It is recommended to engage industry and other government agencies in the project from very early stages. Extensive consultation with industry and relevant government agencies would decrease the initial impact when deploying the new IT system.

Organizations often underestimate the internal project management skills and governance structures required to manage delivery of such a large program – the IT system specification and design becomes a set of many interlinked projects addressing customs functions and interfaces with other stakeholders (e.g., identifying a common indicator of a business entity across all government agencies; defining the process, control points, reporting requirements and information exchange between customs and the express courier industry; license information exchange between the JCD and Ministry of Industry and Trade, and its management and maintenance). Good governance and management structures, and experienced and skilled personnel are essential for the success of a major IT project, at the commencement and throughout the project.

The overall risk of managing complex projects that are divided into smaller independent projects increases exponentially due to the complex web of project interdependencies. It is a must to have risk management, risk monitoring and risk mitigation mechanisms in place.

3.5 Opportunity

A new IT system is an opportunity to review the current business model - how JCD conducts its business and how it interacts with its stakeholders, the business

⁴In their guidelines on IT projects “Decision Map for Project Strategy and Procurement”, the United Kingdom’s Office of Government Commerce (<http://www.ogc.gov.uk>) states that “the fundamental consideration is that if you cannot articulate what you want, the market will not be able to deliver it. Unclear objectives, poor linkage between those objectives and the intended outcomes, lack of clarity about what is required (and why) will lead to project failure. It is essential that your senior management has a clear vision of the rationale for, and desired outcome of, the project. Your organization’s business objectives should provide a solid foundation for the project and the baseline against which all negotiation and progress can be measured.”

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community and other government agencies. This is also an opportunity to implement world best practices, regional initiatives for standardisation and the agreements Jordan is signatory as well as guidelines from the World Customs Organizations such as the supply chain security, client accreditation, advanced processing or capacity building to name a few.

The new IT system offers an opportunity for:

- enhancement of customs risk management assessment;
- a closer integration and collaboration between Customs and other government agencies issuing licenses, permits, regulations etc;
- a closer integration with the industry – traders, brokers, shipping agents, logistics operators etc;
- international standardisation of customs procedures;
- a review of customs business systems and processes;

The new IT system specifications should be derived from the new business model with applications of new principles. Following are a few examples of such principles applied in other countries:

- Intervention by exception;
- Customs controls not impeding the flow of legitimate trade;
- Identification and facilitation of clearance for low risk cargo and passengers;
- Identification of high risk cargo prior to arrival;
- Application of thorough risk management framework;
- Treatment of clients in accordance with their compliance history and behaviour;
- Use of both incentives and sanctions to ensure and improve compliance – providing flexible arrangements for the Golden List Clients;
- Provision of all necessary information to clients are informed so that they can comply voluntarily;
- Shifting the burden of data entry in exchange for facilitated processing;

3.6 Risks

The risks in large applications development are very high mainly because of their size and complexity. The large application development requires a specific set of business, IT and project management skills. The project needs to follow a sound methodology and international software development standards, e.g., ISO/IEC 12207 - Information technology-Software life cycle processes.⁵

⁵ This International Standard applies to the acquisition of systems and software products and services, to the supply, development, operation, and maintenance of software products, and to the software portion of firmware, whether performed internally or externally to an organization.

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The overall project might become a set of many projects addressing different customs functions and aspect of the project – proper governance and project management structures are necessary to ensure tight management control.

One of the key risks is having an IT product driving the modernization process and Customs adjusting its business processes to suit the product's functionality. Based on the lessons learned by other countries, system specification should be an outcome of a business process review and reengineering.

The overall cost of implementation that will be carried by business and cost of bringing the stakeholders up to the level necessary to ensure smooth operations, e.g. training and certification of the brokers, might not be well understood.

Thorough quality management and risk management policies at all levels throughout all stages of the system design, development and deployment are necessary to deliver expected outcomes.

Customs environment is very complex, extensive consultation with the stakeholders from the conceptual phase of the project will smooth the impact of the business change delivered by the new IT system.

When engaging a vendor, the contract specifies how the risk is distributed between Customs and the vendor. The contract mechanism will also drive the delivery style and behaviour of the vendor.

The scope of the project will go beyond the IT application development and would cover issues such as data quality, data migration, help desk arrangements, user training and environment management to name a few.

Through life cost - an important decision that must be considered in the acquisition of new software, particularly a primary operating system is the through life costs. The through life costs are those fees that will be expended during the lifecycle of the product.

Through-life-costs for a new customs prime operating system must be measured against the costs paid by all users. The costs, in some cases, are not paid directly by the government but by a “per transaction” fee paid for by the private sector clients.⁶

⁶An example of this type of payment scheme currently in operation in Jordan is the Bureau Veritas contract for standards certifications. The Government should make a careful consideration to identify the ultimate beneficiary of the payment for through-life-costs or per transaction fees. Is Jordan benefiting or is the software provider, a non-Jordanian entity gaining the most? Money paid to the foreign entity does not re-circulate in the Jordan economy. Careful consideration of best national interests is required. This is the same dilemma that has placed pre-shipment inspection services (PSI) for customs valuation in strong question when the actual price paid in some cases for PSI services exceeds the annual budget for the entire national customs administration. As an illustrative example, the potential impact of per transaction fees can be estimated based on historical customs statistics. In 2004 the JCD processed 1,306,021 transactions that could potentially be the subject to a transaction-based fee. Assuming a fee of JD 10 per transaction, the annual payment would amount to over 13 million JD to the software supplier. Assuming a 10-year lifecycle for the proposed software solution, the total cost could amount to more than JD 130 million in through life costs plus any initial purchase price.

4. The Proposed Process

There is an ongoing interaction between the business changes and technology associated with a major IT project. The business changes should drive the technology and not vice versa.

Consult the stakeholders - the IT system will have a considerable impact on the all entities dealing with customs – other government agencies issuing licenses, permits and regulations, customs brokers and traders, shipping agents, transport and courier companies who are obliged to provide accurate and timely information to customs.

Establish the program governance structures to manage the program, review the current customs business model, review the legislation and the Customs Law, make the policy related decisions and interact with the stakeholders.

- Establish a Program Management Office to coordinate all business process reengineering (BPR) and system development activities, performance management and reporting, communicate the progress to both internal and external stakeholders.
- Identify business process/project champions – this will provide senior management sponsorship and key people within each process that are vital to make the BPR and modernization efforts successful. They will also own, manage, direct and report on progress of the modernization efforts.
- Identify business process project teams – they will deliver creative and innovative process solutions and manage implementation of the new processes aligned with the vision of the JCD. The teams will carry out process mapping, identify constraints of existing information systems and organizational factors, conduct process improvement, redesign and testing, identify new technologies, new skills, and new organizational structures based on the new business model.

Business process reengineering (BPR) should be completed or substantially completed prior to contract or application development, as the information from BPR is necessary to define the scope of the contract. If this is not done, subsequent change requests and variations to the contract are inevitable.

The goal of the BPR process might consist of the following activities:

- Identify the main organizational and structural parts of customs⁷;
- Map business processes and information flows;
- Understand and identify how customs' critical processes interact;
- Describe customs' interaction with other agencies and stakeholders;
- Review of customs practices and processes to match those identified as a world best practice customized for the Jordan environment;
- Identified scope and gap between today's and future systems;
- The review will guide the conceptual development of the IT system and provide basis for defining user and system requirements;

⁷ Parts of this work is already ongoing as part of the Human Capital Development and Management change processes.

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- Implement of knowledge management principles, collaboration and knowledge sharing, in the redesigned business processes
- Define an evaluation framework measuring benefits of the modernization initiative.

Producing the detailed business requirements - this task will be performed by the business process project teams led by the project champions. The outcome of the whole process mapping and evaluation exercise will be detailed understanding of the process activities, roles within each process, information flow and exchange and collaboration with internal and external stakeholders. All customs processes and their interdependencies, including all business, access, exceptions and security rules, data quality and validation requirements will be mapped out and translated into detailed business requirements.

Documented detailed business requirements will serve either as specifications for a new integrated system development or a customization of an off-the-shelf-solution.

4.1 Potential benefits

- Enhanced risk management process;
- Enhanced identification of both high risk and low risk consignments;
- Minimization of the level of intervention of the JCD in the flow of legitimate trade and people across the border consistent with the need to exercise the necessary level of control;
- More accurate information and a better tool set for risk management and post-clearance audit purposes;
- Reduced cargo clearance times for the discharge of customs formalities;
- Enhanced accuracy and timeliness of management information and better tools to analyses;
- Better cooperation and information exchange with other border control agencies, increased transparency and predictability for the business sector;
- More efficient revenue collection and accounting;
- More accurate and timely trade statistics.

Customs should clearly define each of these benefits and have measurable expected outcomes that the new system will deliver – defined and articulated goals will be critical in selection of a new IT system.

4.2 Transparency

It is important and a good practice to aim for the maximum level of process transparency throughout the IT system procurement. Following the best practices and international standards during the IT system procurement process would also help to ensure that Jordan will select the best option during the IT system acquisition process. The due process will guarantee transparency and provide a business case and justification for securing resources necessary for such a large and complex project.

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Once the business requirements are published and a fair and open competition for the procurement process has been completed the full through life costs paid for by all stakeholders must be disclosed. The issue of fees that will be paid by the private sector based on a system selection by the government can also create a private sector backlash as exemplified by the issuance of the Bureau Veritas contract in Jordan for standards certifications.

4.3 Options

There are a few options for the IT system: (a) acquisition of an off-the-shelf (already developed) product, (b) building the system in-house, (c) outsourcing the system development, (d) any combination of the previous choices or (e) enhancing the existing system – this might not be applicable since the JCD doesn't own the source code. Each of the choices has its own advantages and disadvantages and we need to understand risks associated with each of the options.

Option 1 - Cost-off-the-shelf products

Advantages

- cost of acquisition might be lower when compared with the in-house or outsourced development;
- depending on the application customizability and on the effort required to customise the application to fit Customs' requirements, it might decrease the system design and development phases – thus the time for project completion might be shortened;
- there is a lower requirement for in-house technical skills and abilities;

Risks

- a lot of effort for customisation might be too high if there is a functional mismatch (this risk is increased when the detailed business requirements are not well understood at the selection process);
- system incompatibility with Customs' current systems on site and integration difficulties – the new systems' technology and architecture will impact architecture and technology of future Customs systems;

Option 2 - Developing the system in-house

Advantages

- the system can be built to the Customs specific requirements and demands;
- easier integration with Customs legacy systems;
- development might strengthen the expertise of the IT Directorate that can be used to support sustainability of the system and its future enhancements;
- the gained skill and experience might be used to develop future customs systems;

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Risks

- Emphasis on the in-house system development skills - In case of deciding to build the system in-house – only a skilled and competent IT department experienced in development of large and complex IT systems, adhering to IT system development standards and methodologies can guarantee successful completion of such projects (it is understood that the JCD gained a lot of experience and knowledge during the last ASYCUDA deployment and from the post deployment maintenance and enhancements);
- not enough skilled employees to get job done;
- not enough time given to project because other jobs are and daily operations demands are on the plate;
- staff turnover when skilled employees may quit during or after the project;
- the development will take too long.

Option 3 - Outsourcing system development

Advantages

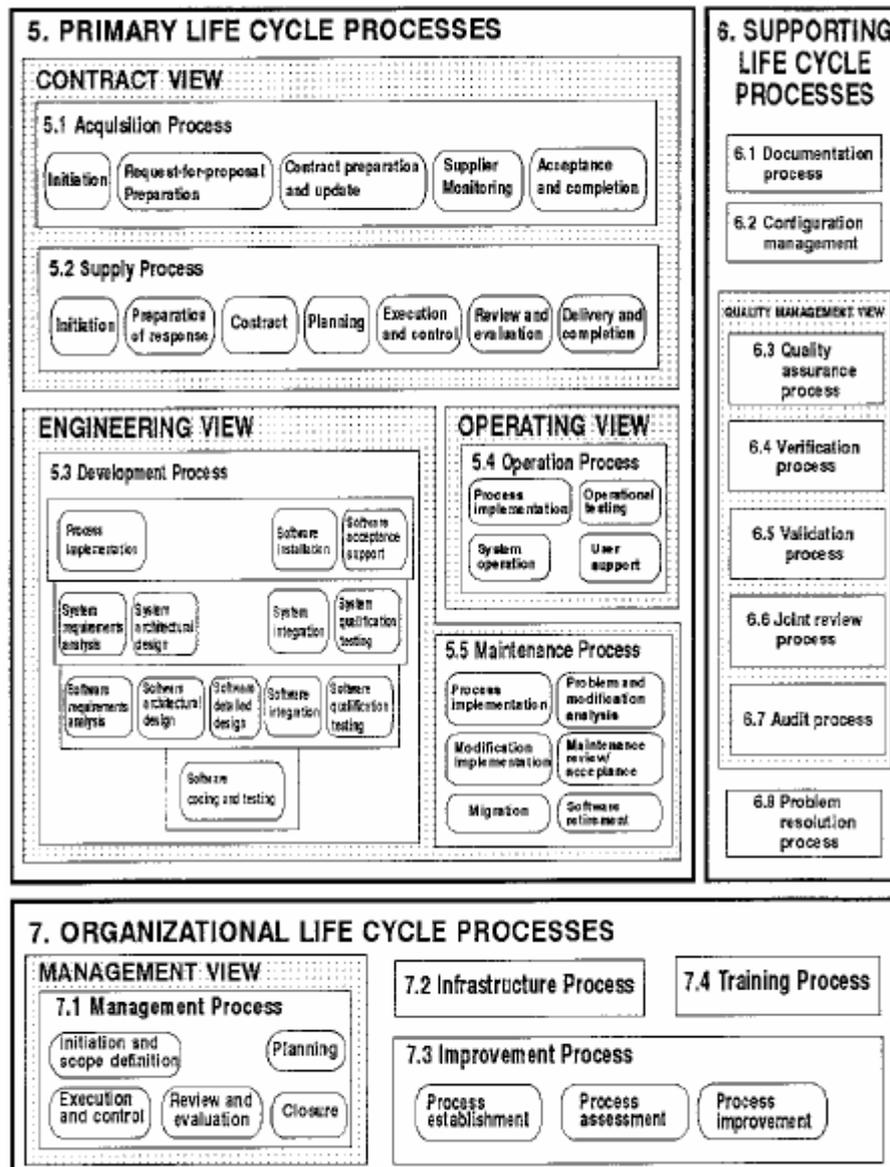
- the vendor might provide necessary skills and methodology for large application development;
- the system can be build to JCD' specific requirements and demands;
- involving in-house technical staff in the four-step project process, which enriches job experience.

Risks

- the vendor might not understand the business;
- the cost of development might be very high;
- long timeframes.

Annex 1: Software life cycle processes

© ISO/IEC 12207:1997 – “Information technology—Software life cycle processes”



The position order of activities does not mean time order.
Names of activities in the Development Process are not names of development phases.

Figure 1 - Software Life Cycle Processes, Views and Activities