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Trade and Investment Information System (TIIS) Scoping Study

AMIR II Achievement of Market-Friendly Initiatives and Results

December 2004

This document was produced for review by the United States Agency for International Development. It was prepared by Chemonics International Inc.

JORDAN AMIR II

Achievement of Market-Friendly Initiatives and Results

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

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.

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 Report: December 2004

Document Title: Proof of Concept for a Trade and
Investment Information System (TIIS)
Final

Author's Name: Andrew Ford, AlliedSoft, Al-Jidara

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

Trade and Investment Information
System Scoping Study
432.14 Trade and Investment
Information System

**Trade and Investment Information System (TIIS) Scoping Study
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Data Page

Name of Component: ICTI

Author: Andrew Ford, AlliedSoft, Al-Jidara

Practice Area: Trade and Investment Information System

Service Offering: N/A

List of Key Words Contained in Report trade, investment, TIIS, metadata, ISO11179, data governance, data management, statistics, information model, stewardship, registry, repository.

Abstract

This report summarizes the outcome of work undertaken as part of a scoping study for a trade and investment information system (TIIS) in Jordan. It addresses current business and technical gaps in trade and investment statistics, provides a vision for a future TIIS, including a best practice governance framework and reports on the results of a successful proof of concept for the envisaged solution. It presents a detailed project plan for the next two phases of the project.

Acronyms & Abbreviations

ASEZ	Aqaba Special Economic Zone
DB	Database
DOS	Department of Statistics
ETL	Extract/Transform/Load
HS	Harmonized System
IPR	Intellectual Property Rights
ISO	International Organization for Standards
JIB	Jordan Investment Board
JIEC	Jordan Industrial Estates Corporation
MIT	Ministry of Industry and Trade
QIZ	Qualifying Industrial Zone
TIIS	Trade and Investment Information System

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EXECUTIVE SUMMARY

Quite simply put, Jordan can no longer afford to have its trade and investment-related ministries collect, manage and report trade and investment statistics in the manner which it has over the past few years. Fragmentation, duplication, inconsistency and the inability to share data between agencies means Jordan cannot plan its policies properly, cannot meet its international reporting obligations, and cannot provide investors and donors with the information they need to make the right decisions.

As a bare minimum, each of the trade and investment agencies needs to adopt a minimum set of data standards to clean up the poor state of their current data collections in order to make that data more useful to policy makers and decision makers. That would be a good start to better data management in the kingdom.

To take this one step further, Jordan's trade and investment agencies should agree to a common set of data standards, definitions and data management practices to ensure full data "interoperability"¹. This requires them to adopt an appropriate governance structure, based on international best practice that binds each and every party to conforming to the agreed standards.

The best of all worlds would be to develop and adopt a comprehensive trade and investment information system (TIIS), demonstrated in the proof of concept delivered by this project that could pull all data and metadata elements together in a single, integrated source of Jordanian trade and investment data. That could then be a one-stop-shop for all users of this data and would be the foundation for analyzing any gaps in existing data collections against requirements.

Whether or not a TIIS is developed beyond the proof-of-concept, the data governance framework set out in this report will deliver a quantum leap in the quality of trade and investment statistics currently available to users. It could provide a model not just to other Jordanian government agencies in other data domains, but to other developing countries collecting, analyzing and reporting data.

This report provides a number of options available to Jordan to fix the lack of data interoperability in the trade and investment subject domain. It recommends designing, developing and deploying a metadata repository to facilitate data exchange and standardize definitions, managed by a simple, scalable and effective governance model. To do this, a number of practical steps need to be taken by following a phased approach to the project. These steps are addressed in a detailed project plan.

¹ The ability to exchange and use information (usually in a large heterogeneous network made up of several local area networks)

Vision for the future

A practical solution to overcoming the current business and technical gaps in Jordan's trade and investment data has been designed developed and has now been proven in concept. If adopted and implemented by the TIIS agencies, it will deliver data to users of trade and investment statistics from a single, consolidated and reliable source. It will ensure full interoperability of data by providing consistent definitions of data within and across entities. For the first time, Jordan policy-makers, business, and the international trade and investment community will be able to use comparable indicators that can be trusted and where source, collection methodology and ownership are fully understood.

The TIIS will provide all stakeholders with faster access to key statistics at lower cost than at present and help in the collection, analysis and reporting of data. It will allow for consistent and accurate results across the trade and investment subject domain. This will result in better decisions and policy formulation being made by the Jordanian government. Just as in other countries that have taken this approach, this model can be readily applied across the rest of the trade and investment data domain and can be used as a template approach to data management and data governance across other data domains (e.g., financial markets, telecommunications, education, health and welfare, etc.). A simple, scalable and unified data management framework across the whole-of-Jordan government will result in better policy, better decisions and lower costs.

The model proposed for a TIIS, and upon which the proof of concept was built, focuses on using a metadata repository. Metadata is more than "data about data". To understand metadata's vital role in the TIIS, consider the purpose of a card catalog in a library. The card catalog identifies what books are in the library and where they are physically located. It can be searched by subject area, author, title, etc. By showing the author, number of pages, publication date and revision history of each book, the card catalog helps you determine which books will satisfy your needs. Without the central card catalog information system, finding books in a library would be a cumbersome and time-consuming task.

Metadata is the card catalog in an integrated information system. By defining the contents of the information system, it helps the user locate relevant information for analysis. In addition, the metadata allows the user to trace data from the information system to its operational source (drill-down) and to related data in other subject areas (drill-across). By managing the structure of the data over a broad spectrum of time, it provides a context for interpreting the shared meaning of the information.

The benefits of using a metadata repository, from both a user's perspective, and that of a systems developer's perspective is summarized in Annex 1.

Background

AMIR has previously addressed the problem of poor trade and investment data² and recommended that a new approach to data and statistics management was required. It tasked the project team³ to scan the present trade and investment statistical environment, work out where the gaps were in the current data sets and develop a model system for managing trade and investment data, including an appropriate governance structure. A number of deliverables were presented during the project including a TIIS scoping study business case report, a detailed business gap analysis, a detailed technical gap analysis, an information model, a proposed governance framework and the proof of concept.

The following broad objectives were set for the project:

- Scoping the TIIS project in phases and identifying areas of possible AMIR involvement;
- Coordinating with stakeholders and getting buy-in on the project scope; and
- Developing a workplan for the project that details the project phases and required effort and timeline to develop.

This scoping study report represents a synthesis of this work, including a set of options, a recommended approach and a detailed project plan for the next stage of the project.

Methodology

The project team put itself in the shoes of a trade and investment policy-maker and brainstormed a number of policy-related questions. It came up with twenty high-level questions⁴. Some of these included the following:

- From a national government perspective – what is the impact of Qualified Industrial Zones (QIZs) on Jordanian employment;
- From a donor perspective – what is the effect of the Jordan-US Free Trade Agreement (JUSFTA) on Jordanian imports from the US?
- From a multilateral agency perspective – what is the level and flows of foreign direct investment into Jordan over the last five years; and
- From a business person’s perspective – what have been the major trends in the exports of electronics by region?

The team used a number of business and technical criteria to choose five questions ranked in terms of quality and feasibility (refer to Annex 4 of the *Trade & Investment*

² Refer to the following reports: Greta Boye & Hana Uraidi-Hummudeh, *Trade and Investment Information Systems in Jordan*, AMIR Report, June 2001; Greta Boye, Abdel Shamlawi, Peter Gallagher & Amir Tahami, *Jordan’s Ministry of Industry and Trade Center of Excellence Program: Information Management Assessment*, AMIR Report, July 2002; and Greta Boye, *Moving Towards an Integrated Trade and Investment Information System in Jordan*, AMIR Report, December 2002.

³ Comprised of staff from AMIR, Al Jidara and AlliedSoft.

⁴ Refer to the report, Al Jidara, *Trade & Investment Information Scoping Study: Business Case Report*, AMIR Report, May 2004.

Information Scoping Study: Business Case Report). The team went through the process of trying to answer the questions and expanded them to sub-questions. On the basis of site visits to the stakeholder agencies, four questions were chosen for the proof of concept. These were as follows:

1. What is the impact of the Industrial Estate (IEs), QIZs and ASEZ on Jordan's exports by sector and commodity?
2. How much local and foreign investments have the IEs, QIZs, and the Aqaba Special Economic Zone (ASEZ) attracted? In which sectors and from which countries?
3. Are investment incentive schemes (ASEZ, Jordan Investment Board (JIB) (A,B,C), Jordan Industrial Estate Corporation (JIEC)) offered in various regions in Jordan effective in attracting investments to the less privileged ones?
4. What has been the impact on Jordan's trade of joining the World Trade Organization (WTO) and signing many multilateral and bilateral trade agreements (Free Trade Agreement (FTA), European Union (EU) Association Agreement, Greater Arab Free Trade Agreement (GAFTA), QIZ, etc)?

A team of business and technical experts then visited each of the stakeholder agencies identified in order to survey and review the datasets held by the agencies and obtain relevant data to answer the business questions set and populate the proof of concept.

Once the site visits were completed, a detailed business gap analysis⁵ and a detailed technical gap analysis⁶ were completed. These findings are addressed in the next section. Concurrently, international best practice in data management and interoperability was studied and a governance model was developed and is discussed further below. A working demonstration of the proposed data model, using a single question (question 1 above) was built and is also discussed below.

The limited scope of the proof of concept in this methodology was deliberate. Proving the concept using only a discreet set of trade and investment statistics demonstrated the broader applicability of the information architecture, technical solution and governance model to the rest of the trade and investment subject domain. Proving the applicability to the trade and investment subject domain will demonstrate the viability of the approach to other subject domains. The approach recommended could eventually be adopted across all other subject domains in a whole-of-government approach in Jordan.

Current status of Jordan's trade and investment data

In the process of developing a proof of concept for the TIIS a number of physical challenges, technical gaps and business gaps became apparent. For the user of this trade and investment data, the gaps resulted in an unacceptable amount of time required to obtain the data in order to make the right trade and investment policy and decisions. Once obtained, a significant amount of time and expertise is then required

⁵ Al Jidara, *Trade and Investment Information System: Detailed Business Gap Analysis*, AMIR Report, September 2004

⁶ Allied Software, *Trade and Investment Information System: Detailed Technical Gap Analysis*, AMIR Report, September 2004

to harmonize the data from disparate sources in order to make it useful. Simply put, it is currently impossible to obtain consistent and accurate answers to key trade and investment questions in Jordan today. Clearly, the *status quo* is not an option for Jordan today without undertaking a considerable amount of data cleansing and workarounds.

The following represents a more detailed analysis of the business and technical gaps in Jordan's trade and investment data.

Physical Challenges

The data required to answer the representative question chosen for use in the proof of concept was simply not available from a single source. Instead, three different data sets had to be collected from three different entities, namely:

- Customs: where data was collected for the National Customs area and JIEC exports;
- Ministry of Industry & Trade (MIT): where QIZ export data was collected ; and
- The Aqaba Special Economic Zone Authority (ASEZA): where ASEZ exports were collected.

As shown in figure 1, the data sets required to answer the question had to be obtained through physical requests to the entities involved. Data was collected in a variety of formats, including hard and soft copy - none of this information was accessible or available online.

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Figure 1 Physical challenges to data integration

Technical Gaps

An examination of the existing network infrastructure/architecture showed there were different relational database management systems in place within each of the entities as well as different client applications.

[Error! Objects cannot be created from editing field codes.](#)

Figure 2 Technical gaps in datasets

These different network infrastructures/architectures and client applications are illustrated in tables 1 to 3. As figure 2 demonstrates, these technical differences, including the absence of any protocol for data transferal between the entities, made data interoperability between the entities extremely difficult. The architecture outlined in the proof of concept discussed below, seeks to overcome this technical gap.

Table 1 Network infrastructure used at the TIIS entities

Entity	Network Domain	Network Bandwidth	Firewall
ASEZA	Windows 2000 Domain	10/100 mbps. 1-Gigabit Backbone. 1MB Lease Line.	Data not available

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Customs	Windows 2000 Domain	10/100 mbps. 64 KB Leased Line connections with other Customs centers.	Sun Screen
DOS	Windows 2000 Domain	10/100 mbps. Fiber-Optic Backbone.	Sun Screen
JIB	Windows 2000 Domain	10/100 mbps.	Data not available
JIEC	Windows 2000 Domain	10/100 mbps.	Microsoft ISA Server
MIT	Windows 2000 Domain	10/100 mbps. 64 KB Leased Line connections to other departments.	Sun Screen

Table 2 Client applications at the TIIS entities

Entity	Client Platform	Client Application	How Data is Accessed
ASEZA	Windows 98 and 2000	Web-based Applications (Microsoft Technologies)	OLE DB
Customs	Windows 98, 2000, XP, and Dummy Terminals (Oracle Text Mode).	FOXPRO. Oracle Clients (Developer 2000) Different client applications build using Microsoft Visual Studio 6.0/.NET, and VB.NET.	OLE DB ODBC
DOS	Windows 98, 2000, and XP.	Web-based Applications (Microsoft Technologies) Oracle Clients (Developer 2000)	OLE DB ODBC
JIB	Windows 98, 2000, and XP.	Oracle Clients (Developer 2000)	ODBC
JIEC	Windows 2000 and XP.	Oracle Clients (Developer 2000)	ODBC
MIT	Windows 98, Me, 2000, and XP.	Web-based Applications (ASP and COM+). Oracle Clients	OLE DB ODBC

Table 3 RDMS used at the TIIS entities

Entity	DB Server Platform	Number of DB Servers	RDBMS
ASEZA	Windows 2000 Server Family.	3 Servers (hosted on 2 Hardware Servers)	Microsoft SQL 2000 Server Oracle 8i (Windows-based)
Customs	Windows 2000 Server Family. SCO UNIX Intel-based system. SUN Solaris.	20 Servers (each Customs center has 2 DB Servers for the ASYCODA system, and a third Server to host the customs declaration activities)	Oracle 7.3, 8i, 9i
DOS	SUN Solaris (6.0 and 8.0).	3 Servers	Oracle 7, 8i
JIB	Windows 2000 Server Family.	1 Server	Oracle 8i
JIEC	Windows 2000 Server Family.	1 Server	Oracle 8i
MIT	Windows 2000 Server Family.	4 Servers	Oracle 7.3, 8i, 9i

Business Gaps

For data interoperability to become feasible, it is essential that all of the TIIS entities standardize on a number of lookup data, such as country codes, commodity classification (harmonized system codes), trade classification (e.g., international standard industrial classification (ISIC) and investment sector classifications.

However, as discussed above, a closer examination of the trade and investment data collected by the different entities revealed a number of discrepancies (see Annex 2 for a more detailed overview of the difficulties encountered trying to answer each of the

four representative questions) and the workarounds that were required to harmonize this data.

The following issues were associated with answering question 1 mentioned above:

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Figure 3 Inconsistent country codes

Comparable data across entities was simply not comparable. For example, ASEZA, Customs, the Department of Statistics (DOS), and MIT are considered the main suppliers for trade data within the scope of this study. However, these entities are using inconsistent country code values (see figure 3).

There were inconsistencies with how country codes were used within the agencies themselves. ASEZA country codes were used to present trade data collected by ASEZA, MIT and Customs. DOS country codes were used to collate trade data collected by DOS. Figure 4 shows how ASEZA uses inconsistent country codes within its own trade data base. This is striking given that ASEZA as an institution is less than four years old and yet it already uses inconsistent data definitions.

This situation could be avoided if each agency had a data model in place and a supporting set of data management policies (see Annex 3). None of the agencies visited as part of this project had data models available or in place. For example, JIB has no data model and no data documentation procedures in place, meaning they have no data sets, just statistics to report.

There are also significant methodological differences in trade data collection. JIEC does not collect time series or historical data for its exports, which is why the TIIS project team needed to source these from Customs.

Trade data provided for the IE exports from Customs were simply wrong as some IE exports to certain countries (such as North Korea or Malaysia) were greater than Jordan's overall exports to these places. Private IEs have very poor and unreliable export data at each IE, and their exports cannot be obtained from any other more reliable source (Customs do not collect their export data), indicating that this potentially large and expanding initiative of creating private IEs is not being measured properly.

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Figure 4 Inconsistent country codes within entities

There are also problems associated with different commodity classifications used between the TIIS agencies. For example, JIEC is using their own commodity and trade sector classification scheme. These classifications are tailored to meet their own business requirements which do not need to use the full HS code or ISIC classifications. In addition, these classifications are neither consistent nor interoperable with classifications used by any of the other trade entities. ASEZA is using an additional chapter (chapter 98) of the Harmonized System (HS) code which is not being used by the other TIIS entities. This is incompatible with national customs and the broader trading community. The HS code used by the TIIS entities also included Arabic definitions that were not consistent between the TIIS entities.

Data inconsistency is also present within single entities. For example, DOS is using a different version of the HS code each year. These different versions are caused by minor changes to the Arabic version of the HS code description text.

There are also problems with how trade figures are recorded by currency between the various entities. Figure 5 shows that ASEZA is the only entity that is using currencies other than Jordanian Dinar to register trade activities. In some cases, trade activities are registered in a currency that is neither Jordanian Dinar nor the US dollar, nor the official currency of the destination country. Some exports are recorded in currencies that are no longer in international circulation (e.g., the German Deutschemark).

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Figure 5 Inconsistent currency codes

Other problems with data being collected by the various TIIS agencies include the following:

- QIZ export data is neither disaggregated by commodity nor by QIZs;
- Export data by agreement (JUSTFA, GAFTA, EU Association Agreement, etc) is simply not collected; and
- There are incompatible investment indicators collected and recorded by each of the different entities. For example, these may include registered capital, invested capital, investment value, or approved capital

Realizing the vision

By adopting international best practice in data and metadata management, Jordan can be a showcase to other developing countries in the region and across the world.

The following section describes the underlying information model used in the proof of concept before describing the proof of concept in detail. The proposed solution will not work without an appropriate data governance framework. This is discussed further below.

Proposed Information Model

A number of approaches to developing the information model underlying the proof of concept were developed, including a metadata repository architecture, a data warehouse architecture and a combination of both of these⁷. There are a number of reasons why the metadata repository architecture was preferred:

- Data sources will not be touched – the staging database is implemented to reduce the load the solution will impose on the different operational data sources. The database can be configured to retrieve updates from the different data sources during their low-load times;

⁷ Allied Software, *Trade and Investment System: Information Model*, AMIR Report, September 2004.

- The staging database will enable data to be queried from a single data source which will make managing the data easier;
- No staff training on new technologies imposed by the proposed solution is required at the involved entities;
- No infrastructure, systems or databases upgrades are required, assuming solution performance remains acceptable. Data extraction, transformation and load tools can be purchased separately – these will use the metadata elements held in the metadata repository (registry);
- Design and implementation complexity is relatively low when compared with other information models; and
- There are endless possibilities for reporting data from the proposed system, especially when used with “Export to Excel” tool in the proof of concept (see further below).

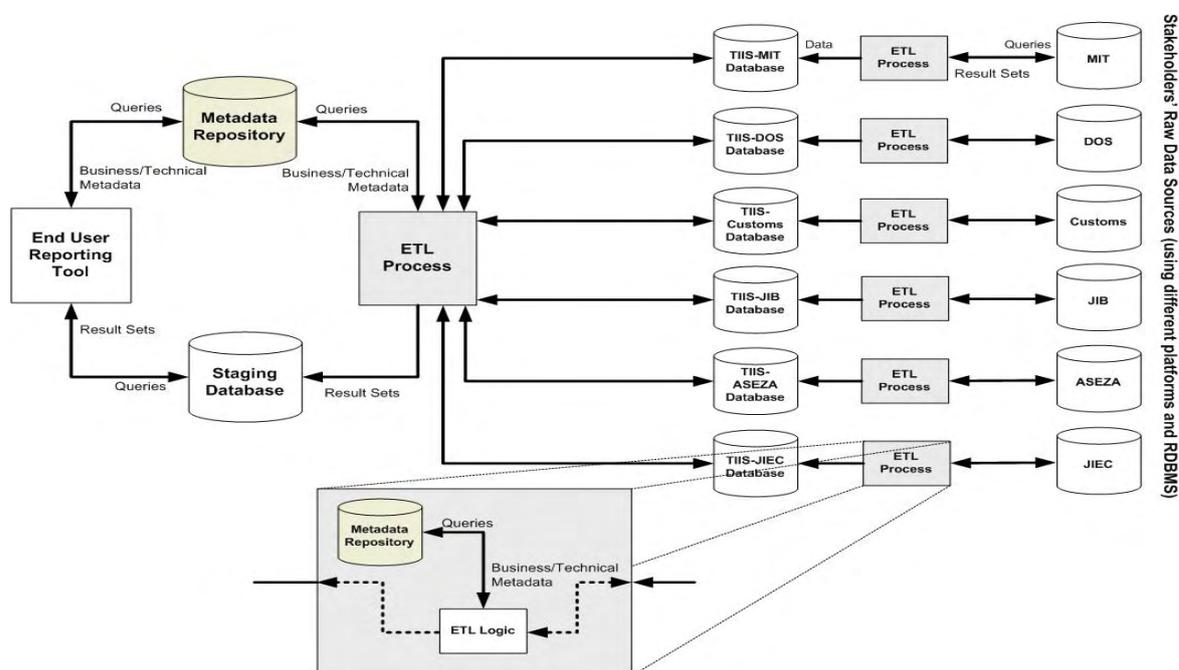


Figure 6 Proposed Information Model

The proposed information model presented in figure 6 is a large scale version of what was done in the proof of concept.

Proof of Concept

It should be remembered that the proof of concept that was designed and developed is a “demonstration” of the proposed system; it is not the final system itself. The proof of concept was based on the metadata repository architecture proposed above.

In order for the proof of concept to work properly, some of the deficiencies mentioned in the first part of this report needed to be resolved. Once the data was received a number of data mapping rules and workarounds needed to be done in order to improve the quality of the data (refer to Annex 2). It took a considerable amount of time, effort and expertise to overcome these gaps, discrepancies and inconsistencies between the different data sources. The proposed governance model discussed below,

and the use of a number of commercially available data extraction, transformation and load tools will help streamline this process once the full system is developed.

The aim of the proof of concept was to consolidate all extracted data, including metadata in one single location. The TIIS “homepage” (figure 7) therefore allows access to both a reporting tool for pre-packaged and ad-hoc reporting and to the underlying metadata used in the information model.

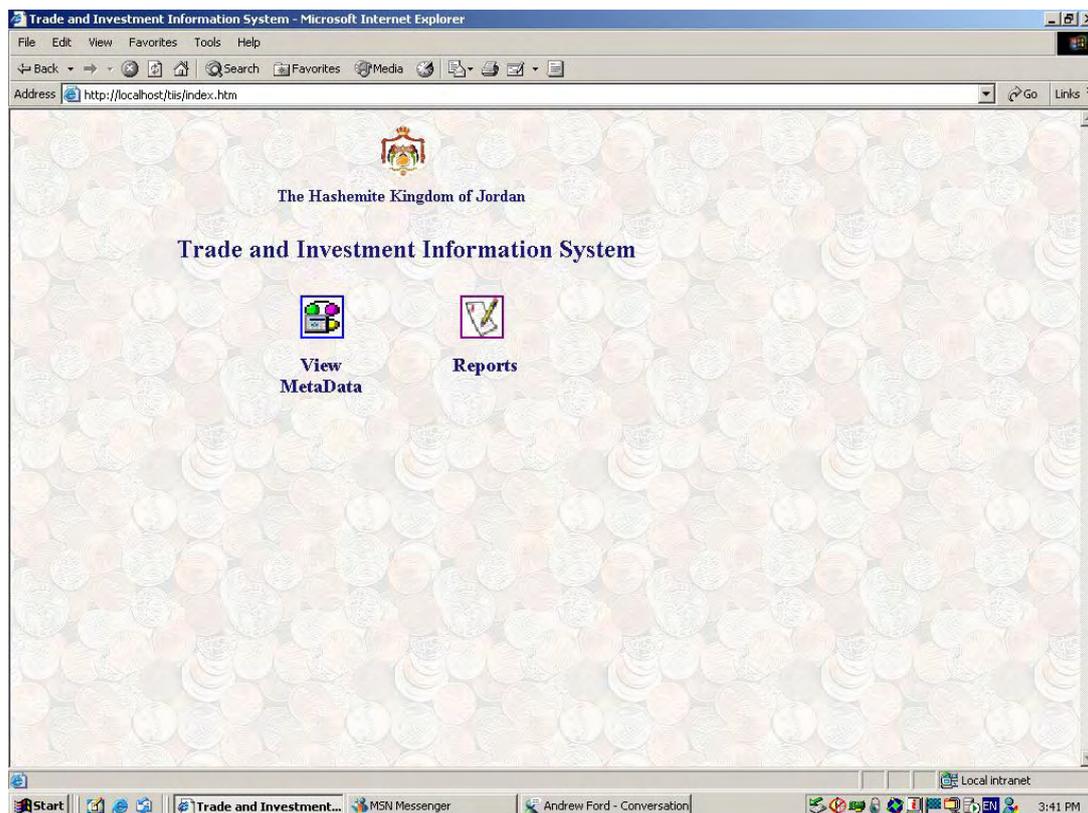


Figure 7 TIIS home page

Clicking on the reports button opens the report interface. A number of prepackaged reports are included here. Clicking on Exports of ASEZA provides the following (see figure 8):

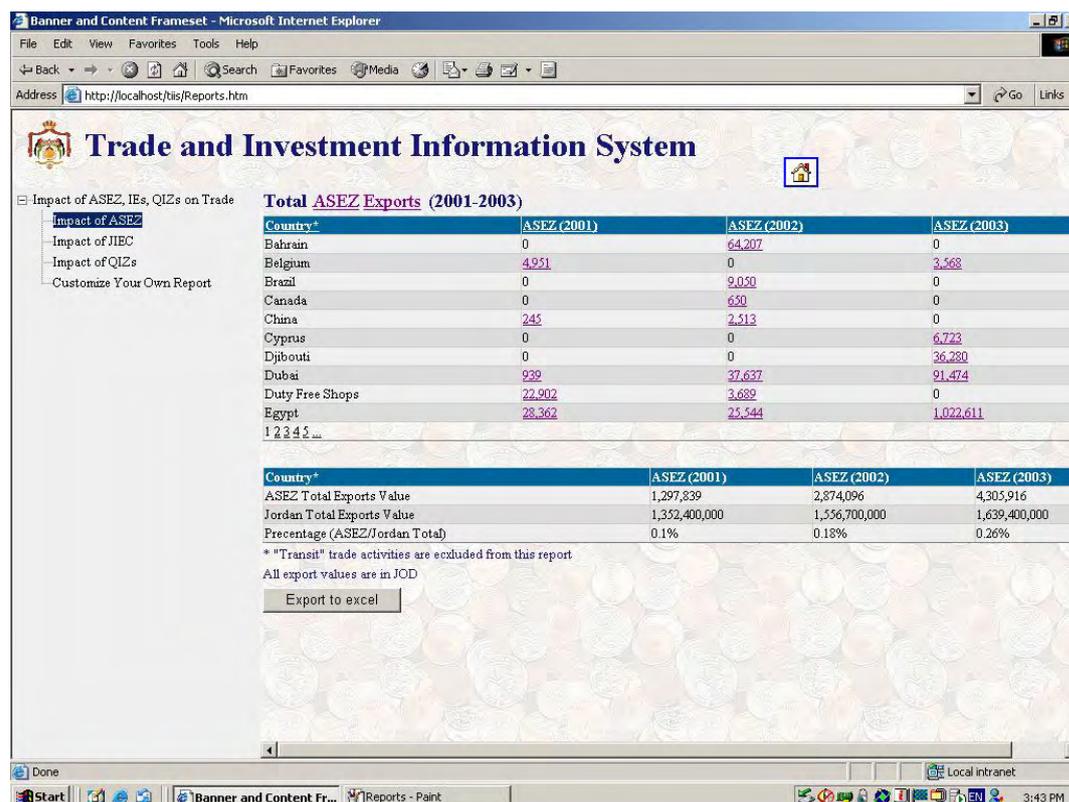


Figure 8 ASEZ exports

From an analytical perspective, this report is useful for a number of reasons. It shows that ASEZ exports have almost tripled in three years, albeit from a low base.

Clicking on the “Impact of QIZs” fixed report generates the following screen (figure 9):

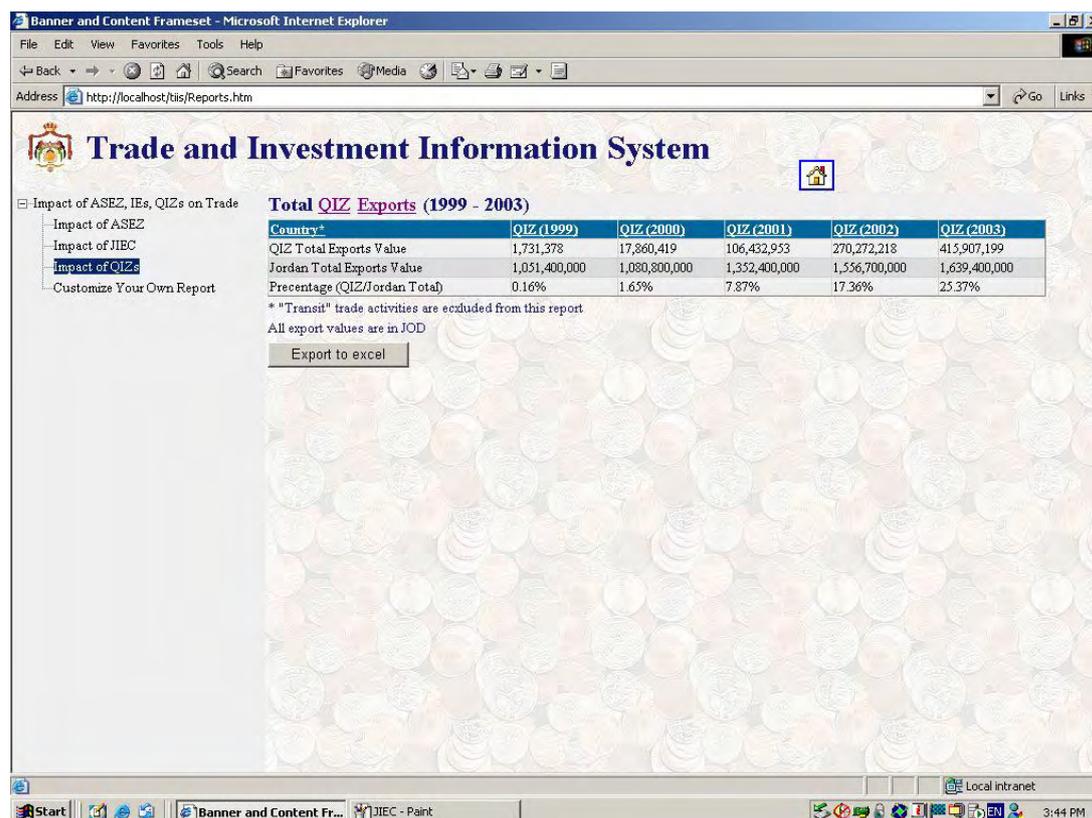


Figure 9 QIZ exports

Once again, from an analytical perspective, this fixed report is useful as it demonstrates that QIZ exports by now account for a quarter of Jordan's overall exports.

Generating these fixed reports, in absence of the information model upon which the proof of concept was based, would have taken considerably more time to compile and review, varying anywhere between ten minutes for the QIZ data, to a full day to get the JIEC data, to more than two working days to get and review the ASEZA data. With the proof of concept all of this data can now be obtained with a simple click of the mouse.

However the real power of the proof of concept can be seen when the customized report feature is used. Through the use of drop-down menus, users can select which countries, commodities, and years can be included in the report. In addition, results can be selected by amount (greater than, lesser than, etc) and can be grouped according to country or commodity.

Figure 10 shows the screen presented when the user selects the customized reports option.

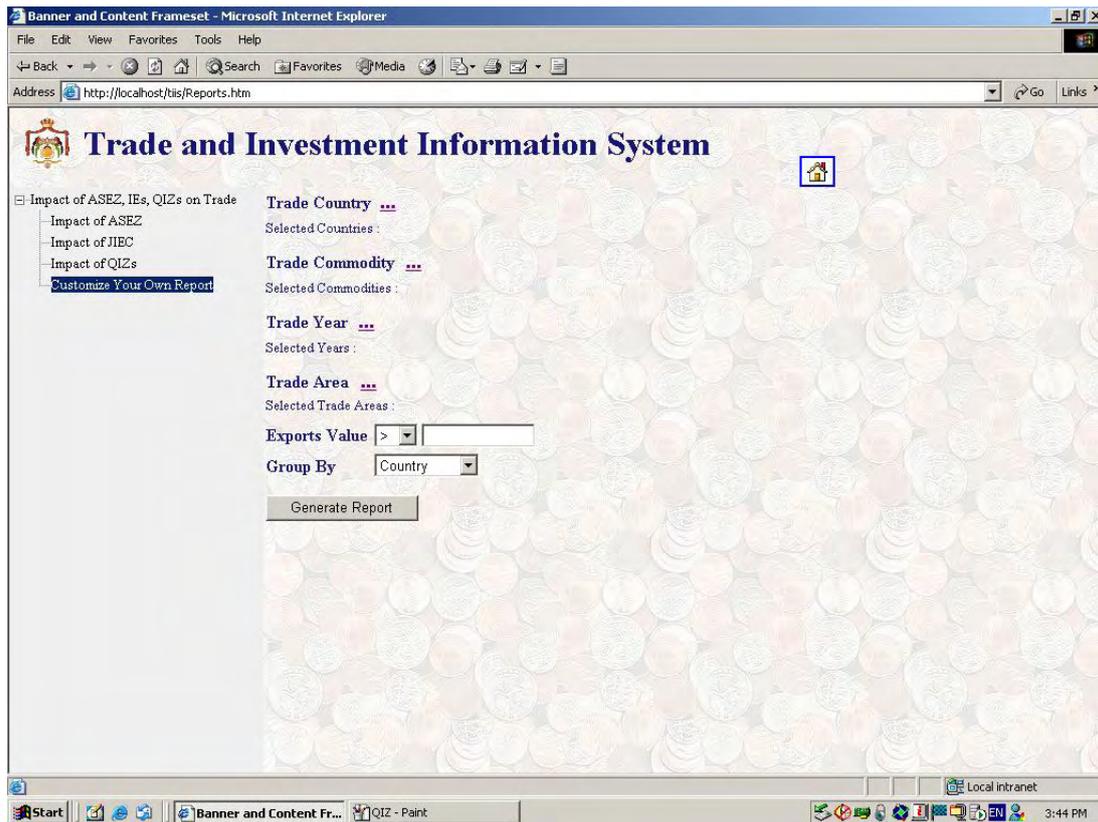


Figure 10 Customized report interface

The user can then select the trade destinations they want, as is shown in Figure 11.

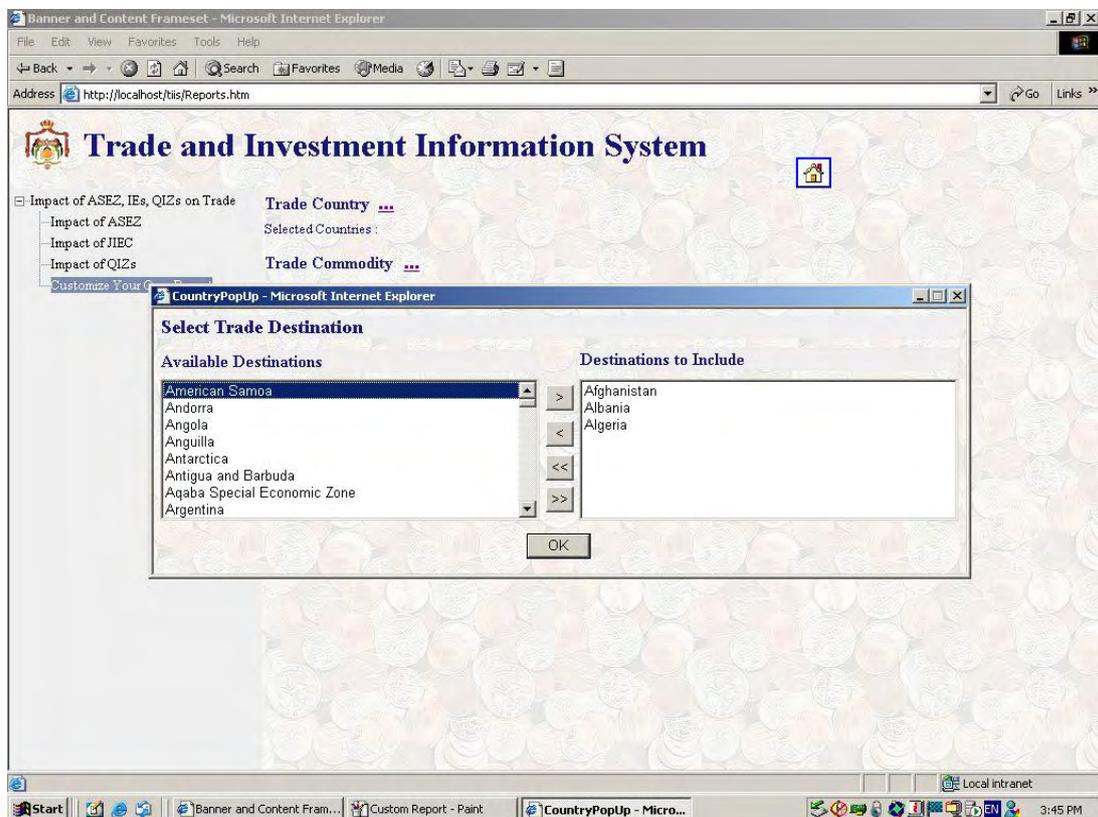


Figure 11 Select trade destination

The following results are presented to the user (figure 12). The user can then send the results to Microsoft Excel for further analysis and producing graphs (figures 13-14).

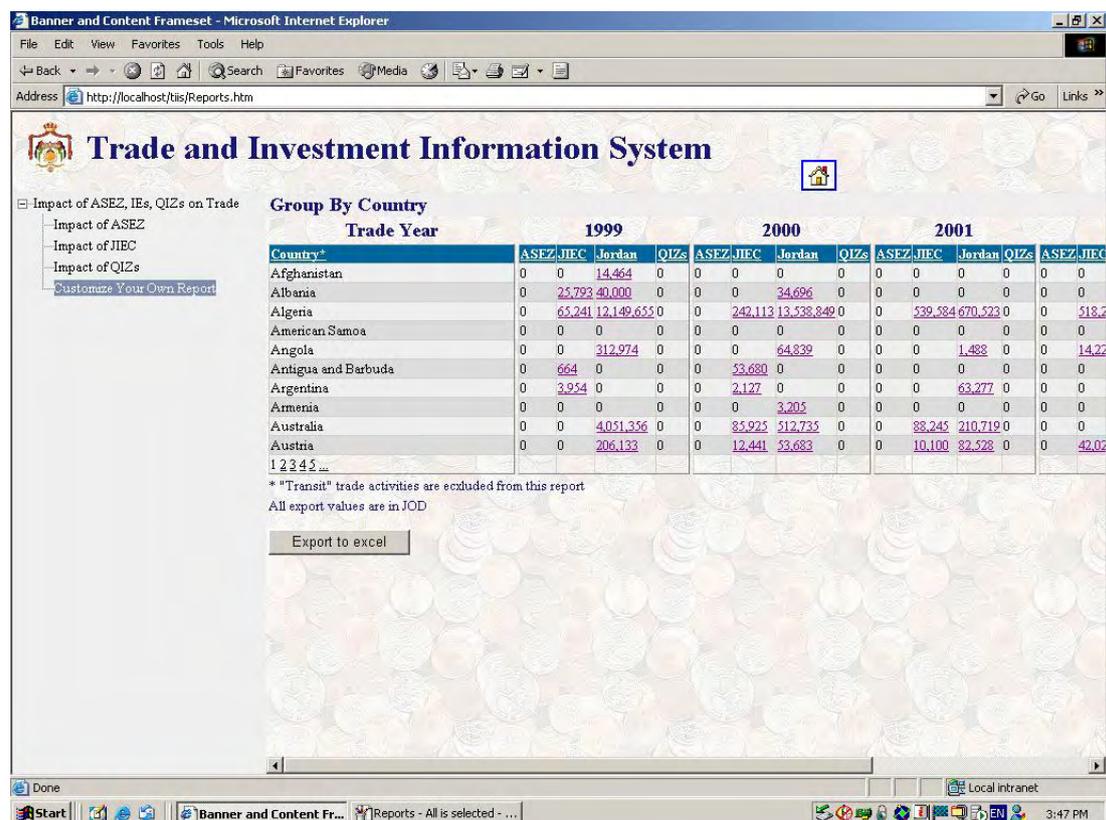


Figure 12 Trade destination results

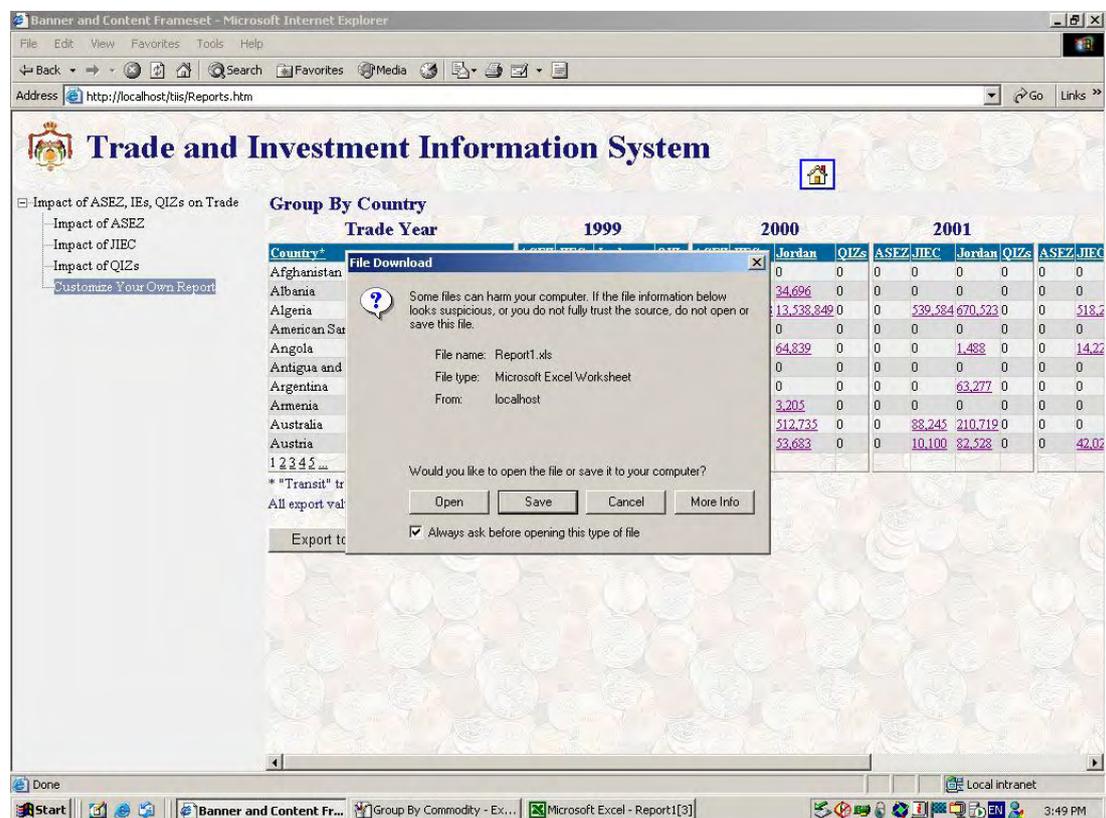


Figure 13 Export trade destination report to Excel

Country*	ASEZ (1999)	JIEC (1999)	Jordan (1999)	QIZs (1999)	ASEZ (2000)	JIEC (2000)	Jordan (2000)	QIZs (2000)	ASEZ (2001)	JIEC (2001)
1 Afghanistan	0	0	14,464	0	0	0	0	0	0	0
2 Albania	0	25,793	40,000	0	0	0	34,696	0	0	0
3 Algeria	0	65,241	12,149,655	0	0	242,113	13,538,849	0	0	0
4 American Samoa	0	0	0	0	0	0	0	0	0	0
5 Angola	0	0	312,974	0	0	0	64,839	0	0	0
6 Antigua and Barbuda	0	664	0	0	0	53,680	0	0	0	0
7 Argentina	0	3,954	0	0	0	2,127	0	0	0	0
8 Armenia	0	0	0	0	0	0	3,205	0	0	0
9 Australia	0	0	4,051,356	0	0	85,925	512,735	0	0	0
10 Austria	0	0	206,133	0	0	12,441	53,683	0	0	0
11 Azerbaijan	0	0	50,708	0	0	0	101,171	0	0	0
12 Bahrain	0	135,834	10,476,900	0	0	296,621	10,571,225	0	0	0
13 Bangladesh	0	0	1,988,911	0	0	0	2,313,153	0	0	0
14 Belgium	0	13,570	0	0	0	15,390	0	0	4,951	0
15 Belize	0	14,666	0	0	0	0	0	0	0	0
16 Benin	0	0	15,000	0	0	0	18,555	0	0	0
17 Bolivia	0	0	0	0	0	0	0	0	0	0
18 Bosnia and Herzegovina	0	0	137,768	0	0	0	166,584	0	0	0
19 Brazil	0	0	130,657	0	0	0	2,493,153	0	0	0
20 Brunei	0	0	56,500	0	0	0	1,000	0	0	0
21 Bulgaria	0	0	3,076,643	0	0	0	1,656,769	0	0	0
22 Burma	0	0	10,670	0	0	0	0	0	0	0
23 Cambodia	0	25,375	0	0	0	303	0	0	0	0
24 Cameroon	0	0	147,472	0	0	0	0	0	0	0
25 Canada	0	0	356,707	0	0	26,605	500,337	0	0	0
26 Central African Republic	0	14,500	356	0	0	0	0	0	0	0
27 Chad	0	4,999	0	0	0	0	0	0	0	0
28 Chile	0	0	6,000	0	0	0	1,843	0	0	0
29 China	0	0	25,242,835	0	0	27,762	32,999,208	0	245	0
30 Colombia	0	0	0	0	0	0	15,000	0	0	0
31 Congo	0	0	2,000	0	0	0	0	0	0	0
32 Costa Rica	0	0	0	0	0	719	0	0	0	0
33 Croatia	0	0	22,691	0	0	0	13,837	0	0	0
34 Cuba	0	0	0	0	0	0	0	0	0	0

Figure 14 Trade destination report in Excel

The user can also select trade commodities from the customized report option.

Trade and Investment Information System

- Impact of ASEZ, IEs, QIZs on Trade
 - Impact of ASEZ
 - Impact of JIEC
 - Impact of QIZs
 - Customize Your Own Report**

Trade Country ...
Selected Countries :

Trade Commodity ...
Selected Commodities :

Trade Year ...
Selected Years :

Trade Area ...
Selected Trade Areas :

Exports Value >

Group By

Figure 15 Customized report interface

In which case the user is then able to select which trade sectors to include in the report (figure 16). The results are shown in figure 17 and exported to Excel (figure 18-19).

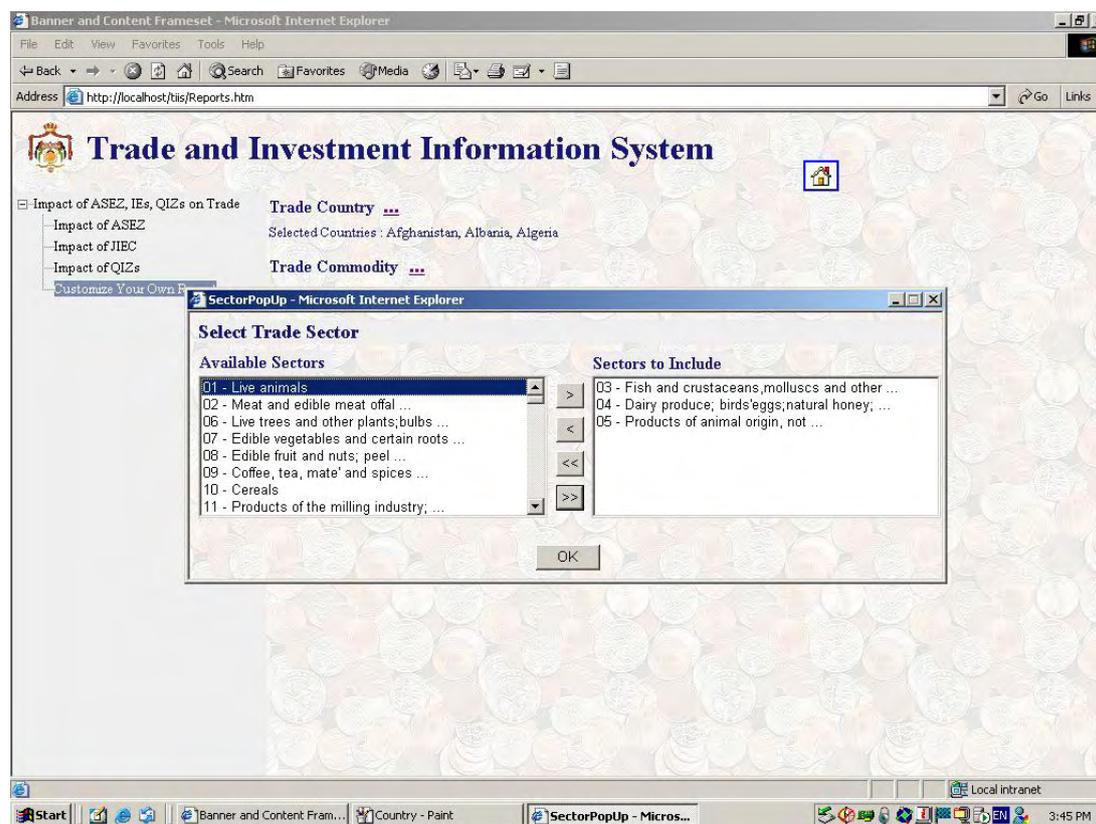


Figure 16 Select trade sector

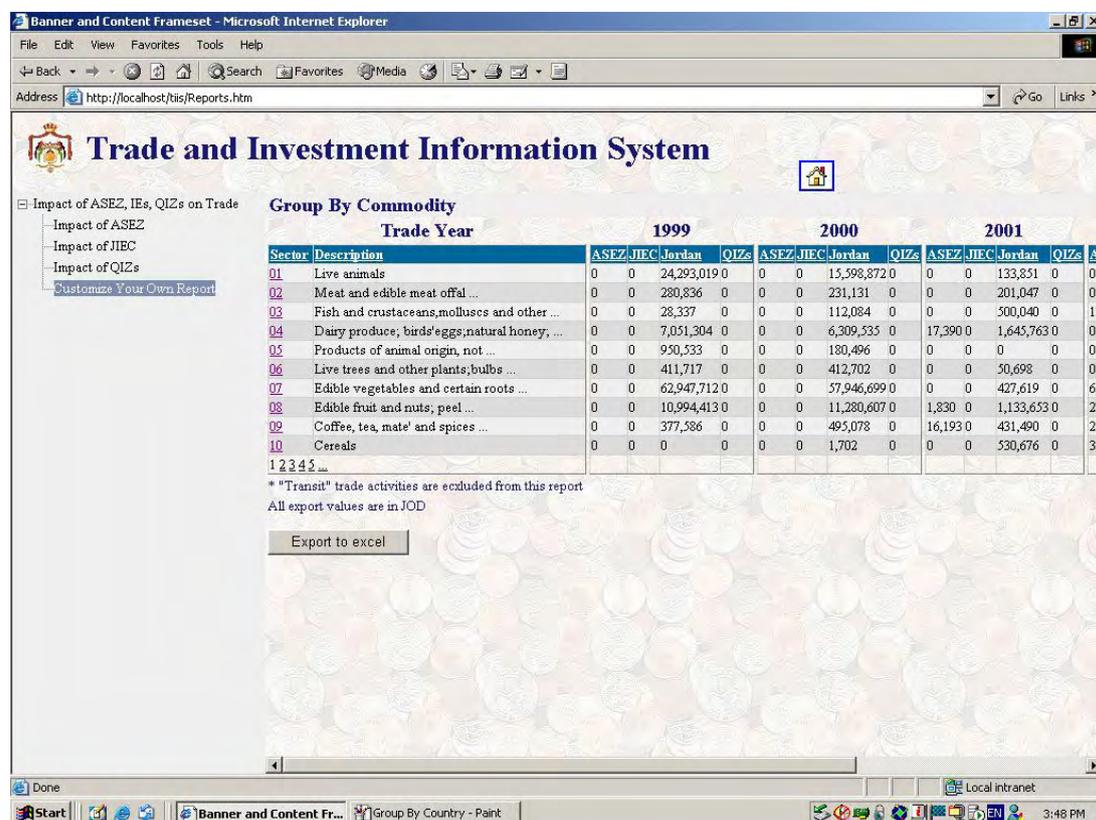


Figure 17 Results grouped by commodity

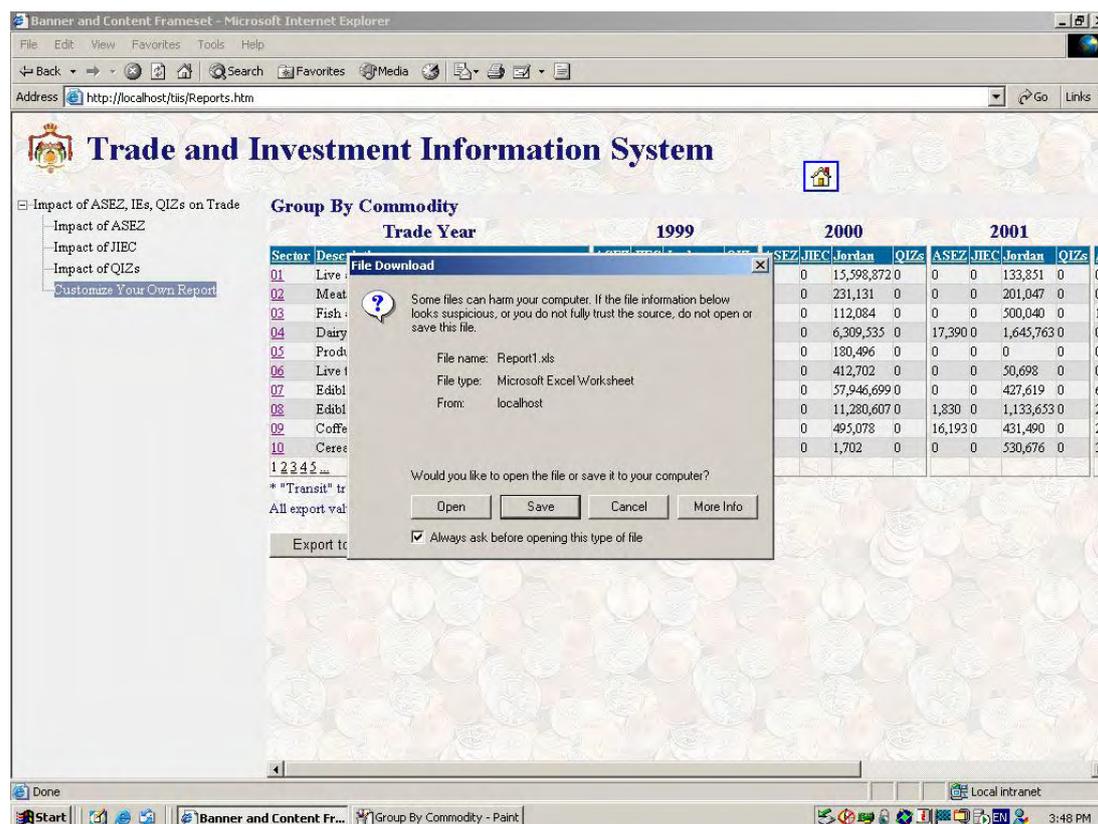


Figure 18 Export commodity report to Excel

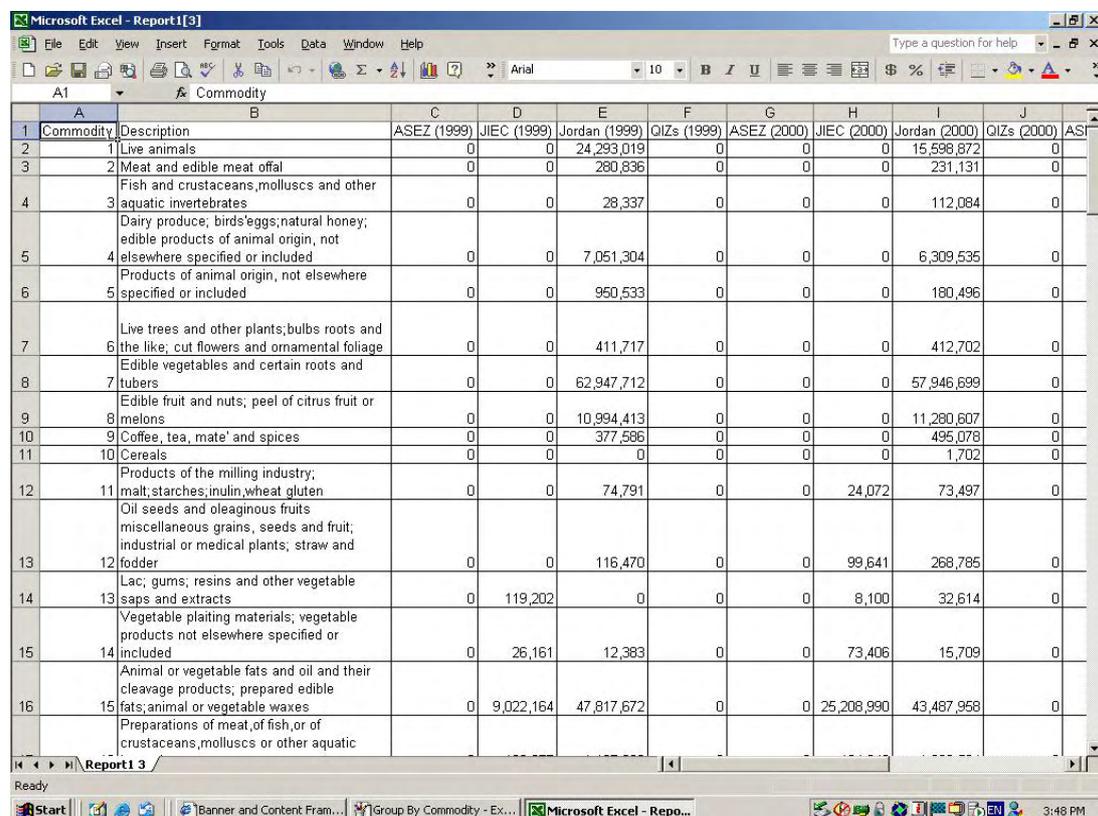


Figure 19 Report grouped by commodity in Excel

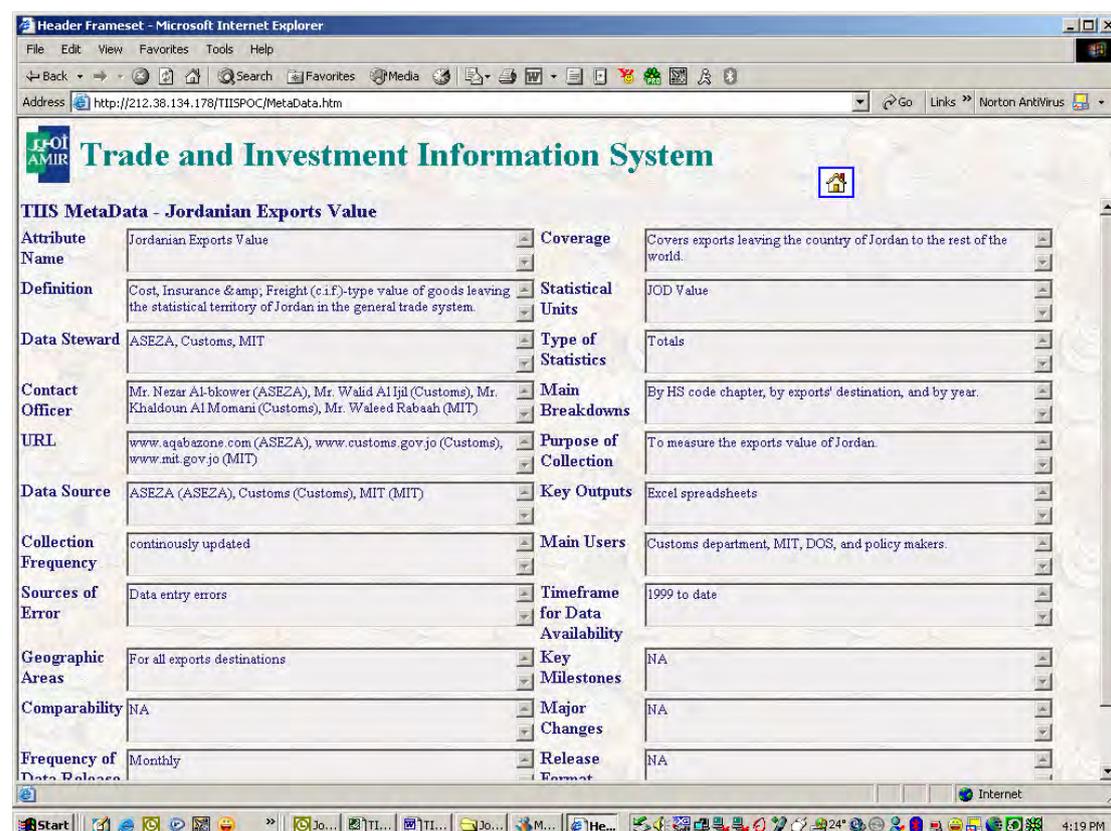


Figure 20 Metadata for Jordan export data

Descriptive information regarding all of the data elements in the database (i.e., the metadata) can be reviewed using the “view metadata” button on the TIIS homepage (refer figure 7 above).

A detailed list of the business and technical metadata for the proof of concept is included in the *TIIS Information Model*. An example of the metadata included in the TIIS is shown in figure 20. It includes, *inter alia*, the definition of the data set, the data steward (who is responsible for the data), contact details, the origin of the data, why the data is collected, etc. This metadata either does not exist, or is not currently collected in Jordan. The TIIS proof of concept is the only repository in Jordan today that adheres to standard definitions of metadata in order to help both the collectors of data and the users of this data quickly locate, and understand the nature of the data that they manage or use.

Best Practice Models

The problems associated with data governance mentioned above are neither unique to Jordan nor to the trade and investment domain. The project team did a quick survey of data interoperability models being used around the world. Three stood out and provided a way forward.

Forfás is the Irish national board responsible for providing policy advice to Government on enterprise, trade, science, technology and innovation in Ireland. It was recommended by previous AMIR reports as best practice in that it follows a broad principle to providing up-to-date information and statistics that can be trusted,

validated and acted upon quickly. Forfás differs from the Irish Central Statistics Office in that it produces more hands-on data that is readily available. The insistence of Forfás on good solid data that is readily available allows policy makers to analyze information, quickly make recommendations and move swiftly to implementation.

While useful as a general model, the Forfás data framework does not address inter-agency data interoperability as such. A more comprehensive initiative is underway by the Irish Statistics Office, which is now looking at developing a cross-departmental statistics network, but work on this remains fairly embryonic. A similar project, the National Statistical Service is currently underway in Australia. This aims at providing a full suite of information produced by government, by linking producers and users of statistics to narrow the gap between the supply of and need for information to ensure a better information base. However, it is likely to base its metadata registry on the model developed by the Australian Institute of Health and Welfare (AIHW).

Amongst all of the government approaches studied, only the AIHW appeared to take an approach to data management that uses the international standard for interoperability (ISO11179 – see further below). A detailed study of its governance model showed it as a template for other agencies operating in multi-agency and multi-jurisdictional data domains because of its simplicity, flexibility and scalability.

ISO11179 describes the process of classifying, identifying, forming definitions, and standardizing and registering data for the purpose of making it sharable. It is based on developing a central register of data definitions and other metadata to achieve interoperability. The proof of concept discussed above was based on this approach.

The purpose of ISO11179 is to give concrete guidance on the formulation and maintenance of descriptions and semantic content that shall be used to specify data elements or value domains in a consistent, understandable manner. It primarily does this by giving guidance for building, establishing, and maintaining a metadata repository.

This standard:

- facilitates acquisition and registration of data;
- expedites access and use of data;
- simplifies data manipulation by intelligent software by enabling manipulation of data based on characteristics described by metadata; and
- facilitates electronic data interchange and data sharing.

It also makes possible the communication of data among information systems and people:

- within an organization;
- among different organizations; and
- crossing all levels of software and hardware, and geographic, organizational and political boundaries.

For users and managers of data, ISO11179 specifies a basic set of characteristics necessary to share data. It places special emphasis on important data element and

value domain characteristics such as identifiers, names, definitions, concepts, valid values, and classification schemes.

For systems analysts and data stewards, ISO11179 provides a way to reuse, design, or redesign a data element or value domain that meets a need. Even before the user accesses data in a database, data stewards and systems analysts must have a way to identify and describe data logically so that they do not inadvertently introduce inconsistent values of data.

The ISO11179 standard provides an internationally accepted guideline to help facilitate data acquisition/registration, expedite access and use of data and help with data sharing. Jordan should adopt this international best practice so as to be a showcase to other developing countries in the region and the world.

Proposed Data Governance Framework

A fundamental prerequisite for better data governance in Jordan must begin inside each of the stakeholder agencies themselves. Even if the proposed metadata registry and its associated governance structure were not to go ahead, a suitable data management strategy, by itself, implemented within each stakeholder agency, would result in an enormous improvement to the quality of trade and investment data currently available in Jordan.

A data management strategy embraces the whole range of activities involved in the handling of data. These activities include: naming conventions and standards, data policy, data ownership and responsibilities for ensuring legislative compliance, data documentation and metadata compilation, data quality, standardization and harmonization, data lifecycle control, data stewardship, and data audit. A more detailed overview of these components of a data management strategy is included at Annex 3.

The ISO11179 standard provides a simple, practical and workable governance framework to manage the TIIS. The roles and responsibilities for each component are outlined in the ISO11179 documentation in detail.⁸

The Registration Authority receives and processes proposals from agencies for registration of data items within the trade and investment domain. It is the executive body responsible for managing the repository.

The Responsible Organization and/or Submitting Organization (these can be the same thing) provide mandatory metadata elements required by the Registration Authority. They provide any additional information required by the Authority to perform its responsibilities and ensure that when data is registered, no further changes are made without first advising the Authority. These responsibilities can be spelled out in the form of a MOU.⁹

⁸ These roles and responsibilities are provided in further detail in the *Trade and Investment Information System Proposed Governance Framework*.

⁹ The Trade and Investment Information System Proposed Governance Framework report proposes modifying the MOU developed by the AIHW as a suitable baseline for the TIIS.

Each of the stakeholders involved in the TIIS will need to provide a high-level (senior manager, if not CEO or his/her delegate) to the Executive Committee. The Registry itself is likely to be managed and reside in DOS. It will comprise both technical and business representatives from the department. The rationale behind the proposed DOS ownership of the Trade & Investment Metadata Registry (TIMR), can be discussed around the following points:

- According to “THE PROVISIONAL STATISTICS LAW NO. 8 OF 2003”, that was endorsed and published in the official Gazette and came into force as of 16.2.2003. collection and dissemination of data is officially under DOS mandate.
- Eventually, although not under the scope of this effort, it is hoped that the TIIS will become an inveterate system, that will , in the long run, be expanded and revamped to include a bigger scope of data such as socio-economic data.
- DOS, throughout the years, has maintained cordial relationships with Arab, regional and international statistical organizations and institutions. These bodies include: the Arab league , the United Nations UN and its specialized agencies, the IMF , the World Bank , EURO STAT and other organizations.
- DOS, since its establishment in 1949, has gained an institutional capacity to conduct surveys; as well as, to collect, process, manage, analyze, archive, and disseminate data.

The data stewards and data submitters will be identified in each of the stakeholder agencies (their names are included in the registry itself).

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Figure 21 Proposed TIIS data governance framework

It is proposed that each stakeholder will assign representatives separately to act as Data Stewards and Data Submitters. Since, MIT is the organization that makes the decisions regarding investment and trade issues, it is suggested that the Executive Committee will be chaired by MIT. The Control Committee, which will be responsible for setting the main guidelines regarding international standards, metadata definitions, technical and business requirements, and will control quality adherence to them, is most likely to be chaired by DOS. However, the Control Committee, as well as the Executive Committee should include a few selected senior eligible members from some of the possible stakeholders listed below.

Possible stakeholders may include, but are not limited to, the following:

- The Department of Statistics (DOS)
- The Ministry of Industry and Trade (MIT)
- Jordan Customs Department
- Jordan Industrial Estates Corporation (JIEC)
- Aqaba Special Economic Zone Authority (ASEZA)
- Jordan Investment Board (JIB)
- Central Bank of Jordan (CBJ)
- Private Industrial Estates
- Free Zones Corporation

Options

There are four options available to Jordanian trade and investment policy makers. They are as follows:

Option 1 – do nothing

Clearly failure to address the shortcomings in Jordan's current trade and investment data discussed in this report means this is not a viable option.

Option 2 – have the TIIS stakeholder entities adopt appropriate data management strategies.

This option will need to be undertaken whether the decision to proceed with developing a TIIS is taken or not. As discussed in the preceding section, it is a fundamental prerequisite for ensuring the quality of data whether that data is to be exchanged between TIIS stakeholder entities or not. In and by itself this would contribute to a marked improvement in the quality of trade and investment data currently available in Jordan.

Option 3 – have the TIIS stakeholder entities adopt the proposed data governance framework

This option takes option 2 one step forward and requires the TIIS stakeholders to agree on a common set of data standards, definitions and data management practices to ensure full data interoperability between each agency. This requires them to adopt the data governance framework mentioned above, based on international best practice (ISO11170) that binds each and every party to conforming to the agreed standards. It would make searching for, retrieving, analyzing and reporting trade and investment data much easier than at present.

Option 4 – develop a fully-integrated TIIS

This option involves extending the proof of concept delivered by this project into a fully-integrated, comprehensive trade and investment information system. This solution would use a number of IT tools to automatically pull all up-to-date data and metadata elements into a single, integrated repository of Jordanian trade and investment data. It would represent a one-stop-shop for all users of the data and would be the foundations for analyzing any gaps that exist in current collections and requirements. This is therefore the recommended option.

Project Plan

Each of the above options can be addressed in a project plan adopting a phased approach to implementing each element; each step building on progress undertaken in the previous steps. Options 2-3 would be delivered in the first phase of the project, scheduled to be completed in May 2005. Depending on the success of the first phase of the project, the next phase of the project – designing, developing and deploying the TIIS – would commence in May 2005 and be completed by October 2005. Key deliverables in both phases are shown in figure 22.

As mentioned above, even if a decision were made not to proceed with phase 2, the work done in phase 1 would result in a marked improvement in the quality of trade and investment data available in Jordan. A commitment to deliver phase 2 of the project would capitalize on this improvement in the quality of trade and investment data by providing a mechanism to pull all of this data into a single repository.

This phased approach to the project will also reduce some of the project risks mentioned further below.

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Figure 22 TIIS Phase 1 & 2 project plan

A detailed overview of each of the component parts of the proposed workplan is included in table 4 below.

The first phase will consist of two parts; establishing the proposed business and governance framework while simultaneously undertaking a technical analysis to select the right ETL tools and setting the framework for the design of the proposed system. The first phase will also include a survey of stakeholders' data sets and the development of an appropriate set of metadata for inclusion in the repository to be developed in phase 2.

Key business deliverables for phase 1 include obtaining stakeholder agreement to the proposed system and governance structure, the formation of a TIIS task force, an MOU binding participants to the governance model, a set of unified metadata and a metadata registration authority. Key technical deliverables include selection and acquisition of ETL tools. A detailed workplan for phase 2 of the project will be the final deliverable for phase 1 work. A draft workplan for phase 2 is presented in table 5 below.

Table 4 TIIS Implementation Plan -Phase 1

ID	Task Name	Duration	Start	Finish
1	TIIS Implementation	227 days	Mon 11/1/04	Tue 9/13/05
2	Phase 1: Project Setup	105 days	Mon 11/1/04	Sun 3/27/05
3	Technical Setup	40 days	Mon 11/1/04	Sun 12/26/04
4	Technical Analysis Phase	20 days	Mon 11/1/04	Sun 11/28/04
5	Analyze Business and Technical Requirements	15 days	Mon 11/1/04	Sun 11/21/04
6	Determine ETL Tool Specifications	5 days	Mon 11/22/04	Sun 11/28/04
7	Develop & Approve Analysis Phase Documentation	5 days	Mon 11/22/04	Sun 11/28/04
8	Analysis Signoff	0 days	Sun 11/28/04	Sun 11/28/04
9	Entity Specific Design	10 days	Mon 11/29/04	Sun 12/12/04
10	Design Entity Metadata Repository	5 days	Mon 11/29/04	Sun 12/5/04
11	Design Entity Staging Databases	10 days	Mon 11/29/04	Sun 12/12/04
12	Select COTS Tools	15 days	Mon 11/29/04	Sun 12/19/04
13	Select ETL Tool	10 days	Mon 11/29/04	Sun 12/12/04
14	Select Enterprise Reporting Tool	15 days	Mon 11/29/04	Sun 12/19/04
15	Enterprise Specific Design	10 days	Mon 12/13/04	Sun 12/26/04
16	Design Enterprise Staging Database	10 days	Mon 12/13/04	Sun 12/26/04
17	Design Enterprise Metadata Repository	10 days	Mon 12/13/04	Sun 12/26/04
18	Establish Business and Governance Framework	95 days	Mon 11/1/04	Sun 3/13/05
19	Key Stakeholders Agreement	5 days	Mon 11/1/04	Sun 11/7/04
20	Obtain Key Stakeholders Agreement to Implement the System	5 days	Mon 11/1/04	Sun 11/7/04
21	Selection of Project Champion	3 days	Mon 11/8/04	Wed 11/10/04
22	Select Project Champion	3 days	Mon 11/8/04	Wed 11/10/04
23	Task Force Formation	5 days	Mon 11/8/04	Sun 11/14/04
24	Form the TIIS Task Force	5 days	Mon 11/8/04	Sun 11/14/04
25	Establishment of Program Management Unit (PMU)	20 days	Mon 11/8/04	Sun 12/5/04
26	Establish and Staff the PMU	20 days	Mon 11/8/04	Sun 12/5/04
27	Survey of Stakeholders Current Data	30 days	Thu 11/11/04	Wed 12/22/04
28	Survey Stakeholders Current Data (business & technical)	30 days	Thu 11/11/04	Wed 12/22/04
29	MoU	10 days	Mon 11/15/04	Sun 11/28/04
30	Develop MoU Among Stakeholders	10 days	Mon 11/15/04	Sun 11/28/04
31	Prioritize Metadata Development	10 days	Mon 11/15/04	Sun 11/28/04
32	Set Priorities for Metadata Development	10 days	Mon 11/15/04	Sun 11/28/04
33	Data Governance Orientation	15 days	Mon 11/15/04	Sun 12/5/04
34	Educate Stakeholder Staff on Data Governance	15 days	Mon 11/15/04	Sun 12/5/04
35	Agreement on References for Metadata Definitions	10 days	Mon 11/29/04	Sun 12/12/04
36	Obtain Agreement on Metadata Definition References	10 days	Mon 11/29/04	Sun 12/12/04
37	Metadata Governance Framework	15 days	Mon 11/29/04	Sun 12/19/04
38	Obtain Agreement on Metadata Governance Framework	15 days	Mon 11/29/04	Sun 12/19/04
39	Setting up Governance Offices in Participating Entities	5 days	Mon 12/6/04	Sun 12/12/04
40	Setup Governance Offices	5 days	Mon 12/6/04	Sun 12/12/04
41	Developing Metadata for T&I Terms	45 days	Thu 12/23/04	Wed 2/23/05
42	Develop Metadata	45 days	Thu 12/23/04	Wed 2/23/05
43	Procedures for Governance Framework	20 days	Mon 12/20/04	Sun 1/16/05
44	Develop Procedures for Governance Framework	20 days	Mon 12/20/04	Sun 1/16/05
45	Establishment of TIIS Registration Authority	40 days	Mon 1/17/05	Sun 3/13/05
46	Establish and Staff Registration Authority	40 days	Mon 1/17/05	Sun 3/13/05
47	Draft Workplan for TIIS Development	10 days	Mon 3/14/05	Sun 3/27/05
48	Draft TIIS Development Workplan	10 days	Mon 3/14/05	Sun 3/27/05
49	TIIS Project Setup Completed	0 days	Sun 3/27/05	Sun 3/27/05

Table 5 TIIS Implementation Plan - Phase 2

ID	Task Name	Duration	Start	Finish
50	Phase 2: TIIS Development	122 days	Mon 3/28/05	Tue 9/13/05
51	Implement Data Gathering, Optimization, & QA Procedures	120 days	Mon 3/28/05	Sun 9/11/05
52	Develop Procedures for Data Gathering	40 days	Mon 3/28/05	Sun 5/22/05
53	Develop & Rollout Quality Assurance Methods	40 days	Mon 5/23/05	Sun 7/17/05
54	Support Entities to Determine Optimal Data Types to Collect	40 days	Mon 7/18/05	Sun 9/11/05
55	Implement TIIS Applications	122 days	Mon 3/28/05	Tue 9/13/05
56	Design Phase	20 days	Mon 3/28/05	Sun 4/24/05
57	Design Metadata Management Tool	5 days	Mon 3/28/05	Sun 4/3/05
58	Design Applications Security Model	5 days	Mon 3/28/05	Sun 4/3/05
59	Design H/W Architecture	5 days	Mon 3/28/05	Sun 4/3/05
60	Design Reports	10 days	Mon 3/28/05	Sun 4/10/05
61	Procure Enterprise Reporting Tool and ETL Tool	20 days	Mon 3/28/05	Sun 4/24/05
62	Develop & Approve Design Phase Documentation	10 days	Mon 4/11/05	Sun 4/24/05
63	Design Signoff	0 days	Sun 4/24/05	Sun 4/24/05
64	Construction Phase	45 days	Mon 4/25/05	Sun 6/26/05
65	Enterprise Specific Construction	10 days	Mon 4/25/05	Sun 5/8/05
66	Construct Enterprise Staging Database	10 days	Mon 4/25/05	Sun 5/8/05
67	Construct Enterprise Metadata Repository	10 days	Mon 4/25/05	Sun 5/8/05
68	Construct Enterprise ETL Process(es)	10 days	Mon 4/25/05	Sun 5/8/05
69	Construct Reports	15 days	Mon 4/25/05	Sun 5/15/05
70	Procure & Install H/W	40 days	Mon 4/25/05	Sun 6/19/05
71	Entity Specific Construction	25 days	Mon 5/9/05	Sun 6/12/05
72	Construct Entity Metadata Repository	10 days	Mon 5/9/05	Sun 5/22/05
73	Construct Entity Staging Databases	15 days	Mon 5/9/05	Sun 5/29/05
74	Construct Entity ETL Process(es)	10 days	Mon 5/30/05	Sun 6/12/05
75	Construct Metadata Management Tool	15 days	Mon 5/23/05	Sun 6/12/05
76	Construct Applications Security	10 days	Mon 6/13/05	Sun 6/26/05
77	Develop End User & Technical Manuals	22 days	Mon 6/27/05	Tue 7/26/05
78	Testing Phase	22 days	Mon 6/27/05	Tue 7/26/05
79	Deployment Phase	35 days	Wed 7/27/05	Tue 9/13/05
80	Conduct Acceptance Testing & Incorporate Feedback	15 days	Wed 7/27/05	Tue 8/16/05
81	Deploy Applications on Servers/Clients	5 days	Wed 8/17/05	Tue 8/23/05
82	Business User Training	15 days	Wed 8/24/05	Tue 9/13/05
83	Technical User Training	15 days	Wed 8/24/05	Tue 9/13/05
84	TIIS Implementation Signoff	0 days	Tue 9/13/05	Tue 9/13/05

Project Risks and Mitigators

There are a number of risks to successfully completing this project. These may be summarized as follows:

- MIT may not exercise sufficient leadership to ensure that all of the responsibilities and roles of the participating agencies are adhered to and that the minimum data standards and the processes associated with the governance structure are followed – the decisions of the Registration Authority may be ignored;
- Changes to ministers, senior agency representatives, or to the machinery of government, particularly as the new governance framework is being implemented, may imperil successful buy-in and implementation of the governance model;
- Other agencies (e.g., DOS) may claim ownership and responsibility over the source data or metadata or governance structure proposed for the TIIS;

- There may be ongoing conflict over ownership of the metadata registry or agencies may be unwilling to contribute the necessary metadata or metadata at the minimally accepted standard for the registry to be useful; and
- Agencies may deem the governance structure, associated processes and required obligations (e.g., meetings) as not important enough to field the necessary personnel, with the appropriate authority to fulfill their obligations under the governance arrangements – the process will fail because it is not resourced properly.

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Figure 23 Key risks and mitigators

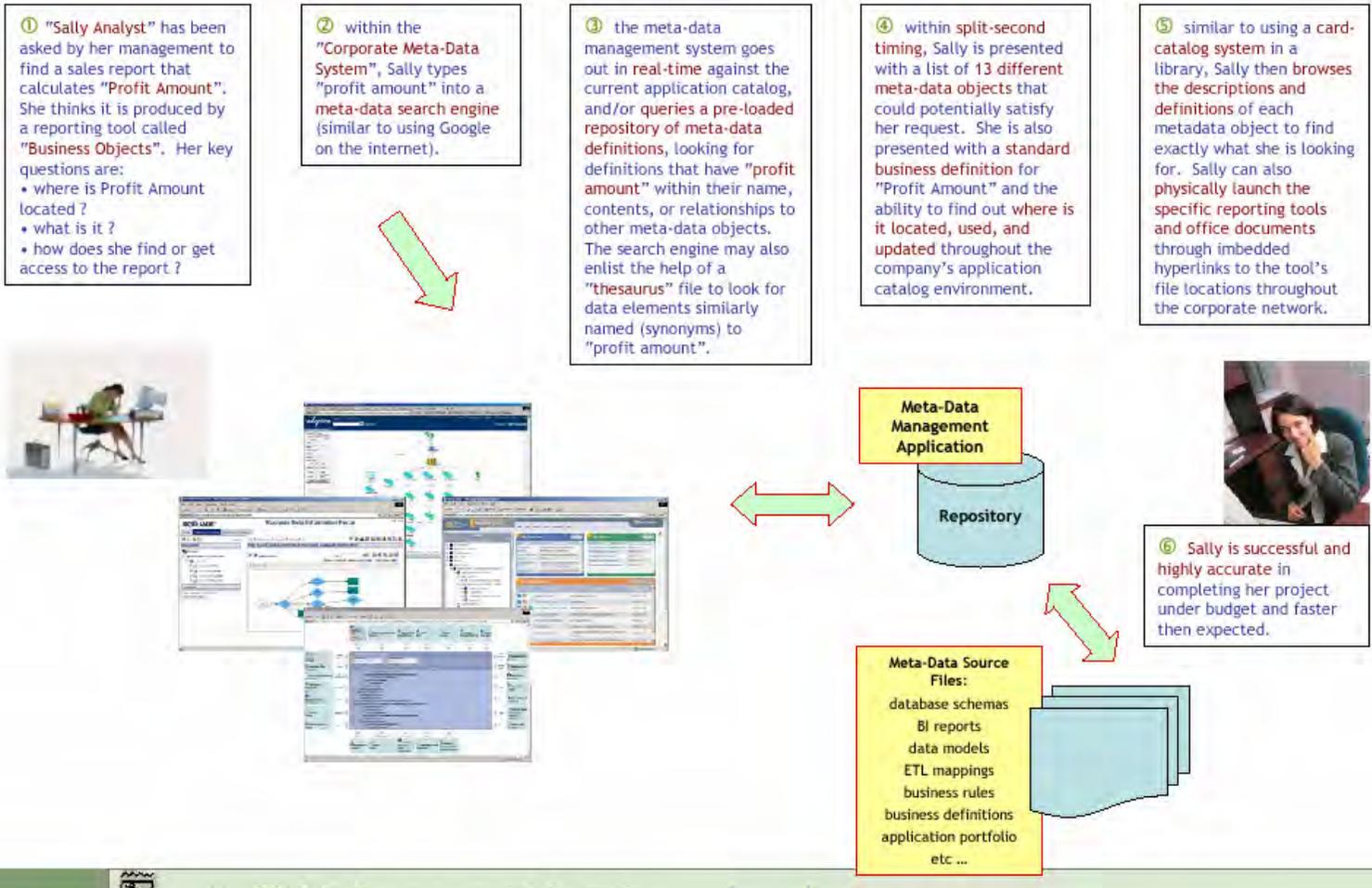
As figure 23 shows, these risks can be mitigated by securing a firm commitment by the leaders of each of the stakeholder agencies to the proposed model, in the form of a MOU. This requires strong leadership from the Minister for Industry and Trade, and his subordinates in the MIT). The MOU would also bind each of the stakeholders to providing adequate resources to guarantee the ongoing success of the project, including human resources (both senior managers, business staff and technical staff) and appropriate funding.

The selection of a project champion (the Minister of Industry and Trade) and the formation of a TIIS task force, (to include senior managers of the TIIS stakeholder agencies) will be crucial to securing buy-in and commitment from each of the stakeholders.

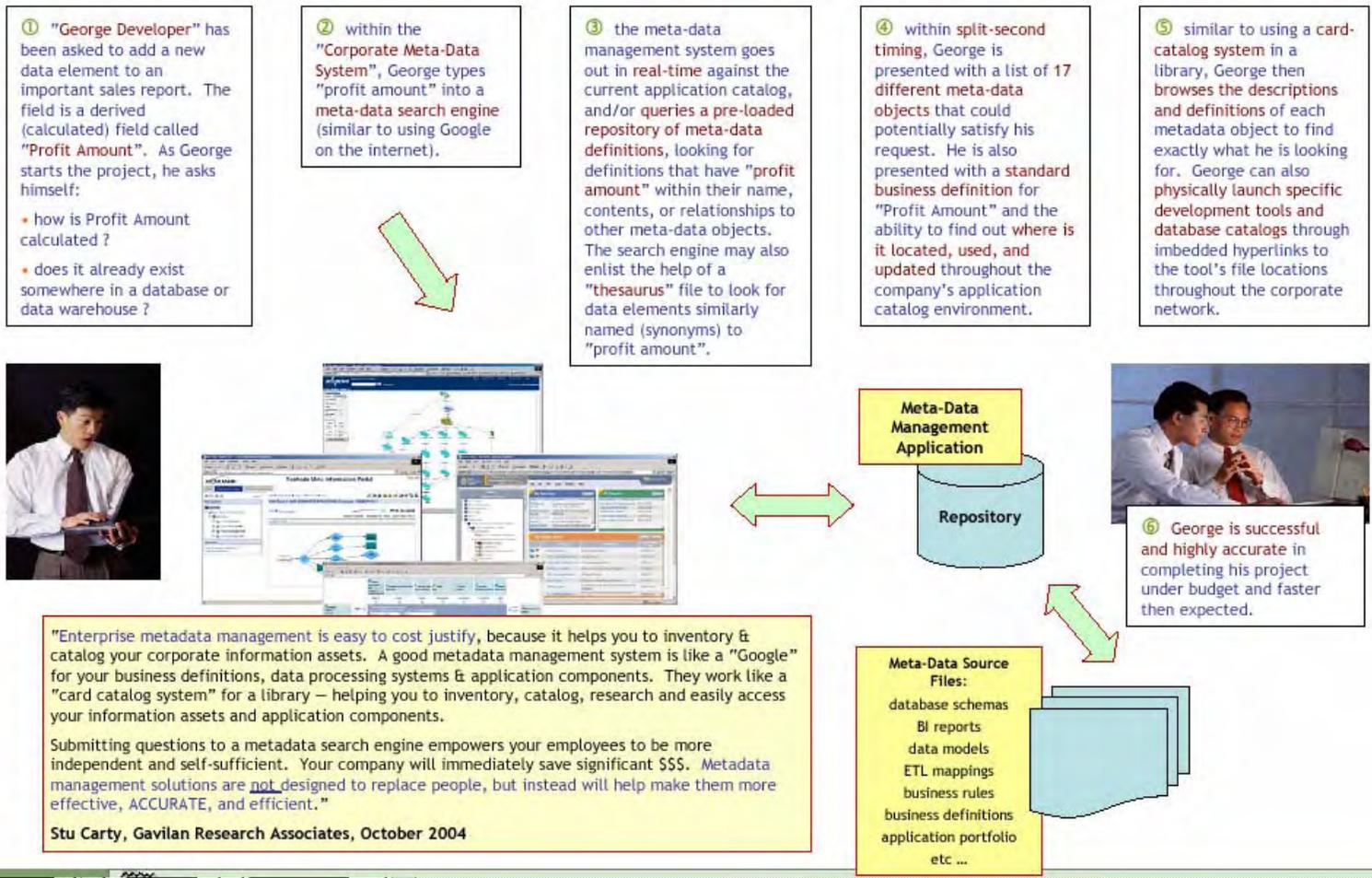
The use of a simple, flexible, scalable and proven governance model will ensure that all of the processes, procedures, roles and responsibilities required to make the TIIS work are in place. The use of a phased approach to delivering the project will reduce risk by allowing each step to be addressed in a logical and sequential manner. As mentioned above, even if only phase 1 of the project is delivered, it will represent a quantum improvement in the quality of Jordan's trade and investment statistics.

Annex 1: Metadata Solutions in Action

Business Meta-Data in Action



Meta-Data Solutions in Action



Annex 2: Data Mapping Rules – Data Cleansing & Workarounds

General Mapping Rule (Workaround)	Rationale
<p>Each Investment entity (ASEZA, MIT, and JIEC) is using a different Investment Sector classification.</p> <p>To resolve this, the Investment Sectors used by ASEZA were used as a reference.</p>	<p>ASEZA Investment Sector classification was found to be the most appropriate for the purpose of this study; it includes four main sectors; Commercial, Industrial, Agricultural, and Services. ASEZA Investment Sectors includes and forms a superset of the Investment Sectors used by other the other Investment entities.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different Country Code classification; with minor inconsistencies exist between ASEZA and Customs versions.</p> <p>To resolve this:</p> <ol style="list-style-type: none"> 1. ASEZA County Code values were used to present Trade data collected by ASEZA, Customs, and MIT. 2. DOS Country Code classification was used to present Trade data collected by DOS. 	<p>Since ASEZA and Customs are considered the main two providers of Trade information, they are considered the best provider for he Country Code values.</p> <p>DOS Country Code classification is difficult to map to that used by ASEZA and Customs.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different HS Code classification; the HS Code Arabic description is not consistent among the entities.</p> <p>To resolve this, data from ASEZA, DOS, and Customs were consolidated into a single list.</p>	<p>This is essential to ensure that the same list of HS Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>
Customs Mapping Rule (Workaround)	Rationale
<p>Since Exports data broken by trade agreement is not available at any of the involved entities, a workaround was implemented, which clustered Export data collected by DOS in accordance to the trade agreements of interest in this project; these are the World Trade Organization agreement (WTO), Jordan-European Union agreement (JEU), Jordan-United States Free Trade Agreement (JUSFTA), Qualified Industrial Zones (QIZ), and Greater Arab Free Trade Area (GAFTA).</p>	<p>This approach is used by some of the involved entities when compiling reports related to different trade agreements.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different HS Code classification; the HS Code Arabic description is not consistent among the entities.</p> <p>To resolve this, data from ASEZA, DOS, and Customs were consolidated into a single list.</p>	<p>This is essential to ensure that the same list of HS Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>
<p>Instead of using the ISIC classification to categorize Trade Sectors, the HS Code classification chapters (a total of 97 different chapters) was used to indicate trade sectors.</p>	<p>This classification approach is used by all of the involved Trade entities.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different Country Code classification; with minor inconsistencies exist between ASEZA and Customs versions. To resolve this:</p> <ol style="list-style-type: none"> 1. ASEZA County Code values were used to present Trade data collected by ASEZA, Customs, and MIT. 2. DOS Country Code classification was used to present Trade data collected by DOS. 	<p>Since ASEZA and Customs are considered the main two providers of Trade information, they are considered the best provider for he Country Code values.</p> <p>DOS Country Code classification is difficult to map to that used by ASEZA and Customs.</p>

Trade and Investment Information System Scoping Study

Customs Mapping Rule (Workaround)	Rationale
<p>When clustering different countries into their corresponding Trade Agreements (WTO, JUSFTA, JEU, GAFTA, and QIZ), the following was performed:</p> <ol style="list-style-type: none"> 1. Trade activities related to The United Arab Emirates, Bahrain, Saudi Arabia, Sudan, Iraq, Kuwait, Morocco, Tunisia, Syria, Oman, Palestinian Authority, Lebanon, Libya, Egypt and "م.ت.ح.ع" were associated to the GAFTA. 2. Trade activities related to "اوروبا" and "اوروپا-م" were associated to the JEUFTA 3. Trade activities related to The United States was associated to the JUSFTA and the QIZ 4. Trade activities related to the rest of the countries were associated to the WTO. 	<p>This approach was discussed and agreed upon with AMIR and the business team.</p>
<p>Customs is using the following Country Codes in when collecting Trade Data:</p> <ol style="list-style-type: none"> 1. "EZ" for "Aqaba Special Economic Zone" 2. "IQ" for IRAQ 3. "JS" for "Jordanian-Syrian Free Zone" 4. "JT" for "Transit within Jordan Governorates" 5. "ZC" for "Free Zone - Airport" 6. "ZZ" for "Free Zone – Zarqa". <p>Trade activities related to this country code were excluded.</p>	<p>Trade activities related to these areas does not fall under any of the Trade Agreements targeted by this study (which are WTO, JUSFTA, JEU, GAFTA, and QIZ)</p>
JIEC Mapping Rule (Workaround)	Rationale
<p>JIEC is using a newly developed application to manage Company Registration activities. This application is not filling the data elements that are needed to link a company to its Investor information (Investor nationality, Investment Sector, and Registered Capital).</p> <p>To resolve this:</p> <ol style="list-style-type: none"> 1. All companies were assumed to fall under the "Industrial Investment Sector" 2. Investment nationality was obtained from a "Free Text" filed in one of the tables provided by JIEC. If no value was assigned to this field, the nationality was assumed to be "Jordanian" 	<p>It is essential to know the nationality of the investor, Investment Sector, and Registered Capital to able to answer the business questions this study is designed to answer.</p>
<p>Each Investment entity (ASEZA, MIT, and JIEC) is using a different Investment Sector classification.</p> <p>To resolve this, the Investment Sectors used by ASEZA were used as a reference.</p>	<p>ASEZA Investment Sector classification was found to be the most appropriate for the purpose of this study; it includes four main sectors; Commercial, Industrial, Agricultural, and Services. ASEZA Investment Sectors includes and forms a superset of the Investment Sectors used by other the other Investment entities.</p>
ASEZA Mapping Rule (Workaround)	Rationale
<p>Investment data collected by ASEZA is gathered through the "Companies Registration" process, which collects different statuses of a company (Registered, Rejected, Needs Renewal, Deleted...). As advised by ASEZA, the study focused only on companies with a "Registered" status.</p> <p>In such case, the collected data will indicated the date when a company paid its registration fees, not when the actual investment took place.</p>	<p>As advised by ASEZA.</p>

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ASEZA Mapping Rule (Workaround)	Rationale
<p>Each Investment entity (ASEZA, MIT, and JIEC) is using a different Investment Sector classification.</p> <p>To resolve this, the Investment Sectors used by ASEZA were used as a reference.</p>	<p>ASEZA Investment Sector classification was found to be the most appropriate for the purpose of this study; it includes four main sectors; Commercial, Industrial, Agricultural, and Services. ASEZA Investment Sectors includes and forms a superset of the Investment Sectors used by other the other Investment entities.</p>
<p>ASEZA is the only entity that is using different currencies when reporting and collecting customs fees paid against Trade activities.</p> <p>Fees paid against Trade activities were all converted into Jordanian Dinars.</p>	<p>For the Trade data to be more meaningful and useful to the policy makers, it should all be reported in a single currency, which is Jordanian Dinars.</p>
<p>ASEZA is using an additional chapter (chapter 98) which is not used by the other Trade entities (ASEZA, Customs, MIT, and DOS).</p> <p>This chapter was excluded.</p>	<p>This is essential to ensure that the same list of HS Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>
<p>ASEZA is adding using additional trailing double-zeros to HS Codes. These trailing zeros are not present at the other Trade entities (ASEZA, Customs, MIT, and DOS).</p> <p>These trailing zeros were removed.</p>	<p>This is essential to ensure that the same list of HS Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different HS Code classification; the HS Code Arabic description is not consistent among the entities.</p> <p>To resolve this, data from ASEZA, DOS, and Customs were consolidated into a single list.</p>	<p>This is essential to ensure that the same list of HS Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>
<p>Instead of using the ISIC classification to categorize Trade Sectors, the HS Code classification chapters (a total of 97 different chapters) was used to indicate trade sectors.</p>	<p>This classification approach is used by all of the involved Trade entities.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different Country Code classification; with minor inconsistencies exist between ASEZA and Customs versions.</p> <p>To resolve this:</p> <ol style="list-style-type: none"> 1. ASEZA County Code values were used to present Trade data collected by ASEZA, Customs, and MIT. 2. DOS Country Code classification was used to present Trade data collected by DOS. 	<p>Since ASEZA and Customs are considered the main two providers of Trade information, they are considered the best provider for he Country Code values.</p> <p>DOS Country Code classification is difficult to map to that used by ASEZA and Customs.</p>
<p>The following Country Code entries were manually added to the list of countries to cater for the needs of different Trade entities:</p> <ol style="list-style-type: none"> 1. Record for "Oman" to cater for MIT QIZ data. 2. Record for "Taiwan" to cater for MIT QIZ data. 3. Record for "Taiwan" to cater for JIEC data. 	<p>This is essential to ensure that the same list of Country Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>

MIT Mapping Rule (Workaround)	Rationale
<p>Each Investment entity (ASEZA, MIT, and JIEC) is using a different Investment Sector classification.</p> <p>To resolve this, the Investment Sectors used by ASEZA were used as a reference.</p> <p>All investments made at the QIZ were associated with the "Industrial" sector.</p>	<p>ASEZA Investment Sector classification was found to be the most appropriate for the purpose of this study; it includes four main sectors; Commercial, Industrial, Agricultural, and Services. ASEZA Investment Sectors includes and forms a superset of the Investment Sectors used by other the other Investment entities.</p>

Trade and Investment Information System Scoping Study

MIT Mapping Rule (Workaround)	Rationale
<p>Investment Year (Starting Year) information collected by MIT is indicated in terms of quarters (Q1 2002, Q2 2003...). Q1 2002 was mapped to NAJ 2002; Q2 2002 was mapped to APR 2002, and so on.</p> <p>In the case were no quarter was indicated, the Investment Year was set to JAN YYYY</p>	
<p>Instead of using the ISIC classification to categorize Trade Sectors, the HS Code classification chapters (a total of 97 different chapters) was used to indicate trade sectors.</p>	<p>This classification approach is used by all of the involved Trade entities.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different HS Code classification; the HS Code Arabic description is not consistent among the entities.</p> <p>To resolve this, data from ASEZA, DOS, and Customs were consolidated into a single list.</p>	<p>This is essential to ensure that the same list of HS Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>
<p>Each Investment entity (ASEZA, MIT, and JIEC) is using a different Investment Sector classification.</p> <p>To resolve this, the Investment Sectors used by ASEZA were used as a reference.</p>	<p>ASEZA Investment Sector classification was found to be the most appropriate for the purpose of this study; it includes four main sectors; Commercial, Industrial, Agricultural, and Services. ASEZA Investment Sectors includes and forms a superset of the Investment Sectors used by other the other Investment entities.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different Country Code classification; with minor inconsistencies exist between ASEZA and Customs versions.</p> <p>To resolve this:</p> <ol style="list-style-type: none"> 1. ASEZA County Code values were used to present Trade data collected by ASEZA, Customs, and MIT. 2. DOS Country Code classification was used to present Trade data collected by DOS. 	<p>Since ASEZA and Customs are considered the main two providers of Trade information, they are considered the best provider for he Country Code values.</p> <p>DOS Country Code classification is difficult to map to that used by ASEZA and Customs.</p>

DOS Mapping Rule (Workaround)	Rationale
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different HS Code classification; the HS Code Arabic description is not consistent among the entities.</p> <p>To resolve this, data from ASEZA, DOS, and Customs were consolidated into a single list.</p>	<p>This is essential to ensure that the same list of HS Codes is used across all involved entities. Data discrepancies affect entity-to-entity interoperability.</p>
<p>Instead of using the ISIC classification to categorize Trade Sectors, the HS Code classification chapters (a total of 97 different chapters) was used to indicate trade sectors.</p>	<p>This classification approach is used by all of the involved Trade entities.</p>
<p>Each Trade entity (ASEZA, Customs, MIT, and DOS) is using a different Country Code classification; with minor inconsistencies exist between ASEZA and Customs versions.</p> <p>To resolve this:</p> <ol style="list-style-type: none"> 1. ASEZA County Code values were used to present Trade data collected by ASEZA, Customs, and MIT. 2. DOS Country Code classification was used to present Trade data collected by DOS. 	<p>Since ASEZA and Customs are considered the main two providers of Trade information, they are considered the best provider for he Country Code values.</p> <p>DOS Country Code classification is difficult to map to that used by ASEZA and Customs.</p>

Annex 3: Key Elements of a Data Management Strategy

Naming Conventions and Standards

As the data stores within the various trade and investment related entities in Jordan were investigated, one of the gaps found was the lack of standardized naming conventions used among these data stores. This makes it harder to consolidate the data in order to come up with an integrated trade and investment information system.

A naming convention describes how names are formulated and assigned to administered items in a specific context. A naming convention may be simply descriptive, whereby there is no authority or control over the formulation of names and merely names that already exist are registered. Alternatively, a naming convention may be prescriptive, specifying how names shall be formulated, with an authority expected to enforce compliance with the naming convention.

Data Policy

The first step for any organization wishing to implement good Data Management procedures is to define a Departmental Data Policy. This is a set of broad, high level principles that form the guiding framework in which Data Management can operate.

Data Ownership

One key aspect of good Data Management is the clear identification of the owner of the data. Normally this is the organization or group of organizations who originally commissioned the data and has managerial and financial control of that data. The Data Owner has legal rights over the data, the Intellectual Property Rights (IPR) and the Copyright. This is still the case, even where the data were collected, collated or disseminated by another party.

It is therefore important for Data Owners to take action to establish and document:

- The ownership, IPR and Copyright of their data so that these can be safeguarded.
- The statutory and non-statutory obligations relevant to their business to ensure that the data are compliant.
- The departmental policies for data security, disclosure control, release, pricing and dissemination.
- The agreement reached with users and customers on the conditions of use in a signed Memorandum of Agreement, before data are released.

Data Documentation and Metadata Compilation

All datasets should be identified and documented to facilitate their subsequent identification, proper management and effective use and to avoid collecting the same data more than once.

To provide an accurate list of datasets held by the organization, a departmental catalogue of data should be compiled. This is a collection of discovery level metadata for each dataset, in a form suitable for users to reference. These metadata should

provide information about the content, currency and accessibility of the data, together with contact details for further information about the data.

All business-related datasets, once catalogued, should also be documented in a detailed form suitable for users to reference when using the data. These detailed metadata should describe the content, characteristics and use of the dataset, using a standard detailed metadata template.

Data Quality, Standardization, and Harmonization

Good Data Management also ensures that datasets are capable of meeting current needs successfully and are suitable for further exploitation. The ability to integrate data and other datasets is likely to add value, encourage ongoing use of the data and recover the costs of collecting the data.

To maximize the potential and use of datasets, organizations should:

- Use standard data definitions and formats.
- Define quality standards and apply the appropriate validation processes to each dataset.
- Adopt formal Query and Change Management procedures.
- Ensure the data are quality assured and approved as fit for purpose before use or release.
- Encourage the use of the appropriate National and International standards.

Data Lifecycle Control

Good Data Management requires that the whole lifecycle of data be managed carefully. This includes:

- Business justification, to ensure thought has been given to why new data are required rather than existing data amended, how data can be specified for maximum use including the potential to meet other possible requirements and why the costs of handling, storing and maintaining these data are acceptable and recoverable.
- Data specification and modeling, processing, database maintenance and security to ensure that data will be fit for purpose and held securely in their own databases.
- Ongoing data audit, to monitor the use and continued effectiveness of the data.
- Archiving and final destruction, to ensure that data are archived and maintained effectively until they are no longer needed or are uneconomical to retain.

Data Stewardship

There are a number of focal points within Government organizations where data are gathered, compiled and analyzed as part of normal course of business. These focal points have a particular role to play in managing the Government's data, over and above the responsibilities of Data Owners.

An appointed individual, called a Data Steward should be given formal responsibility for the stewardship of each major dataset. The Data Steward should be made responsible and accountable for the management and care of the data holdings assigned to them, in line with the defined data policy.

Data Audit

Data management audits are recommended to assess the extent to which Data Management procedures are followed. The following mechanisms may be used to monitor implementation.

- Data Management audits of major data collection, storage and dissemination activities should be commissioned to ascertain the level of compliance with data policies and guidance notes.
- Data Management audits should review the extent to which stewardship procedures are followed and the subsequent improvement in the quality and accessibility of the data is subsequently improved.
- Memoranda of Agreement between owner/supplies and users should be checked to ensure that the conditions of use are in line with agreed departmental policies.

Key Roles for Implementing Data Management

To be successful, Data Management procedures must be implemented across the whole organization, under the guidance of a member of an Executive Board or the Data Management Champion. Other key roles are the Data Policy Manager and the Data Stewards assigned to each key dataset.

The following list of responsibilities may help organizations to establish these key roles and implement good Data Management policies and procedures.

Data Management Champion

The champion is responsible for:

- Ensuring that departmental policies in Data Management are in line with Government Policies.
- Directing the development, implementation and maintenance of the detailed data policies, standards, procedures and guidelines across the whole organization.
- Reporting progress to the Executive Board on the performance achieved against the targets set for the improvement of data quality and the value gained from effective Data Management.

Data Policy Manager

The Data Policy Manager may require the help of Local Data Managers to discharge the following responsibilities:

- Developing and maintaining the Data Policy Statement and other enterprise guidance.

- Appointing and monitoring the performance of Data Stewards.
- Issuing guidance and training staff.
- Ensuring local practice in individual business areas meets the standard set for the whole organization.
- Ensuring that the organization maintains a central metadata resource.

Data Stewards

Data Stewards are responsible for ensuring that the following minimum standards are applied for each dataset.

- The dataset must be documented in the organization's catalogue following the standards for metadata, to enable the ownership, Intellectual Property Rights, stewardship and accessibility to be determined.
- The policy for exploiting the dataset and making it available to third parties must be agreed and documented.
- The dataset and its conditions of use must comply with all statutory and non-statutory obligations of the organization.
- The data must follow standard classifications and definitions where appropriate and must comply with all relevant standards, codes of practice and other protocols.