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Trade and Investment Information System (TIIS) Phase II

AMIR II Achievement of Market-Friendly Initiatives and Results

September 2006

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JORDAN AMIR II

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Abstract

This report summarizes the outcome of work undertaken for developing a trade and investment information system (TIIS) in Jordan. It reports methodology, main findings, and benefits of the TIIS throughout its three-year development phases, with an emphasis on the third development phase. The report primarily describes the live TIIS, suggests an expansion plan to it, and considers its sustainability and success factors. It also addresses the business needs, shows how the TIIS answers these needs, highlights the main data shortcomings and recommends future areas of improvement. Equally important the report presents the envisioned management structure of the TIIS along with operational procedures to ensure a smooth and efficient communication between participating entities as well as clear division of roles and responsibilities between them.

List of Abbreviations and Acronyms

AMIR	Achievement of Market-Friendly Initiative and Results Program
USAID	United States Agency for International Development
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
ESCWA	United Nation Economic and Social Commission for Western Asia
IMF	International Monetary Fund
ISO	International Organization for Standardization
WTO	World Trade Organization
US	United States
FTA	Free Trade Agreement
EU	European Union
FDI	Foreign Direct Investment
TIIS	Trade and Investment Information System
ISIC	International Standard of Industrial Classification
SITC	Standard International Trade Classification
HS	Harmonized Coding System
BEC	Broad Economic Categories
SNA	System of National Accounts
IE	Industrial Estate
QIZ	Qualifying Industrial Zone
ASEZA	Aqaba Special Economic Zone Authority
ASEZ	Aqaba Special Economic Zone
CBJ	Central Bank of Jordan
DOS	Department Of Statistics
JIB	Jordan Investment Board
JIEC	Jordan Industrial Estate Corporation
MIT	Ministry of Industry and Trade
MoPIC	Ministry of Planning and International Cooperation
MoPSD	Ministry of Public Sector Development
GPD	Government Performance Directorate
CCD	Companies' Controller Department
ACI	Amman Chamber of Industry
JD	Jordanian Dinar
MOU	Memorandum of Understanding
BOP	Balance of Payments
QA	Quality Assurance
FAQ	Frequently Asked Questions
PMI	Project Management Institute
GFCF	Gross Fixed Capital Formation
GCF	Gross Capital Formation
CoM	Council of Ministers
IT	Information Technology
ICT	Information and Communication Technology
UI	User Interface
ETL	Extraction, Transformation, Loading
DBA	Database Administrator
RDBMS	Relational Database Management Systems

AIHW Australian Institute of Health and Welfare
METeOR Metadata Online Registry
GoJ Government of Jordan

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Executive Summary

The Trade and Investment Information System (TIIS), was developed by local and international business and technical consultants, under the USAID funded program AMIR. The TIIS is now a live on-line single datasource for selected trade and investment indicators. It is hosted at the Department of Statistics (DOS) and co-championed by the Ministry of Planning and International Cooperation (MoPIC) and the Ministry of Industry and Trade (MIT). The TIIS can be accessed through the website of DOS by clicking on the link "Trade and Investment Information System".

The Trade and Investment Information System (TIIS) provides interactive tool that allows the user to custom-design reports on trade and investment in Jordan. The system is designed to automatically compile data from eight participating governmental entities, the system then standardizes and publishes some of the most updated national statistics on trade and investment according to internationally and nationally recognized standards.

The development of a TIIS was a core recommendation of a scoping study that was undertaken in 2003. Realizing the pressing need to actually establish the TIIS, as per the scoping study's recommendations, the development of the TIIS was carried out in two phases:

Phase I – Data Governance of the TIIS, December 21, 2004-October 31, 2005: This phase dealt with the business aspects of the system, which include, but are not limited to, the following: forming a TIIS Task Force that encompasses participating entities, surveying technical and business data at entities, developing metadata, researching best practices and international standards, and developing a governance structure and pertinent operational procedures.

Phase II – TIIS Development, November 2005-August 2006: This phase is the focus of the report at hand. The major accomplishment out of this phase is the actual development of the TIIS. Guided by the business requirements and needs, the second phase of the TIIS was able to solve a great deal of imperfections in data, reporting mechanisms, and classification standards at the entity level. The limited time of delivery was a constraint in dealing with all issues related to trade and investment data at entities, however, one of the main outcomes was the provision of a detailed list of the areas that need improvement in the future. The end of this phase resulted in an up and running TIIS.

The TIIS presents an ideal model for future development endeavors on standardization of collection, classification, and publishing methodologies and mechanisms. TIIS flexibility and long-term needs were highly considered during the system development phase in order to ensure that it can accommodate future expansions. Ultimately, the TIIS can accommodate as much as the full datasets of national economic indicators in Jordan as it matures.

The following are the key benefits of the TIIS, as it stands today:

- Improved accessibility: On-line single data source that can be easily accessed and available to the public. This source includes the best indicators available in Jordan.
- Improved depth and breadth of data: Offers multi-dimensional datasets.
- Better understanding: Provides common data definitions and features through "metadata development."
- Improved representational consistency: Provides a consistent representation of data, through using an ETL mapping tool to group different codes into unified common codes.

- Ensured timeliness: Provides an automatic generated data, retrieved at frequent refresh rates to ensure timeliness
- Standardization: Collects transfers and manages data to a central repository that is then used to generate needed reports and provide accurate, consistent information.
- Clear and detailed identification of data shortcomings: throughout the project lifetime, several data shortcomings were encountered. Although the TIIS provides a cleansing mechanism, it was found that a lot of housekeeping is needed at the datasource. A detailed documentation of entity-specific data shortcomings were reported for future consideration.

To ensure that the TIIS is well-maintained, the consultants' team worked on the following sustainability factors that were discussed, developed, and modified over the course of the project. They are:

- The *championship and support* of the project in terms of management and funding
- Implementation of an *automated data generation processes*; in order to ensure that human intervention is minimal.
- Development of *governance structure and operational procedures* to ensure a smooth and efficient communication between participating entities as well as clear division of roles and responsibilities between them is facilitated
- Assignment of *TIIS management body and staff*: included the assignment of contact points at the participating entities as well as the staffing of the TIIS unit. The TIIS unit is tasked with maintaining the TIIS as well as ensuring that it follows the operational procedure among other tasks.

1 Introduction

1.1 Background

Currently, Jordan actively participates in the global market by moving forward with its commitments under the World Trade Organization (WTO), and other free trade agreements, such as the Jordan-US FTA and the EU Association Agreement. Despite this active participation in the global market, Jordan's statistics lack accuracy and timeliness, and only few organizations commit to international trade and investment standards in the collection, classification, and presentation methods of statistics. Various AMIR studies found that despite the fact that the trade and investment information systems in Jordan are concentrated in few government agencies; the systems are uncoordinated and fragmented.

The origins of this project go back to 2001, when AMIR conducted an assessment of the trade and investment information systems in Jordan. The findings of the assessment pointed out that trade and investment systems in Jordan are disjointed with noticeable shortcoming. Of these, systems appear to undertake minimal processing of information; hence, trade and investment data lack timeliness, consistency, and compliance to standards or minimal presentation requirements.

In 2003, AMIR commissioned a group of consultants (Al Jidara to undertake the business assessment of TIIS and Allied Soft to undertake the technical assessment) to carry out a scoping study of the trade and investment information system project. The proposed TIIS came as the core recommendation of the scoping study. Additionally, guidelines on how the system should be established, governed, and structured were provided. This effort was concluded towards the end of year 2004. Realizing the pressing need to actually establish the TIIS, as per the scoping study's recommendations, AMIR called for the assistance of the two consulting firms (Al Jidara and Allied Soft) to set-up and to implement the Trade and Investment Information System (TIIS). A two-phase approach was chosen for the implementation as follows with Al Jidara leading the project management efforts besides the business aspects of the TIIS:

Phase I – Data Governance of the TIIS, December 21, 2004-October 31, 2005: This phase dealt with the business aspects of the system, which include, but are not limited to, the following: forming a TIIS Task Force that encompasses participating entities, surveying technical and business data, developing metadata, researching best practices and international standards, developing operational procedures and a governance structure.

Phase II – TIIS Development, November 2005-August 2006: This phase is the focus of the report at hand. The major accomplishment out of this phase is the actual development of the TIIS. Guided by the business requirements and needs, the second phase of the TIIS was able to solve a great deal of imperfections in data, reporting mechanisms, and classification standards. The limited time of delivery was a constraint in dealing with all the issues of trade and investment data, however, the major achievement in this regards is to point out all the areas where there is room for future improvements. This effort solely, was only possible by the extensive survey and in-depth observation of trade and investment data that went on for more than two years. The end of this phase resulted in an up and running TIIS.

1.2 Definitions and Terminologies

The aim of this section is to define the keywords in this report, which will help clarify the business and technical concepts that were and will be repetitively used as far as the Trade and Investment Information System is concerned.

Trade and Investment Information System (TIIS): is a single on-line source with a substantial amount of trade and investment data in Jordan; the TIIS hosts trade and investment data from relevant governmental entities. The TIIS is designed to automatically-compile, standardize and publish some of the most updated national statistics on trade and investment according to internationally and nationally recognized standards. Statistics in the TIIS are furnished and periodically updated by selected government entities that generate primary data on trade and/or investment in Jordan. All participating entities, referred to hereinafter as "Stakeholders" are committed to the advancement and institutionalization of trade and investment data collection, classification and publication in a manner that adheres to the standards and formats set forth by TIIS.

At present, TIIS includes data pertaining to trade and investment only. Nonetheless, the system is designed in a flexible and accommodative manner that will enable it to absorb as much as the full set of the national economic information of Jordan in the future.

Stakeholders: Entities involved in issuing and/or administering trade and investment data. Stakeholders are either defined as data users or data providers. Most of the TIIS stakeholders are data providers and they responsible for furnishing and periodically updating the TIIS data. They are:

- Department of Statistics
- Ministry of Industry and Trade
- Companies' Controller Department
- Aqaba Special Economic Zone Authority
- Central Bank of Jordan
- Jordan Industrial Estates Corporation
- Amman Chamber of Industry
- Jordan Investment Board

The Ministry of Planning and International Cooperation (MoPIC), Government Performance Directorate, and Jordan Customs Department also played a major role in the development of the system. They are data users except for the Jordan Customs Department, which provides its data through the Department of Statistics.

Stakeholders, both data users and data providers, are committed to the advancement and institutionalization of trade and investment data collection, classification and publication in a manner that adheres to the standards and formats set forth by TIIS.

Governance Structure: It is a suggested structure for managing data networks including; data standards, data exchange protocol, and data maintenance, quality, integrity and security. The governance structure of the TIIS and other business aspects were constructed by following the example of similar experiences in Ireland and Australia. The ISO/IEC11179 standard was used when appropriate. The latter standard describes standardizing and

registering data for the purpose of making it shareable (i.e., interoperable). Based on the review of best practices, the TIIS governance structure was established and its operational procedures were designed. At present, the TIIS is headed by an Executive Committee, and is monitored by a Control Committee. Both committees include one or more representative from each participating government entities, known as the "data steward" and/or the "data submitter". The Data Steward/Data Submitter is mainly tasked with the standardization, verification, and validation of data.

Data Steward: the person or group of people in an entity responsible for ongoing maintenance of metadata items at their entity.

Data Submitter: the person or group of people in an entity responsible for identifying and reporting data suitable for registration in the Metadata Registry.

Operational Procedures: procedures for the different roles involved in the TIIS in terms of processing current and new data and change management and retirement procedures for data

User Interface/Functional Design: structure that shows the business requirements and functionality of the system. The document is to be used by the technical team and the graphic designers for the implementation of the System.

Data Set: A statistical set of data related to a specific economic activity that partially answers one or more of the business questions of the stakeholders. Questions can be answered by more than one data set.

Metadata: Data that is used to describe other data; data definitions are sometimes referred to as metadata. Metadata provides information about the content, format, quality, condition, utility of the data set, and other characteristics of data. Examples of metadata elements are: attribute name, definition, source, frequency, scope and coverage, statistical unit, purpose, etc.

Registered Item: A registry item (data) for which administrative information is recorded for in the TIIS Registry.

TIIS Glossary: A comprehensive alphabetical listing of trade and investment related terms and their common meanings and related standards, with a listing of references.

ISO/IEC 11179: specifies the procedure by which Registered Items required in various application areas could be registered and assigned an internationally unique identifier. For each Administered Item to be registered, ISO/IEC 11179-6:2005 defines the type of information that is specified, the conditions that are met, and the procedure that is followed.

2 Methodology

The consultants followed the Project Management environment of PMI as a guideline framework for the TIIS project in order to demonstrate commitment to sound project management principles and quality of work. Project management techniques were tailored to specific requirements for the project.

This project was handled in three different phases:

2.1 Proof of Concept Phase – Scoping Study

Proof of Concept Phase – Scoping Study, March 2004 – July 2004: This phase included the conduct of a scoping study of the trade and investment information system (TIIS). The proposed TIIS came as the core recommendation of the scoping study. Additionally, guidelines on how the system should be established, governed, and structured were initially provided.

The main tasks of the Proof of Concept Phase included the following:

- **Articulation of business questions:** The consultants' team put themselves in the shoes of a trade and investment policy-maker and brainstormed a number of policy-related questions.
- **Identification of Data Sources:** In an effort to answer these policy-related questions, the consultants' team, identified data sources for a pre-defined list of indicators that resultant from the policy-related questions.
- **Data Survey:** 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 entities, obtain relevant data to answer the business questions set and populate the proof of concept.
- **Gap Analysis:** Once the site visits were completed, a detailed business gap analysis and a detailed technical gap analysis were completed. This exercise involved a comparative analysis of the "Gap" in the capabilities of the current data, pre-existing/current system and data standards and the requirements of the TIIS.
- **Data Management:** Concurrently, international best practice in data management and interoperability was studied and a governance model was developed.
- **Data Collection:** A discreet set of trade and investment statistics was collected manually on Excel sheets to be included in the Proof of Concept.
- **Establishment of the "proof of concept":** a miniature of the TIIS was established to demonstrate the broader applicability of the business concepts and rules, information architecture, technical solution and governance model to the rest of the trade and investment subject domain.

2.2 Phase I – Data Governance of the TIIS

Phase I – Data Governance of the TIIS, December 21, 2004-October 31, 2005: This phase examined the business aspects of the TIIS that are necessary in order to take the "proof of concept" to a larger scale. This phase included the following tasks:

- **Ensuring Stakeholders Buy-in:** The main objective of this task was to introduce each entity to the TIIS system and its benefits. A tailored presentation was conducted for the head of each entity discussing the TIIS System with relevance to each entity's

own needs and specifications. Handouts were distributed at the presentations which included: project summary, roles and responsibilities, and FAQs in Arabic and English.

- Issuing and signing a Memorandum of Understanding: After informal agreement between AMIR and the TIIS stakeholders, it was of essence to formulate the agreement in a Memorandum of Understanding (MOU). Towards the end of September 2005, all MOUs were signed by the heads of each entity; those include Ministers of ministries and general directors of departments. Copies of the signed MOUs are enclosed in Annex I.
- Forming a TIIS Task Force: The objective of this task was to have empowered counterparts from each trade and investment entity participating in the TIIS Task Force and attending all TIIS meetings in preparation of the actual development of the system. Each stakeholder assigned a business and a technical counterpart to represent them on the TIIS in order to work, in conjunction with the consultants team on all issues related to the project.
- Conducting TIIS Task Force Meetings: The TIIS consultants' team conducted a series of five meetings with all business and technical counterparts of the trade and investment entities to inform them on the progress of the TIIS Project, discuss any surfacing issues, and agree on next steps. The meetings allowed stakeholders to give their feedback, share ideas and develop recommendations that would assist the project team in the implementation of the TIIS.
- Conducting Metadata Working Sessions: The TIIS Team also conducted eight working sessions with selected counterparts that have extensive experience in data definitions and standards. The results of these metadata working sessions were: identification of data to be included in the TIIS and development of data definitions, sources, and metadata.
- Desk Research: TIIS consultants team resorted to international best practices and standards (ISO, SNA, UN Statistics Division), in order to improve the data and metadata collection, validation, processing, storage, and dissemination. Following international standards and best practices is essential to improving quality, eliminating errors and incoherencies. Examples of useful web-links are:
 - The United Nations Statistics Division website: <http://unstats.un.org/>
 - International Trade Center UNCTAD/WTO website: <http://www.intracen.org/>
 - The Australian Institute of Health and Welfare¹ website: <http://meteor.aihw.gov.au>
 - The United Nations Conference on Trade and Development Website: <http://www.unctad.org/>
- Business and Technical Data Survey: The consultants surveyed each entity's current data. The data survey method was two folds: business data survey and technical data survey. Over a course of two months, the TIIS consultants' team paid two visits (one for technical data surveying and another for business data surveying) to each stakeholder. This effort aimed at arriving at an extensive examination of data and technical features and shortcomings.

¹ *The Australian Institute of Health and Welfare is the first institute to adopt ISO 11179 standards for its metadata registrar*

2.3 Phase II – TIIS Development

Phase II – TIIS Development, November 2005-August 2006: This phase is the focus of the report at hand. The major accomplishment out of this phase is the actual development of the TIIS. Guided by the business requirements and needs, the second phase of the TIIS solved a great deal of imperfections in data, reporting mechanisms, and classification standards. The limited time of delivery was a constraint in dealing with all the issues of trade and investment data, however, the major achievement in this regards is to point out all the areas where there is room for future improvements. This effort solely, was only possible by the extensive survey and in-depth observation of trade and investment data that went on for more than two years. The end of this phase resulted in an up and running TIIS.

This phase of the project included the following main tasks:

- User interface design: involved the development of an initial "look-and-feel" prototype focusing primarily on the User Interface (UI) and Reports. This prototype continually evolved through the System Design phase to result in a near functionally complete system. The UI design was shared with selected stakeholders for their consent.
- Establishing a business framework for data specifications: One of the main components of this task was to identify and validate the main breakdowns of each dataset, its availability timeframe, its shortcomings and quality levels. Additionally, when possible, entities were advised to change part or all of their methodology, format, classification, etc. to correspond with TIIS quality standards. Nevertheless, there is a great deal of effort that has to take place in the near future, although not within the timeframe of this project. For this reason, a list of TIIS achievements in terms of data quality along with a detailed description of suggested future improvements were documented. Refer to Section 6 for a full documentation of data shortcoming, TIIS benefits, and future areas for improvement.
- Identification of the technology tool: involved setting out business and technical requirements of the TIIS. These requirements have become the selection criteria, based on which the technology of the system was decided. Offers from three international software application providers were evaluated. SAS was granted. A "Build vs. Buy"² scenario is detailed in Annex II.
- Facilitating the assignment of TIIS management body and staff: Facilitated the assignment of TIIS Executive Committee's members, Control Committee's members, data stewards, and data submitters (Refer to section 5.1 for clarification). This included sending out letters to entities' heads requesting the assignment of TIIS management body in addition to representatives that will eventually take the roles as data stewards and data submitters. Nomination letters along with a list of contacts are provided in Annex III and Annex IV respectively.
- Finalization of the Glossary and Metadata: Following on from the Phase I, the Glossary and the Metadata sheets were reviewed and updated based on new findings through Phase II of this project. The final version of TIIS Glossary and Metadata is available on the TIIS under the "Reference Center" section. TIIS link is currently available on DOS website (www.dos.gov.jo).

² A "Build vs. Buy" scenario assesses the technical question of whether it is better to build a software application from scratch, or to buy COTS (commercial off the shelf) software.

- Improving data quality at the data source: The consultants' team worked with the participating entities, to the extent possible, to improve their data. Several improvements have been done in this regard. For more detail refer to section 6.2.2.
- System Design: involved the technical architecture of the TIIS, the development of the Data Model and the ETL process, and the identification of business rules and workflows.
- Data Migration: involved the data retrieval process from the entities' internal systems to the TIIS. The retrieval process was done according to certain technical formats that were developed by the TIIS technical consultants' team.
- Quality Assurance: involved the complete system testing of the application in order to determine the ability of the system to handle data and transaction loads.
- User Acceptance Testing: involved the thorough testing of the system by the consultants' team as well as new users. The system was modified in accordance with the suggestions made by the "users" and the approved system was modified and re-deployed.
- Data Quality Checking: In parallel to the user acceptance testing up until the finalization of the TIIS, a data quality checking effort was run. The consultants' team conducted several "validation" checks towards the end of this project. Desk research was mainly carried out to complement the field research proceedings. Desk research capitalized on documented, reliable, published data by the stakeholders. Such activities were also followed up with phone calls with the respective parties, mainly for clarifications and validation of gathered data. Additionally, field visits were conducted to hold in-depth quality checks. The validation and checking effort was done directly with the stakeholders. This task made the consultants' team confident of the quality of acquired and presented data.
- System Development: involves the construction of the proposed system into a fully functional system
- Administrator Training: The technical consultants' team conducted a three-day SAS administrator training to three technical persons from the DOS.
- Systematic collection, collation, storage and sharing: Ensuring automatic generation and scheduled jobs (refresh rates).
- Governance Structure, Operational Procedures, and Roles and Responsibilities: Following on from the previous phase, the governance structure, operational procedures, and the roles and responsibilities of the different participants were updated. This update took into account the technical requirements of the TIIS, the sustainability and the maintenance considerations of the TIIS that became more apparent in this phase. This task is detailed in Section 5.
- Handing-over and closure: involved sharing information and documents with the TIIS champions (the MoPIC and MIT) and the TIIS host (the DOS). The consultants team held several meetings with the DOS team and an extensive meeting with the TIIS coordinator and the TIIS assistant to explain in detail the hand-over package, the roles and responsibilities, and next steps.

2.4 Challenges

This section describes the challenges faced throughout the course of this project in its three phases. The description of these challenges is believed to be beneficial to the stakeholders in anticipating similar issues and undertaking precautionary measures.

The following are the main challenges:

- Rescheduling and delay of assignments beyond their end date:

As a result of the occurrence of various unanticipated commitments, the dates of the project tasks that were previously scheduled within the work plan had to be rescheduled in the course of the assignment depending on several factors, such as: unavailability and/or delayed response of entities representatives (due to other pressing engagements at their entity). The stakeholders' representatives' workloads and other binding obligations have imposed changing dates for pre-itemized activities in the work-plan.

Additionally, some entities showed modest technical and business capabilities, which made it difficult for them to respond to the consultants request with ease.

Despite the continuous re-shuffling of the project tasks, the entities' enthusiasm and commitment was one of the most important factors that contributed to the success of the TIIS.

- Managing effective project hand-over

The hand-over of the project remained a challenge throughout the three phases of the project. In the initial phases of the project, the project was presented to several parties for possible future support and championship. The continuous ministerial re-shuffling posed a threat on the project.

Despite this, the project was successfully handed-over to the co-champions the Ministry of Planning and International Cooperation (MoPIC) and the Ministry of Industry and Trade (MIT). Additionally, a TIIS coordinator was assigned by the MoPIC at the Department of Statistics.

To ensure an effective and smooth hand-over to the MoPIC, the MIT, and the DOS, as it is the host of the TIIS, the TIIS documents including the operational procedures, the roles and responsibilities of stakeholders and TIIS management body as well as their contacts, and this document "TIIS Final report" was delivered. In fact, this document provides guidelines, lessons learnt, and procedures for maintaining and expanding the TIIS. This document facilitates the communication of information among owners, stakeholders, users, and designers from project inception through operations to maintenance.

- Lack of definitions of data sets and trade and investment related terms at the data source.

In an effort to create a unified glossary and metadata for investment and trade related terms, the consultants' team worked on researching internationally recognized data sources and standardization bodies. On the national level, it was also of essence to develop unified definitions and metadata for Jordan-specific terms. Since few of the participating entities had definitions and common understanding of specific data features, the development of the metadata and the glossary was considered a daunting task by the consultants' team. Actually, this shortcoming had led to many changes in the metadata and the glossary even when they have been finalized. Many edited versions of the metadata and glossary sheets were

developed after the delivery of the final version. The consultants' team is now confident about the quality and the accuracy of the metadata and the glossary sheets. However, the consultants' team believes that the updates on the metadata and the glossary sheets must be held in a continuous manner and in cooperation with the participating entities.

- Coordination with eleven different governmental entities.

The multi-dimensional and the multi-source nature of the TIIS imposed a complex web of communication and coordination challenges, all of which demanded a high level of governmental cooperation at strategic, operational, and technical levels. The consultants' team managed to ensure effective cooperation and coordination among participating entities and individuals which was critical to the success of the project.

- Lack of systems at some participating entities.

The TIIS is maintained through a fully automated process, whereby all participating entities were asked to link their databases to the TIIS. Obviously, for this automation process to be successful the TIIS has to be linked to databases. Any connection of manual processing and archiving files is not possible. Few entities have not had databases for all or some of their data. For this reason, these entities, in consultation with the consultants' team and out of their interest to be part of the TIIS, have developed databases and transferred their historical data to these databases to be able to feed into the TIIS.

This task, although necessary, has been a bottleneck in the continuation of this project as was originally scheduled.

3 Description of the TIIS

The Trade and Investment Information System (TIIS) is an interactive tool that allows the user to custom-design reports on trade and investment in Jordan. The system is designed to automatically compile, standardize and publish some of the most updated national statistics on trade and investment according to internationally and nationally recognized standards.

Statistics in the TIIS are furnished and periodically updated by eight participating government entities that generate primary data on trade and/or investment in Jordan. They are:

- Department of Statistics
- Ministry of Industry and Trade
- Companies' Controller Department
- Aqaba Special Economic Zone Authority
- Central Bank of Jordan
- Jordan Industrial Estates Corporation
- Amman Chamber of Industry
- Jordan Investment Board

The Ministry of Planning and International Cooperation (MoPIC), Government Performance Directorate (GPD), and Jordan Customs Department are also playing a major role in the development of the system.

All participating government entities are committed to the advancement and institutionalization of trade and investment data collection, classification and publication in a manner that adheres to the standards and formats set forth by TIIS. The governance structure of the TIIS and other business aspects were constructed by following the example of similar experiences in Ireland and Australia. The ISO/IEC11179 standard was used when appropriate. The latter standard describes standardizing and registering data for the purpose of making it shareable (i.e., interoperable). International best practices and other countries' experiences, have taught us that nation-wide statistical systems and data quality improvements require long-term commitment and serious subsequent efforts.

Based on the review of best practices, the TIIS governance structure was established and its operational procedures were designed. At present, the TIIS is headed by an Executive Committee, and is monitored by a Control Committee. Both committees include one or more representative from each participating government entities, known as the "data steward" and/or the "data submitter".

The TIIS is hosted at the DOS and co-championed by the MoPIC and the MIT. The system is now up and running and available live on the DOS website (www.dos.gov.jo). The system can be accessed by clicking on "The Trade and Investment Information System" link on the left-hand side bar available on DOS' main page.

The TIIS is user friendly, with an easy navigation system, provides plenty of links on the home page, gives visitors an overview of the web sites content and choices. It offers flexibility in finding the latest trade and investment data that the user requires. The user can customize requests, visualize results, export to excel, download, and print customized reports.

The user can learn how to use the System by clicking on the “Using TIIS” tab on the webpage where (s)he will be directed to an easy to follow instructions on how to use the system. There is also an “About Us” tab that informs the user about the TIIS, in terms of whose responsible for the system, how the idea started and how the system was implemented. The “Contact Us” link allows the user to post her/his comments or questions.

The system is available in both languages, Arabic and English. The main menu bar is available on the left hand-side of each web-page. This main menu contains four main sections. They are:

1. Trade information: This section offers two main trade statistics, Merchandise Trade and Trade in Services. Any of these selections will lead to a "customize your own report" page which allows the user to set out her/his selection criteria and obtain the output. A "customize your own report" feature allows the user, where applicable, to choose among the following:

- Variable (e.g. national exports, imports, transit, trade balance, etc.),
- Trade partner: the default setting is that the user can choose the trade partner as individual country(s) (the user can choose up to five countries in a single report or "All countries" to display the report for the total amount). The user can also choose the trade partner displayed as a collected countries that form a geographical region or an economical and trade grouping.
- Product: the choose button under the "choose product" instruction note allows that user to choose the product by three different internationally recognized classifications. They are: the Harmonized Commodity Description and Coding System (HS), the Broad Economic Categories (BEC), and the Standard International Industrial Classification (SITC). Upon selecting any of these three classifications, the user can search a product through a product listing that offers a hierarchical list of HS levels (i.e. up from the chapter level down until the multi digit level depending on the classification), a manual code entry, and a keyword search.

Additionally the Merchandise Trade part offers quick lists of the top ten trade partners and the top ten traded commodities of any selected period as per the user's choice.

2. Investment information: This section offers two main investment statistics, Investment Activity and General Investment Indicators. Any of these selections will lead to a "customize your own report" page which allows the user to set out her/his selection criteria and obtain the output.

3. Reference center: This section is split between three main parts. They are: Trade and Investment Glossary, Metadata, and Composition of Regions and Economic and Trade Groupings.

The Trade and Investment Glossary offers a list of trade and investment terms in alphabetical order, their definitions, and definition source. These definitions are either nationally and/or internationally recognized definitions that help create a common understanding among governmental entities, decision makers, and researchers of a certain trend or investment-related terms.

The "Metadata" provides the main features for a specific data set (e.g. definition, data source, unit of measurement, scope and coverage, main breakdowns, frequency of collection, etc.).

This will facilitate communication between governmental entities, decision makers, and researchers alike on issues like the methodological changes, sources of error, and the depth and scope of a certain data set, which in turn will help minimize ambiguity and create a common understanding of data availability, shortcomings, and purpose of use.

The composition of Regions and Economic and Trade Groupings page allows the user to view the individual countries, of which a region or an economic and trade grouping is composed. This composition corresponds with the ISO country classification standard.

4. Submit Requests: This section is only available for participating entities (registered users). This section is authorized to a registered user who can log-in by entering "aciuser1" as a username and a password. A registered user can download and/or e-mail the requests and submit for processing according to the TIIS operational procedures. Three request forms are used: Registration Request, Retirement Request and a Change Request. Requests will be directed to the Control Committee and/or the Executive Committee and/or the TIIS unit as appropriate and then will be processed according to the TIIS operational procedures (see section 5.2).

4 TIIS Governance and Operational Procedures

The objective of this section is to describe in detail the TIIS Governance Structure and its Operational Procedures in order to ensure that a "TIIS Unit" under the Department of Statistics is properly established, functional and that mechanisms for its update and maintenance are in place. For this purpose, the governance structure and the TIIS operational procedures were developed. This section of the report is dedicated to documenting the processes of data collection and to proposing appropriate update mechanisms.

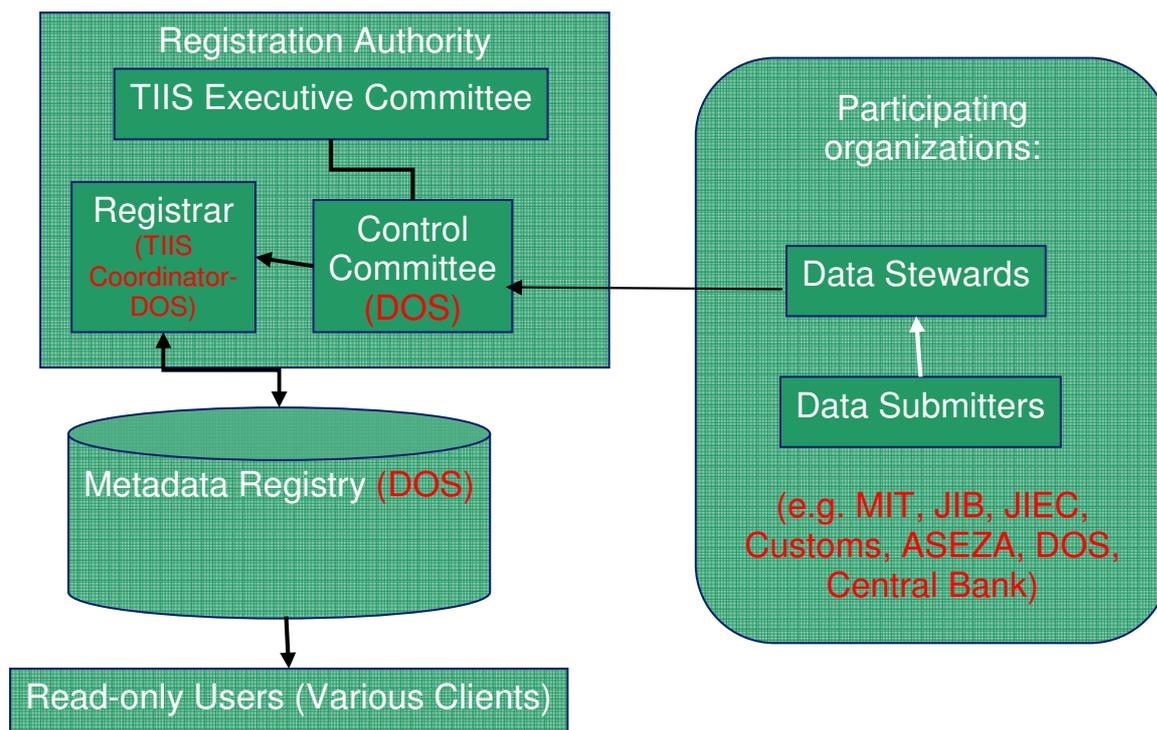
At this point, it is paramount to note that the establishment of a TIIS Unit stems from the Government of Jordan's needs as far as the planning and the decision making process is concerned. The processes and mechanisms created at the time of writing this report reflect the current situation and should therefore evolve and continue to be updated based on practical experience and changes in the surrounding environments and counterparts.

It is suggested that the TIIS be established within a unit in the Department of Statistics. The operation of the TIIS will be according to the Governance Framework Structure, which is introduced below. Additionally, the operations of the TIIS are inspired by the ISO 11179. However, operational procedures suggested in this report are tailored to the needs and specifications of the governmental environment in Jordan.

4.1 Governance Framework Structure

The Governance Framework structure is a system for managing data networks including; data standards, data exchange protocol, and data maintenance, quality, integrity and security. It is simple and flexible enough to evolve over time and accommodate changing requirements and circumstances. Hence, the system will be able to host new entities (stakeholders), new data items, and metadata elements as it matures.

As shown in the figure below, the system will consist of a Registration Authority (Executive Committee, Control Committee and a Registrar), Data Submitters, Data Stewards and Registry (database). All the parties to the Memorandum of Understanding (MOU) agreed that the Registry and the Registrar will be located at the Department of Statistics, the Control Committee is composed of selected representatives of the parties to the MOU and the Executive Committee consists of representatives of all participating entities. The Executive Committee is chaired by the Department of Statistics. Each of the participating entities assigned a Data Steward and a Data Submitter.



The following are the different roles in the Governance Framework structure:

1. The Data Submitter is the person or group of people in an entity responsible for identifying and reporting data suitable for registration in the Metadata Registry. They will ensure completeness of mandatory metadata attributes to be submitted. They will report their data to the Data Steward. (Some submitters could also act as Data Stewards.)
2. The Data Steward is the person or group of people in an entity responsible for ongoing maintenance of metadata items at their entity. They will check for accuracy, reliability and currency of descriptive metadata for Registered Items. The Steward will coordinate with other Data Stewards to prevent or resolve duplicated data. They will submit their data to the Control Committee.
3. The Control Committee is responsible for providing technical direction and harmonization of data and metadata for the Metadata Registry. They will provide Metadata Registry policies to the Executive Committee for approval and approve authorized submitters, read only users, and types of users. Structure, staffing, procedures and membership of the Committee are determined by the TIIS Executive Committee. The Control Committee will submit the data to the Registrar.
4. The Registrar is responsible for facilitating the registration of data and metadata and making them widely accessible and available to the community. They will be the single point of contact for managing/maintaining information about data in the Metadata Registry. The Registrar will enforce policies, procedures and formats for populating the Metadata Registry. The DOS has appointed a TIIS coordinator (Mr. Naser Nahleh) to facilitate the communication between entities and be assigned the Registrar responsibilities. Additionally, an assistant to the TIIS coordinator was appointed (Mr. Khaled Al-Mistarihi). The following are the main tasks that will be handled by the Registrar:

5. The Executive Committee is responsible for the overall policy formulating committee of the Registration Authority and the whole system. They are also responsible for administering responsibilities and delegating authority and facilitating the registration of data and metadata and making them widely accessible and available to the community. They will resolve all business management issues relate to the Metadata Registry (copyrights, stewardships, executive members, etc.)

4.1.1 Responsibilities, Staffing and Selection Criteria for Selection of Personnel

Executive Committee

The Executive Committee will consist of select representatives of all participating entities which will be chaired by the Department of Statistics.

It is proposed that Members of the Executive Committee possess the following qualifications and skills and be able to follow the duties mentioned below.

Qualifications

- Bachelor's degree or preferably a Masters Degree in Economics or related degree with a minimum of 4 years experience directly related to the duties and responsibilities specified
- An executive position at a government entity
- Minimum 5 years working in government entities on trade and investment statistics
- Minimum 5 years of management experience

Skills and Knowledge

- Excellent trade, business and investment knowledge
- An understanding of Metadata and its purpose
- An understanding of the entities trade and investment databases
- Good written and verbal communication skills in Arabic and English
- Possess strong analytical skills for effective problem solving and decision making
- High level of personal organization with a structured approach to work

Duties

- Establish overall Registry policies
- Resolve of all business management issues pertaining to the Registry, e.g., copyrights, stewardship, Executive Committee membership, etc.
- Ensure the long-term success and performance of the Registry
- Establish and update the Registry charter and strategic plans
- Meet periodically in face-to-face meetings, with additional meetings and/or teleconferences held as needed. The Executive Committee will normally fulfill its responsibilities via consensus building.

Control Committee

The Control Committee will be composed of select representatives of the parties to the MOU. The membership of the Committee may include Registrars and Stewards. At least one representative in the Control Committee should be an IT specialist. Details of their qualifications, skills and duties below:

Qualifications

- Bachelor's degree or preferably a Masters Degree in Economics or related degree with a minimum of 4 years experience directly related to the duties and responsibilities
- Bachelor's degree or preferably a Masters Degree in IT related field (only applicable for representatives assigned as IT specialists)
- Minimum 4 years working in government entities on trade and investment statistics
- Minimum 4 years of management experience
- Strong communication skills

Skills and Knowledge

- Excellent trade, business and investment knowledge
- Strong understanding in infrastructures, databases and networking (only applicable for representatives assigned as IT specialists)
- Project management skills and the ability to lead a team
- An understanding of Metadata and the purpose of the system
- An understanding of the entities trade and investment databases
- Good written and verbal communication skills in Arabic and English
- Possess strong analytical skills for effective problem solving and decision making
- High level of personal organization with a structured approach to work

Duties

- Overall conduct of registration operations
- Promote the reuse and sharing of data in the Registry within and across functional-areas, and among external interested parties to the enterprise
- Resolve technical issues associated with Registered Items, e.g., overlap, duplication, etc.
- Approve updates to Registered Items
- Receive and process applications for the registration of new items, assign international registration data identifiers values, and maintain a Registered Item Registry in accordance with provisions.
- Propose Registry policies to the Executive Committee for approval
- Approve authorized Submitters, Read-only Users, and types of users of the Registry
- Approve Registry content, procedures, and formats

- Submit management-related recommendations and issues to the Executive Committee
- Act on directions from the Executive Committee
- Meet periodically in face-to-face meetings, with additional meetings and teleconferences held as needed
- Work with people from all levels of their entity or other government entities

4.1.2 The TIIS Unit/TIIS Registrar

The detailed staffing suggested below consists of the TIIS Unit that will need to be established at a later stage. Currently, the staffing of the TIIS is limited to already existent staff working on a part-time basis. They are: Mr. Naser Nahleh as a TIIS Coordinator and Mr. Khalded Al Mistarihi as a TIIS assistant. Both assigned persons will handle the roles of both the Business Registrar and the Technical Registrar. After the TIIS is well-established, the amount of effort and time will be properly estimated based on real day-to-day operations.

The TIIS Registrar is responsible for facilitating the registration of data and metadata and making them widely accessible and available to the community. The Registrar:

- **Is the point of contact** for managing/maintaining info about data in the Metadata Registry
- **Monitor/manage Registry content**
- **Enforce policies/procedures** for using the Registry
- **Propose procedures/formats** for the Registry
- **Record current registration status** for all Registry items
- **Enforce data registration procedures**
- **Assist in progressing items** submitted to the Registry
- **Maintain contact information** of all Data Submitters, Data Stewards, members of the Control Committee and the Executive Committee
- **Add new users** as required
- **Random and Regular Data Checks:** The Data Warehouse Administrator will receive alerts on data errors and will follow up with the respective entity regarding the errors.
- **Collect Users' Comments and Questions:** The Unit will communicate them with TIIS committees and representatives for feedback.
- **Collect Proposal Forms and Communicate with TIIS committees for review:** The Coordinator will receive all proposals and delegate the comments to the TIIS committees. The Coordinator will organize regular meetings for the committees and follow up with all parties.
- **Implement/coordinate the implementation of the requested modifications to the system as approved:** This includes requests made in the proposal forms
- **Review international classifications:** The Coordinator will need to review changes made in international classifications used in TIIS and update the system accordingly.

- **Bugs reporting:** The parties can report bugs to Allied Soft within the warranty period of the project set at one year. Refer to Annex V for the bugs reporting template.

Staffing of the Registrar/TIIS Unit

The TIIS consultants' team estimated that the Registrar needs to staff a full time Data Warehouse Administrator and a Business Registrar as the TIIS matures. However, the already assigned TIIS coordinator and TIIS assistant may recommend otherwise based on practical experience. In due course, the envisioned roles of the Business Registrar and the Data Warehouse will be extended to cover more tasks. In General, the Business Registrar will advise the Data Warehouse Administrator on how to check for accuracy of data. The Executive Committee shall appoint the Business Registrar.

A. Business Registrar(s): They will be staffed in DOS on a full time basis working with the Data Warehouse Administrator and providing guidance. The Business Registrar will be an expert in registration processes, responsible for facilitating the registration of Registered Items and ensuring that those Registered Items widely accessible and available to the community. Based on the Business Registrar's recommendations and observations, the Control Committee may ask them to take an action and advise the Data Warehouse Administrator on changes to make on the System.

Details of their qualifications, skills and duties below:

Qualifications

- Bachelor's degree or preferably a Masters Degree in Economics or related degree with a minimum of 4 years experience directly related to the duties and responsibilities specified
- Minimum 4 years working in government entities on trade and investment statistics
- Minimum 4 years of management experience

Skills and Knowledge

- Excellent trade, business and investment knowledge
- An understanding of Metadata and the system
- An understanding of the entities trade and investment databases
- Full understanding of the TIIS Operational Procedures and Governance Framework
- Good written and verbal communication skills in Arabic and English
- Possess strong analytical skills for effective problem solving and decision making
- High level of personal organization with a structured approach to work
- Detail oriented with strong documentation skills

Duties

- Monitor and manage the Registry contents
- Enforce policies, procedures, and formats for populating and using the Registry

- Propose procedures and standard formats for the Registry to the Control Committee for consideration
- Record current registration status for Registered Items in the Registry
- Ensure access for authorized users to contents in the Registry
- Assist in the identification and resolution of duplicate or overlapping Registered Items in the Registry
- Act on direction from the DOS, the TIIS Executive Committee
- Archive and keep track of all reported data errors for future reference
- Provide the Control Committee with regular updates on the data errors archive for their action
- Continuously update the Control Committee on any changes in the international community that may impact the data. Examples of these changes may include: inclusion of countries into the EU, changes on the standards, release of a new version of a certain standard, etc.
- Seek alternative funding sources and write proposals for obtaining grants
- Deliver presentation to government officials, donors and the TIIS Registration Authority on the TIIS status, challenges, progress, etc. when requested

B. Data Warehouse Administrator: They are responsible for the installation, usage, accuracy, efficiency, security, maintenance, administration and development of TIIS database and the associated software products. Holder of this position is also responsible for defining requirements for improving any aspect of the system. They will be working on a full time basis in the Registrar.

Details of their qualifications, skills and duties below:

Qualifications

- Bachelors Degree in Computer Science or equivalent
- Minimum 4 years working in government entities on trade and investment statistics

Skills and Knowledge

- Knowledge and skills in networking, infrastructure and databases
- Full understanding of the TIIS Operational Procedures and Governance Framework
- Strong communication skills

Duties

- Ensure that the TIIS database is updated accurately and regularly
- Maintain database parameters for all production
- Develop maintenance procedures
- Implement maintenance to database
- Test the functionality of database, report bugs, and resolve problems
- Control access to data in the database

- Conduct performance monitoring and tuning adjustments as necessary
- Initiate regular exercises to optimize performance
- Plan and co-coordinate database capacity
- Plan and co-coordinate database security measures
- Plan and coordinate database backup
- Devise, develop and implement disaster recovery and archiving procedures
- Identify and resolve users' problems in data access
- Assist users or act on their behalf to create simple query definitions in order to extract data on an ad hoc basis
- Collaborate in the design and development of the TIIS database to meet entities/user needs as per the recommendations and the Control Committee's approval
- Conduct code reviews, and performance application auditing and walkthroughs
- Respond to/anticipating technological innovations
- Maintain database schemas and data documentation
- Maintain database document and data dictionary
- Complete thorough functional and technical evaluation of products and database upgrades and patches
- Carry out routine configuration/installation and reconfiguration of database and related products and upgrading software servers and application tools
- Use database management systems software and appropriate analysis tools to collect routine database performance statistics to assist in planning, and creating reports, including proposals for improvement
- Ensure and document that procedures and scripts for all aspects of database administration are established and maintained
- Develop and maintain software inventory lists tracking system, license and warranty duration
- Complete thorough, accurate, and timely status reports of access to information and databases
- Provide technical database direction and training of database utilities and software products to users, software development and support staff on all corporate standard databases
- Archive and keep track of all reported data errors for future reference
- Provide the Control Committee with regular updates on the data errors archive for their action
- Provide access privileges for end users

4.1.3 Suggested Criteria for Selection of Data Submitters and Data Stewards

Data Submitter

The Data Submitter is the person or group of people in an entity responsible for identifying and reporting data suitable for registration in the Metadata Registry in coordination with the Data Steward.

Qualifications

- Bachelor's degree in Economics or related degree
- Minimum three years in entity working on trade and investment statistics

Skills and Knowledge

- Excellent trade, business and investment knowledge
- Good written and verbal communication skills in Arabic and English
- An understanding of the entities trade and investment databases
- An understanding on Metadata and the purpose
- A detailed understanding of the process and functionalities of the system
- A detailed understanding of trade and investment statistics
- High level of personal organization with a structured approach to work
- Work flexibly, reprioritize and respond to changing requirements

Duties

- Interpret, evaluate, and interrelate trade and investment data upon request
- Locate and pull out Registered Items from its database or other forms of storage
- Document changes in data features, coding for data steward's reference
- Report any problems in data collection, quality, and timeliness to the Data Steward
- Verify data quality with data sources
- Train others on the Trade and Investment Information System (TIIS)
- Conduct proper Quality Assurance (QA) on the data entered

Data Steward

The Data Steward is the person or group of people in an entity responsible for data quality and its adherence to the specified standards and formats. (S)he is also responsible for submitting any changes in the data specified (i.e. metadata, codes, standards, etc.). Details of their qualifications, skills and duties below:

Qualifications

- Bachelor's degree in Economics or related degree with a minimum of 4 years experience directly related to the duties and responsibilities specified
- Minimum three years in entity working on trade and investment statistics
- Minimum of three years of management experience

Skills and Knowledge

- Excellent trade, business and investment knowledge
- An understanding of Metadata and its purpose
- An understanding of the entities trade and investment databases
- Good written and verbal communication skills in Arabic and English
- Possess strong analytical skills for effective problem solving
- High level of personal organization with a structured approach to work

Duties

- Interpret, evaluate, and interrelate trade and investment data
- Standardize data naming with the Control Committee for new data and establishing consistent data definitions
- Provide guidance to the Data Submitter
- Expert point of contact for coordinating and organizing data provision according to the set TIIS formats and standards.
- Acts in two roles as the Data Submitter and Data Steward when needed
- Validate data with respective Data Steward(s)
- Report any changes/updates in data features, coding, etc. to the Control Committee
- Provide solutions to data issues and reports those issues to the Control Committee
- Advise the Control Committee on any new items found to be necessary for inclusion in TIIS
- Submit proposals to the Control Committee on the inclusion of new items for the committee's approval
- Fill-out metadata requirements to new items according to the TIIS metadata template
- Resolve conflict on data and provide additional information to the Registration Authority
- Coordinate with other Stewards to attempt to prevent or resolve duplicated efforts
- Ensure the quality and continuously update metadata attributes for Registered Items
- Work flexibly, reprioritize and respond to changing requirements
- Train others on the Trade and Investment Information System (TIIS)
- Conduct proper Quality Assurance (QA) on the data entered in the system

4.2 Operational Procedures

The operational procedures have been modified in Phase II of the Project after the IT team developed the system. The Operational procedures have been originally drafted in the first phase of the project, then were later reviewed and modified by the technical team to make sure they are compatible with the system.

The following are the operational procedures for the different roles involved in the TIIS in terms of processing current and new data and change management and retirement procedures for data.

There are four types of processes that were developed according to the data status as follows:

- A. *The Current Data Process***, which is concerned about the data that are currently covered by the TIIS as it stands today;
- B. *New Data Entering the System Process***, which is followed when a new data item is to be added to the system;
- C. *The Change Process for a Registered Data Item***, which is basically the process of changing a data feature of an item that is already existent within the current set of data in the TIIS as it stands today (e.g. change in collection and/or compilation methodologies, change in the main breakdowns of a data item, etc.); and
- D. Finally, *The Retirement Process for a Registered Data Item*** is addressed in order to tackle the option of omitting a data item from the original data-set that is currently included in the system as it stands today. This process can be followed if the data item became obsolete or valueless.

For processes B, C, and D, there are three types of forms that are easily accessible on the TIIS. They are: The Registration Proposal Form, Change Request Form, and Retirement Proposal Form respectively. An assigned participant (i.e. member of the Executive Committee, member of the Control Committee, Data Steward, and Data Submitter) can get a copy of these forms easily by accessing the log-in section of the TIIS. Upon accessing the log-in section of the site, a new heading "Submit Request" in the left-hand side bar will appear. Under this section, the user can get a copy of the form, fill it in, upload it, and send it to the TIIS Coordinator. It is suggested that MoPIC appoints a coordinator for the TIIS. Refer to Annex VI for the forms.

To log-in to the forms section, the entity user has to use the following user name and password:

Username: aciuser1

Password: aciuser1

4.2.1 *Current Data Process*

The Current Data Process begins at each entity. According to the technical layout of the TIIS, stakeholders will continue to locate their data on their own databases. The data will be sent from the entities to a server at DOS so the system will not access entities data bases it will retrieve the data from a standard .DAT files. The cleansed data will then be stored in a data warehouse. The data will never be in the warehouse unless it complies with TIIS standards and all of the needed checks will be done by the process of Extracting, Transforming and Loading data (know as the ETL process). The following are the detailed procedures for the day-to-day operations of the system (i.e. the management and processing of pre-identified items, referred to hereinafter as "Registered Items").

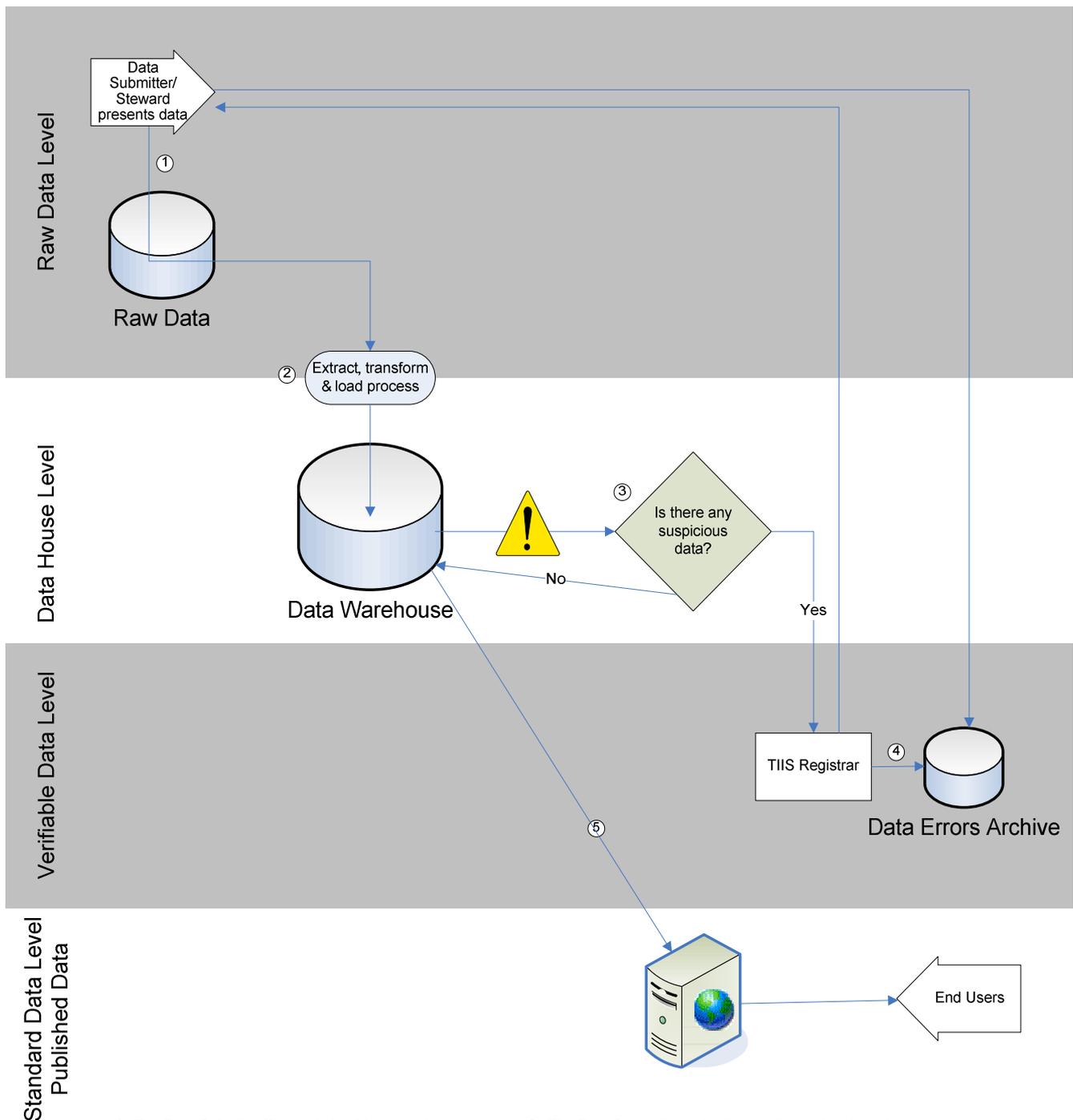
- The Data Submitter and/or Steward should ensure that the requested data are present on a physical secure location out of their databases servers. Data should be presented in compliance with TIIS standards and formats. The data in this level is classified as Raw Data. Additionally, *the Data Submitter and/or Steward should ensure that the data is transferred to the TIIS through an automatic generation process at a pre-defined time intervals. The stakeholders has already specified these time-intervals as detailed in Annex VII.*

- After processing the data through ETL, it will be transferred to the final Data Warehouse layer. In the Data Warehouse layer, the Data Warehouse Administrator³ will be able to see all the entities data. An Alert check system will be placed on all suspicious data in the Data Warehouse. If there is suspicious data, the Administrator will communicate with the Data Steward in each entity to check on accuracy. The data in this level is classified as Data House Layer
- The Data Steward will check on the suspicious data based on the Registrar(s)'s feedback. The Data Steward should verify the data's accuracy within the entity and/or with other participating entities if need be. Then, communicate with the Registrar(s) on quality of data. Data Steward should document his justification of the error for future reference. The data in this level is classified as Verifiable Data.
- All justifications of data errors (technical and business) should be stored in a central archive. The benefit of having this archive for past data errors are to improve the data quality and/or the TIIS ability to process, cleanse, and manage data over time.
- The verified data stays on the data warehouse server not on the web application server, it will be published from data warehouse; the web application just displays what returned from the Data warehouse server and never save anything except the programs. The data in this level is classified as Published Data. The data available for end users is classified as Standard.

The following is the process diagram for the procedures:

³ The Data Warehouse Administrator is to be assigned at the Department of Statistics (DOS). In preparation, two employees of the technical team at DOS were trained on administering the system and all necessary documents were shared with them. These documents are: SAS CDs and documentation, TIIS Administrator Manual, TIIS End-user Manual. It is up to the DOS, and according to the time and effort that is needed from the Data Warehouse Administrator, as will be evident from a trial period of six months or more, whether to employ a new person for this responsibility or to assign this task to an already existent employee.

TIIS Current Data Process (Day to Day Operations)



1. The Data Submitter/Steward should ensure that the requested data is present on a physical secure location out of their database servers at pre-specified time intervals. Data should be presented in compliance with TIIS standards and formats.
2. After processing the data through ETL, it is transferred to the final Data Warehouse layer. In this layer, the Database Administrator (DBA) will be able to see all the entities' data. An Alert Check system will be placed on all suspicious data. If there is suspicious data, the DBA will communicate with the Data Stewards in each entity to check on accuracy.

3. The Data Steward checks the suspicious data based on the Registrar's feedback. The Data Steward should verify the data's accuracy within the entity and/or with other participating entities if need be, then communicate with the Registrar on the quality of the data. Data Stewards should document this justification of the error for future reference.
4. All justifications of data errors (technical and business) should be stored in a central archive. The benefits of this archive for past data errors are to improve the data quality and/or the TIIS ability to process, cleanse and manage data over time.
5. The verified data stays on the data warehouse server where it is published to the Web via a web application.

4.2.2 *New Data Entering the System Process*

- Data Submitters in coordination with the Data Steward that wish to add new items will identify the new data item to be included in the TIIS during their course of normal activities. The Steward reviews whether an administered item should be progressed.
- If the administered item is not progressed--, the process will end there.
- If the Data Steward decided to progress an item, they will submit a registration proposal (a proposal requesting the registration of a new data item into the TIIS) to the Control Committee to add a new data item with a rationale why this item should be added. Registration proposal is available on the TIIS. The user can select the registration proposal form the system and send it to the Control Committee.
- If the Control Committee initially approves the addition of the proposed new data item, it asks the submitting entity to develop metadata according to the TIIS metadata template. The metadata template can be downloaded from the TIIS. In addition, the Control Committee asks the submitting entity to hand-in definitions of related terms to be added in the TIIS glossary. The item at this stage is classified as Candidate.
- The submitting entity researches internationally accepted definitions and standards, etc. in addition to local interpretations; the metadata for the new data item will be developed accordingly and entered in the Metadata template. The Metadata template is easily available by accessing the TIIS. An assigned participant (i.e. member of the Executive Committee, member of the Control Committee, Data Steward, and Data Submitter) can get a copy of the Metadata template by accessing the log-in section. Upon accessing the log-in section, a new heading "Submit Requests" will appear to the assigned participant. To log-in to the forms section, the entity user has to use the following user name and password:

Username: aciuser1

Password: aciuser1

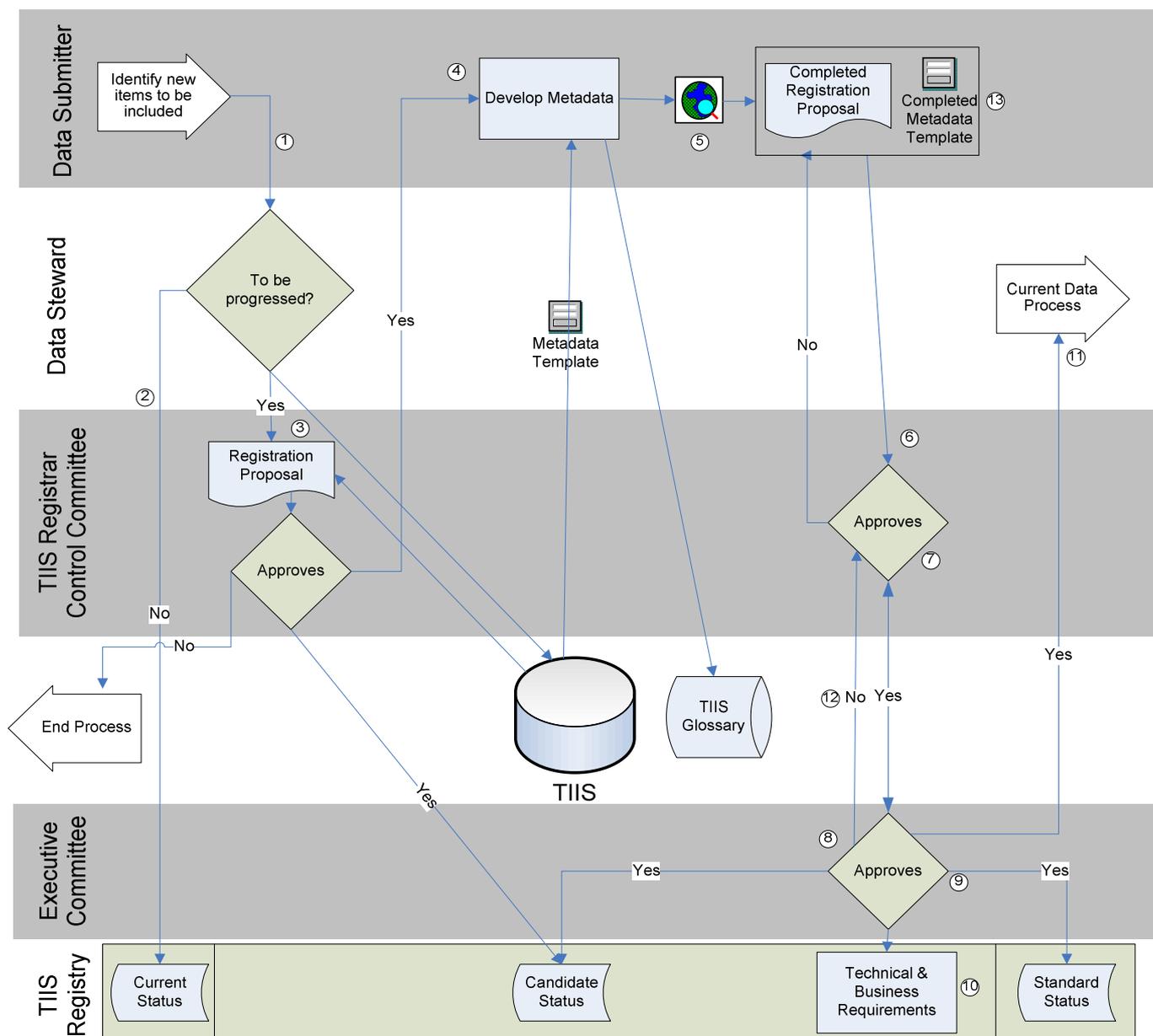
- The submitting entity will then send the Registration Proposal and the filled-out metadata template to the Control Committee for approval. The Registration proposal will be circulated manually/electronically with the metadata template, but the metadata template has to be sent via email, so updates/changes can be made electronically by the Control Committee.
- The Control Committee will provide closure on the new item's metadata and related terms definition by giving a pre-defined period for general discussion and then the Committee will develop the final definition and metadata based on what would be acceptable to official statistical bodies in the international community (e.g. UN statistics division) or the local interpretations of specific terminologies.
- The Control Committee will then send the approved proposal and the metadata template to the Executive Committee for final approval. The data in this stage is classified as Candidate.
- If approved by the Executive Committee, the Control Committee will send the approval to the Data Steward for processing copying the TIIS Registrars for registration purposes. The data in this stage is classified as Standard.

- TIIS registrar will work on technical and business requirements for inclusion into the TIIS.
- At this stage, the new data items becomes an administered data item, hence, it will go through the Current Data Process.
- If the data item is not approved by the Executive Committee, a rationale has to be documented and sent to the Control Committee for discussion.
- All approved and disapproved registration proposals must be archived within the entity (specifically the Data Steward), the Control Committee, and the Executive Committee for future reference/consideration.

It is worth noting, that the addition of new data item can be suggested by various parties (other non-participating governmental entities, data users, decision makers, and members of the Control Committee and the Executive Committee, etc.).

The following is the process diagram for the procedures:

New Data entering the TIIS System/Process



- Data Submitters identify new items to be included in the TIIS during the course of their normal activities. Data Steward reviews whether an administered item should be progressed.
- If the administered item is not progressed, it is held in the Registry in its current status level.
- If the Data Steward decides to progress an item, they will submit a registration proposal to the Control Committee to add a new data item with a reason why this should be added. Registration proposal is available on the TIIS. The user can select the registration proposal from the system and send it to the Control Committee.
- If the Control Committee initially approves the addition of the proposed data item, it asks the submitting entity to develop metadata according to the TIIS metadata template. The metadata template can be downloaded from the TIIS. In addition, the Control Committee asks the submitting entity to hand in definitions of related terms to be added to the TIIS glossary. The item at this stage is classified as Candidate.
- The submitting entity researches internationally accepted definitions and standards in addition to local semantics and the metadata for the new item is developed and entered in the Metadata template.
- The submitting entity sends the Registration Proposal and the completed metadata template to the Control Committee for approval. The Registration proposal is circulated manually/electronically with the metadata template (via email so changes can be made electronically by the Control Committee).
- The Control Committee provides closure on the new item's metadata and related definitions by allowing a pre-defined period for general discussion. The Committee then develops the final definition and metadata based on what would be acceptable to official statistical bodies in the international community (e.g., UN statistical division) or local interpretations of specific terminology.
- The Control Committee sends the approved proposal and the metadata template to the Executive Committee for final approval. The data in this stage is classified as Candidate.
- If approved by the Executive Committee, the Control Committee sends the approval to the Data Steward for processing, copying the TIIS Registrars for registration purposes. The data in this stage is classified as Standard.
- TIIS Registrar will work on technical and business requirements for inclusion into the TIIS
- At this stage, the new data item becomes an Administered Data item, hence it will go through the Current Data Process.
- If the data item is not approved by the Executive Committee, a reason has to be documented and sent to the Central Committee for discussion.
- All approved and disapproved registration proposals must be archived by the entity (specifically by the Data Steward), the Control Committee, and the Executive Committee for future reference/consideration.

4.2.3 Change Procedures for registered data items

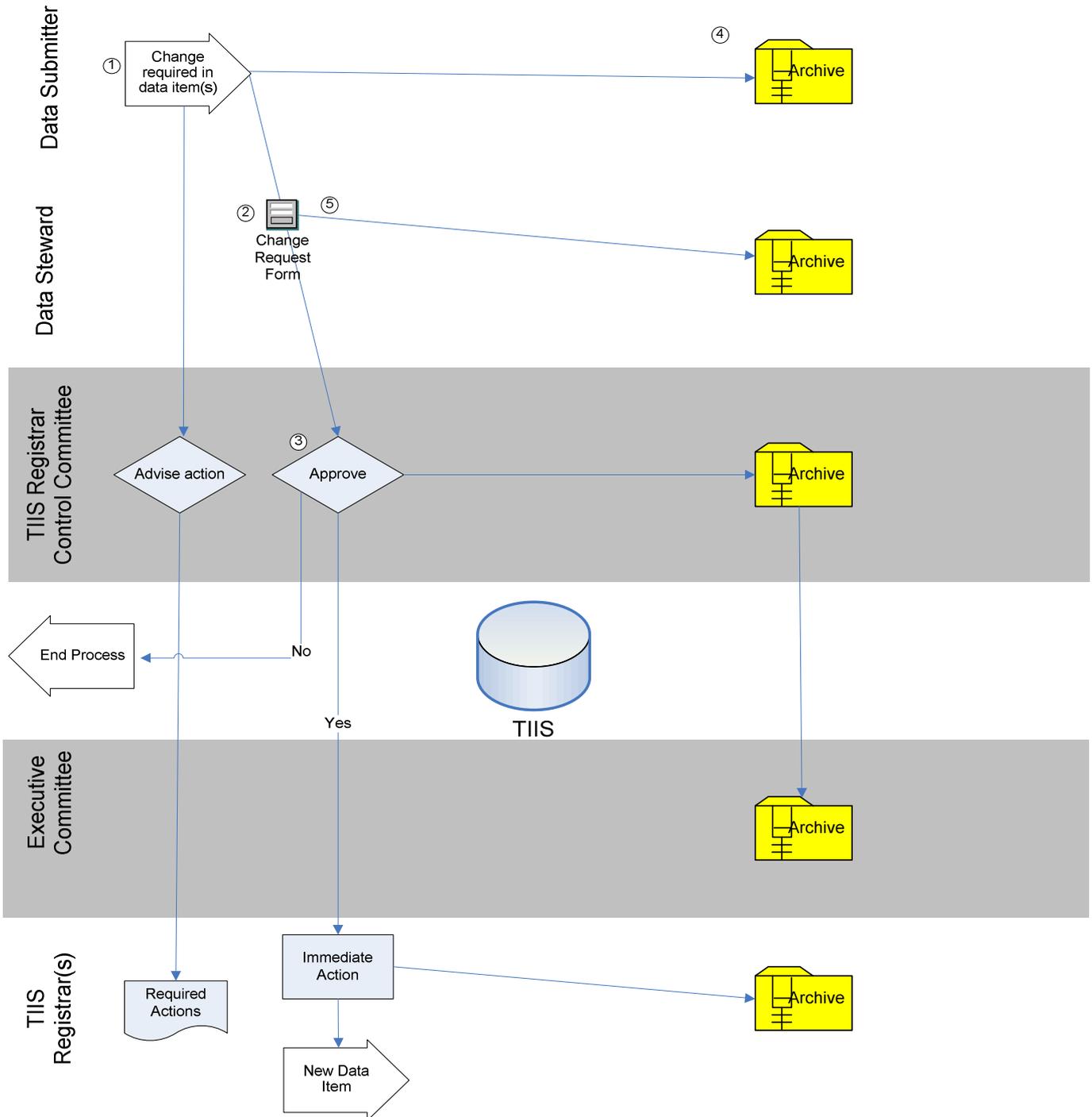
Required changes in a data item(s) and its business and/or technical metadata must be reported immediately to the Control Committee. The Control Committee should advise the TIIS Registrar(s) on the needed actions.

In the event a data item in the Registry is proposed for any changes, the following procedures will apply:

- The requestor of the change will send a change request form to the Control Committee for approval.
- The Control Committee will review the change request form and approve or disapprove the change. If approved, the Control Committee will send the form to the Registrars for immediate action. The Registrars process the administered items requested for changes as if registering a new data item.
- All approved and disapproved Change Request Forms must be archived within the entity (specifically the Data Steward), the Control Committee, and the Executive Committee for future reference/consideration.
- Changes need to be documented in a Version Change mechanism.

The following is the process diagram for the procedures:

Change Procedures for Registered Data Items



1. Required changes in a data item(s) and its business and/or technical metadata must be reported immediately to the Control Committee. The Control Committee should advise the TIIIS Registrar(s) on needed actions.
2. The requestor of the change will send a change request form to the Control Committee for approval.
3. The Control Committee will review the change request form and approve or disapprove the change. If approved, the Control Committee will send the form to the Registrar(s) for immediate action. The Registrar(s) process the administered items requested for changes as if registering a new data item.

4. All approved and disapproved change request forms must be archived within the entity (specifically the Data Steward), the Control Committee, and the Executive Committee for future reference/consideration.
5. Changes need to be documented in a version change mechanism.

4.2.4 Retirement Procedures for data items in the Registry

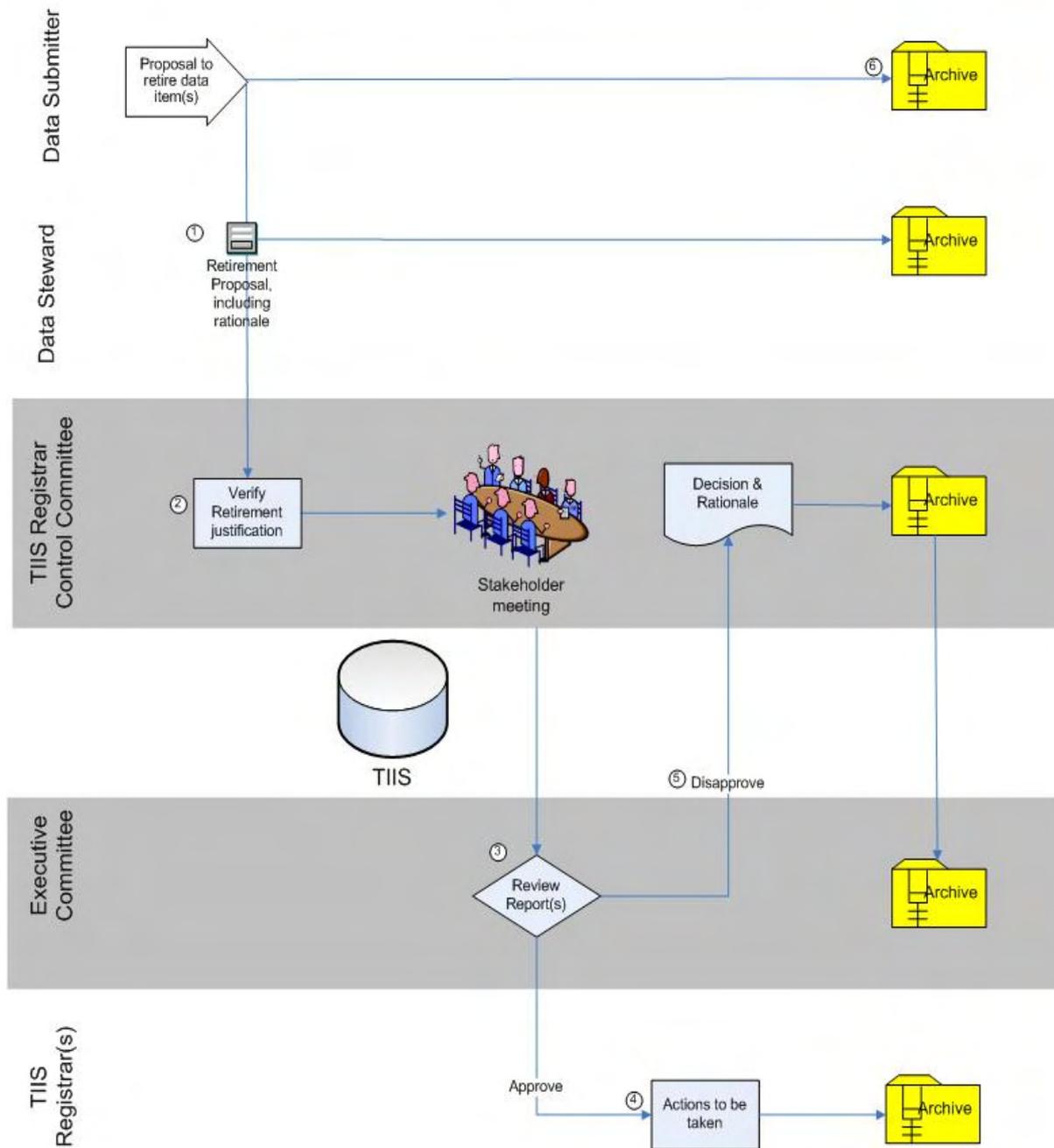
A data can be proposed for retirement for a number of reasons, it may be placed by entirely new data in the Registry, became obsolete, or it might have been inappropriately placed in the Registry.

In the event a data item in the Registry is proposed for retirement, the following procedures will apply:

- Participating entity that wishes to retire a data item(s) will submit a retirement proposal form, in which a strong rationale on why the data item(s) should be retired.
- The Control Committee verifies the retirement justification with the submitting entity and calls for a discussion meeting with relevant stakeholders (e.g. data users or other data sources). Depending on the meetings results, the Control Committee reports the outcome of the meeting attaching the retirement proposal, as well as the Control Committee's recommendations on the matter under consideration.
- The Executive Committee reviews the Control Committee's report(s) and approves or disapproves retirement of data item.
- Based on the final decision made by the Executive Committee, the TIIS Registrar(s) are advised to undertake the necessary actions to retire the data item(s) from the TIIS.
- If the proposal of retiring a data item(s) is not approved by the Executive Committee, a rationale has to be documented and sent to the Control Committee for their reference.
- All approved and disapproved retirement proposals must be archived within the entity (specifically the Data Steward), the Control Committee, and the Executive Committee for future reference/consideration.

The following is the process diagram for the procedures:

Retirement Procedures for Registered Data Items



Data can be proposed for retirement for a number of reasons: it may be replaced by entirely new data in the Registry; or it may have been inappropriately placed in the Registry in the first place

1. Participating entity that wishes to retire a data item(s) will submit a retirement proposal, including a strong rationale why the data item(s) should be retired..
2. The Control Committee verifies the retirement justification with the submitting entity and calls for a discussion meeting with relevant stakeholders (e.g., data users or other data sources). Depending on the meeting's results, the Control Committee reports the outcome of the meeting attaching the retirement proposal, as well as the Control Committee's recommendations on the matter under consideration.

3. The Executive Committee reviews the Control Committee's report(s) and approves or disapproves retirement of the data item(s).
4. Based on the final decision made by the Executive Committee, the TIIS Registrar(s) are advised to undertake the necessary action to retire the data item(s) from the TIIS.
5. If the proposal of retiring a data item(s) is not approved by the Executive Committee, a rationale has to be documented and sent to the Control Committee for their reference.
6. All approved and disapproved retirement proposals must be archived within the entity (specifically the Data Steward), the Control Committee, and the Executive Committee for future reference/consideration

5 Data Shortcomings and Data Quality Improvements

5.1 Data Shortcomings

Before we consider how the government should undertake the implementation of an integrated information system, it would be useful to outline the technical and business difficulties that were encountered in the development of the nucleus information system (the Trade and Investment Information System).

5.1.1 *Business Inefficiencies Encountered*

- Manual systems were used in several entities for some datasets (e.g. foreign direct investment⁴ and Trade in Services as reported by the Central Bank of Jordan; Gross Domestic Product, Gross Fixed Capital Formation and Gross Capital Formation as reported by the Department of Statistics; and the QIZ trade and investment statistics as reported by the Ministry of Industry and Trade's – QIZ Section). These systems took minimal processing of information, thus, the trade and investment data lacked the timeliness and consistency targeted. Moreover, data loss vulnerability was a significant point of concern. Thus, throughout the life-time of the TIIS Project, these entities were urged to construct simple databases in order to automatically generate specific datasets. The TIIS consultants' team played an advisory role in the development of these internal systems in order to ensure maximization of benefits to the respective entities and to the TIIS as well.
- Initially, it was thought that most of the datasets were available in a relatively good quality, but they were found fragmented across the various stakeholders and in need of consolidation in order to be of use for policy makers. However, certain data from certain stakeholders were deemed to be either non-existent or of poor quality such as Jordan's exports broken down by trade agreements.
- Other inefficiencies pertinent to data collection methods and data access were also noted. Examples of these are:
 - Customs department fields are sometimes not filled completely by the customs officers making some datasets incomplete and unreliable. Additionally, DOS access to the Customs Department's database is limited which prohibits any data editing efforts by DOS to take place.
 - QIZ export data are accurately available from MIT, however, prior to 2004 data is available in aggregation only for all QIZ's and not broken down by QIZ, or commodity, which if available could make them even more relevant for policy-makers. The QIZ's themselves have inaccurate export data.

⁴ Foreign Direct Investment (FDI) figures are only collected for Balance of Payments (BOP) purposes, being the best measure of FDI in Jordan. FDI statistics, as reported by the CBJ, are not available by sector or by country. Reports by the International Monetary Fund (IMF) and the United Nations' Economic and Social Commission for West Asia (ESCWA) have identified major problems in Jordan's FDI statistics in terms of their unavailability, inconsistency, lack of accuracy and thus limited reliability. A project to collect Jordan's FDI indicators has been recently completed, in close coordination with the DOS. Upon availing the FDI figures, the consultants' team strongly recommends adding the FDI figures to the TIIS as a new dataset.

- Private IEs data are only available by the private IE operators which are also inaccurate and unreliable.
- It was noted that in most cases, investment data broken down by sector and nationality simultaneously was not readily available despite it being more useful for policy makers.
- Business data survey showed that only few stakeholders adhere to international standards. TIIS consultants team resorted to international best practices and standards (ISO, SNA, UN Statistics Division), and informed data providers on international standards pertinent to the collection, validation, processing, storage, and dissemination of data. In the proposed phases, it is hoped that the Government of Jordan will take the initiative to work with public entities on adherence to international standards and best practices in order to improve quality, eliminating errors and incoherencies
- National standards are not standardized across entities. Each entity creates its own classification (e.g. different sector segmentation across entities, different legal statuses classification, different countries' listing, etc.)
- Lack of standardized definitions of data items across government entities (for example “investment” as reported by MIT doesn’t necessarily have the same definition of “investment” as reported by ASEZ). Thus, following the identification of the data sets to be included in the TIIS, comprehensive metadata sheets were developed, containing unified definitions and data features, aligned with both local and international standards.
- Duplication and lack of consistency in coding and recording of data within the same entity. Examples:
 - ASEZ’s establishments’ lines of production(s) were registered randomly in either one of the ISIC digits available within ASEZ’s database (i.e. chapters, 2-digits, 4-digits, etc.); resulting in largely inconsistent and incoherent data. Consequently; ASEZ’s team were asked to record all establishments according to their own line of production(s) within the chapter level solely of ISIC classification.
 - Entities such as ACI and ASEZA record companies, with more than one line of production, under more than one ISIC code which results in an inflated number of companies and registered capital. Ideally, when compiling statistics, only primary activity of the company (by looking at sales by activity) should be included (other activities are considered secondary).
- Other weaknesses include: representational weaknesses and accessibility weaknesses: i.e. data is not easily available or obtainable

5.1.2 Technical Inefficiencies Encountered

This section provides a summary of a technical gap analysis between the current and required data, infrastructure, and information requirements of the different Trade and Investment entities (MIT, JIB, JIEC, ASEZA, Customs, CCD, CBJ, ACI and DOS). The analysis was done in several site visits, carried out by the project team, which focused on collecting and

documenting the gaps and issues discovered at each of the involved entities. The documented gaps and issues mainly discuss the discrepancies and inconsistencies among the different entities that will prevent them from benefiting from, and participating in, the envisioned TIIS. Each entity should tackle and resolve these gaps and issues for it to be an active member/user of the system.

Gaps and issues are mainly related to the following areas:

- Network Infrastructure/Architecture
 - a. Network Infrastructure.
 - b. Data Clients.
 - c. Relational Database Management Systems (RDBMS).

To successfully participate and use the Trade and Investment Information System, it is essential for the member entities to standardize on a number of lookup data, such as Country Codes, Commodity Classification (Harmonized System Codes), Trade Sector Classification (International Standard Industrial Classification - ISIC), and Investment Sector Classification.

This can be achieved through the implementation of a mapping logic that maps existing lookup data to another standardized version that follows the classifications mentioned above. This approach will minimize the impact of standardizing this data on the existing systems and databases currently in use at the involved entities.

- Entity-Entity Data Exchange

After closely investigating the exiting network, database servers, and client applications, it became evident that the current infrastructure used at the different entities should undergo a series of substantial changes to be able to participate in, and use, the envisioned Trade and Investment Information System. Additionally, representatives from the different entities advised that changes to the existing systems must be kept to a minimum, if not eliminated. This is justified by the fact that the amount of time and resources invested into these systems is substantial enough for the entities to reject any changes to these systems, even if it is imposed by the implementation of the Trade and Investment Information System.

- Data Management/Governance Standards

The Data Governance Model defines a set of guidelines and rules for managing the overall TIIS data network including data standards, protocols for data exchange, procedures for maintaining and improving data quality and integrity. A sub-set of these guidelines and rules were investigated during the site visits. These include:

- *Database Attribute Naming Standards*

Standardize the Database (entities and attributes) naming conventions throughout the enterprise. The importance of such standards is recognized when the different data sources are integrated together to provide consolidated Trade and Investment data.

- *Data Management Strategy*

The Data Management strategy is a function that defines the standards and rules for maintaining and standardizing corporate data. This includes the definition of the

corporate data standards, the review of application data models, and the maintenance/expansion of the Metadata Repository.

Data Management is dedicated to the IT department of an organization. It is also known as Data Administration, but includes data stewards and other representatives drawn from the organization's business (both business and technical metadata needs to be collected and maintained).

- *Software Developers Guide*

It is essential to have a well defined set of standards application developers should follow when developing, maintaining, or extending different functionalities of the entity. These standards should be adhered to in case of in-house or out-sourced development initiatives.

- *Other Data-related Standards*

This includes other forms of standards and policies that affect the data (such as Backup policies).

It was found out in the visits that not all the entities are adhering to defined strategies, guidelines and policies for the above mentioned points.

- **Data Mapping Rules**

In order to consolidate and aggregate Trade and Investment data originating from different data source, it is necessary to apply a series of data mapping rules against the raw data. These rules will map data originating from different data sources into a standardized format that will help answer Trade and Investment enquiries. There were several gaps, discrepancies and inconsistencies that exist between the different data sources (entities). At the time the envisioned TIIS implementation, the existing discrepancies and inconsistencies were resolved, thus eliminating the need for using workarounds.

5.2 Data Quality Improvements – TIIS Benefits

Generally speaking, this project helped to arrive at an in-depth identification of general and entity-specific data shortcomings, provided solutions to some of these shortcomings, and suggested necessary areas of improvement for future considerations.

This section summarizes the main data shortcomings, the general TIIS benefits and the entity-specific improvements thanks to the TIIS, and the future areas of improvements.

5.2.1 General Data Shortcomings and Future Improvements

To evaluate the data shortcomings, it was necessary to identify the qualities that a person and/or entity consider when looking for a quality data. They are:

- **Accessibility:** Data must be easily and quickly accessible
- **Systemization:** Data must be processed and stored with the least human interaction possible to reduce human error
- **Accuracy:** Data must be correct and reliable
- **Completeness:** Data must be available in sufficient depth and scope

- **Ease of Understanding:** Data must be in appropriate language and units, and the data definitions must be clear
- **Representational Consistency:** Data must always be presented in the same format and compatible with previous data
- **Timeliness:** Relevant data must be up to date to help in the planning process.
- **Credibility:** Data must be trusted or highly regarded in terms of their source or content

The table below lists the above-mentioned data quality dimensions and highlights the results that are created as a consequence of the project and would not be created in absence of it.

Table 1: Data Quality Dimensions

Dimension	Description	"as-is" current scenario	TIIS Project Solutions	Future Possible Solutions
Accessibility	Data must be easily and quickly accessible	Limited accessibility to data	On-line single data source that can be easily accessed and available to the public	-
Systemization	Data must be processed and stored with the least human interaction possible to reduce human error	Lack of automatically generated data in some entities for specific datasets	Highlighted the importance of automatically generated data and facilitated the development of three databases at three different entities.	Work with other entities on transforming manually generated data to automatically generated data.
Accuracy	Data must be correct and reliable	Certain data sets were deemed to be either inexistent or of poor quality.	Used the best measure available to date and pointed out gaps for future improvements.	Work on improving data availability and quality at the data source. If need be, suggest new datasets that should be collected regularly.
Completeness	Data must be available in sufficient depth and scope	Limited data gathering procedure	-	Ensure adherence to procedures of data collection and compilation.
		Lack of segregated data sets among certain entities.	Offers multi-dimensional datasets.	Urge data providers to provide more depth and breadth to data as needed.
Ease of Understanding	Data must be in appropriate language and units, and the data definitions must be clear	Lack of common data features and data definitions	Provides common data definitions and features "metadata development"	Build on the TIIS metadata
Representational Consistency	Data must always be presented in the same format and compatible with previous data	Lack of adherence to international standards	Educated participating entities on international best practices and standards	Ensure adherence to international standards and best practices in order to eliminate errors and incoherencies.
		Lack of common national classification and presentation standards	Used an ETL mapping tool to group different codes into unified common codes.	Establish common national standards, codes.
Timeliness	Relevant data must be up to date to help in the planning process.	A considerable time-span between collection and release	Provides an automatic generated data, retrieved at frequent refresh rates to ensure timely data	-
Credibility	Data must be trusted or highly regarded in terms of their source or content	Different sources for the same datasets and sometimes with different figures.	Single source that is offering users with the best indicators available in Jordan. Only trust-worthy data were included.	Develop a mechanism to collect data from "less-trusted" sources to trusted governmental entities.

5.2.2 Entity-specific Data Shortcomings and Future Improvements

This section examines the data quality status at each participating entity, and recommends means for future improvements. This section considers how the lack of standardized and quality data impedes both development planning and decision making process and effective communications among the various entities involved in data administration

The following table details the entity-specific data shortcomings that were identified throughout the project, the actions that were taken under the TIS project, and suggests necessary areas for improvements.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
DOS	Data Availability	Exports and imports data classified by trade agreements is not available, since it is not mandatory to fill out this section within the Customs form.	In coordination with the TIIS consultants' team, the Ministry of Industry and Trade sent a letter to the Customs Department requesting to fill-in exports and imports figures by trade agreement. A copy of the letter is attached in Annex VIII.	Follow-up on the entry of the "trade agreement" field on the customs form, and provide access to DOS in order for it to be able act as a data editor and provider for the export/import value and quantity figures by trade agreement.
	Adherence to international standards	Based upon the field surveys, some ISIC chapters/digits are combined together (i.e. Agriculture and fishing)	Since it was hard to refer back to the records and amend them within the timeframe of this project. The combination of some ISIC chapters was accepted as they are.	A methodology needs to be implemented in order to separate those chapters within the field surveys and throughout the data processing process.
	Adherence to international standards	Within the GFCF and GCF, the "Computed bank service charges" is calculated and presented as a separate sector instead of incorporating it within each sector.	It was accepted into the system.	Coordinating with DOS on the best mechanism to incorporate the "computed bank service charges" within each ISIC sector.
	Quality of Data	The list of countries' codes that DOS uses contains countries that are either not identified within the ISO country classification standard or that represent a region/economic and trade grouping (e.g. the code that reads "European Union" was used in the list of countries' codes until the year 2004. Afterwards, DOS started to register the data according to each country within the EU.	The country code that reads "European Union" was included in the TIIS under "other" in the menu of individual countries. The "other" item also included other countries that were not identified under the ISO country classification standard and those which could not be mapped to the ISO country classification standard. A user note was posted on the TIIS to explain this issue to the users.	The ISO country classification standard and its updated must be shared with DOS for adherence to eliminate similar problems in the future.
	Database Maintenance	The GFCF and GCF are collated and calculated from different sheets and then the results are compiled into one sheet. This process is manual.	In order for the GFCF and GCF figures to be transferred to TIIS properly, DOS technical team was asked to construct a database for GFCF and GFC.	Maintain and update the GFCF and GFC database continuously to ensure that the most up-to-date and accurate figures are transferred to the TIIS.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
DOS	Identification of Establishments in Jordan	Jordan lacks business register numbers for its establishments that can serve as a frame for the population of all establishments in Jordan. For this reason, tracking the economic activity between governmental entities is deemed difficult.	Realizing the pressing need for establishing a Jordan business number registry, the DOS is currently working on developing such identifiers. The TIIS consultants' team was informed of this project and it is reported here for follow up purposes.	The DOS is to unify the business Register numbers that will facilitate the establishments' identification among all governmental entities. Upon completion of the project, the Business Register is to be the unified identification number that will serve as a frame for the population of establishments in Jordan.
JIEC	Data Availability/ Technical Gap	Statistics on the public industrial estates are collected by JIEC, processed, and saved on Excel sheets.	In close coordination with the TIIS Consultants' team, JIEC constructed a database for their statistics. The data entry effort includes statistics starting 1/1/2006. Historical data prior to year 2006 were linked to the TIIS from the excel sheets.	Maintain and update JIEC's internal database and develop it further to broaden the depth and scope of the collected statistics.
	Data Quality	The ownership dimension with regards to the number of factories operating in the public IE and the source of capital dimension with regards to the registered capital of factories operating in the public IEs cannot be generated accurately due to duplication in data registering process (e.g. a Jordanian-French investment is recorded twice, once under the Jordanian nationality/source of capital and another under the French nationality/source of capital).	The dimension of "ownership of factories" was excluded from the TIIS.	Devise and implement a methodology on data processing that will ensure accurate and reliable data without duplication.
	Data Availability	The "country of destination" dimension for the exports of factories operating in the public IEs is not available.	This data dimension was rejected from the system.	Coordinate with the Customs Department, DOS, and JIEC to come up with the best mechanism to broaden the depth of exports data to include the "country of destination" dimension. Reflect this development on the TIIS.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
	Adherence to international standards	All of JIEC statistics are classified according to their own sector classification which limits comparison analysis with other investment schemes in Jordan, other countries, Jordan as a whole, etc.	The JIEC's sector classification was used in the TIIS until further development in adherence to internationally recognized sector classification standards (e.g. ISIC) is in place.	Coordinate with JIEC and DOS to classify JIEC investment statistics according to the ISIC standard and reflect this development on the TIIS.
	Adherence to international standards	JIEC exports' statistics do not comply with internally recognized commodity classification standards (i.e. the HS code)	The JIEC's sector classification was used in the TIIS until further development in adherence to internationally recognized commodity classification standards (e.g. HS) is in place.	Coordinate with JIEC, the Customs Department and DOS to classify JIEC's trade statistics according the HS code and reflect this development on the TIIS.
	Data Availability	The QIZ/non-QIZ breakdown for JIEC's investment statistics is not available prior to the year 2000.	Only post 2000 statistics will be hosted on the TIIS.	Coordinate with JIEC to include this dimension retroactively and include data prior to the year 2000 in the TIIS.
JIB	Data Availability	Number of approved investments by JIB classified under legal status is not available.	It is available within JIB but not within the TIIS system	This item needs to be entered into the system.
	Adherence to international standards	JIB's investment-related statistics are classified according to their own sector classification and do not comply with internationally recognized sector classification standards (i.e. ISIC).	The JIB's sector classification was used in the TIIS until further development in adherence to internationally recognized sector classification standard (e.g. ISIC) is in place.	Coordinate with JIB and DOS to collect JIB's investment data according to the ISIC classification. It is suggested to include the ISIC classification within JIB's system and to oblige the data entry staff to enter each application form under its relevant ISIC code.
	Data Availability	Due to internal system errors, the data will be provided into the system starting from 2001 up until 2006, instead of 1996-2006.	The TIIS includes JIB's statistics starting 2001 onwards.	Modify JIB's internal system and implement a data and technical quality assurance mechanism.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
MIT- QIZ Department	Data Availability/ Technical Gap	QIZ statistics used to be processed and stored manually using Excel sheets.	<p>Since the TIIS can only communicate with another database, a QIZ database, replacing the QIZ MS Excel worksheets, was created. Following various discussions with QIZ personnel, the QIZ database was modified and further fields were added relevant to the needs of the QIZ section and to the needs of the TIIS. Currently, this database contains all QIZ trade data starting from the 1st of January, 2006 were entered to the database, in addition to QIZ investment data. The TIIS was linked to this database and it currently contains QIZ data as available on MIT/QIZ internal database.</p> <p>For the previous years (1999-2004) static reports were prepared and displayed for the user on the TIIS system.</p>	<p>Data entry must be sustained by MIT team to ensure the provision of accurate and reliable data constantly.</p> <p>Moreover, an electronic connection must be established between the QIZs offices in Amman and Irbid to enter all the Certificate of Origins from both focal points and get the total value and volume of QIZ exports accurately.</p>
	Data Quality	The country (source of capital) dimension with regard to the “Registered Capital in QIZ” cannot be generated accurately due to the duplication in the data. (i.e. a British- Jordanian factory with a registered capital of 100, 000 JDs will not be recorded according to each investor’s shares instead the total value of capital will be recorded twice under both nationalities)	Due to the time limitation, the whole dataset was rejected from the TIIS system.	Devise and implement a methodology to provide this data without any country source of capital dimension.
MIT	Adherence to international standards	All of the statistics pertinent to the individual establishments are classified using MIT's sectors classification.	The MIT’s sector classification was used in the TIIS until further development in adherence to internationally recognized commodity classification standards (e.g. ISIC) is in place.	Coordinate with MIT and DOS to classify MIT’s statistics according to international standards, and accordingly reflect this development on TIIS system.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
	Data Quality	The list of countries/governorates used by MIT contains certain codes that do not comply with the international ISO standard, some other do not represent a country but instead an economic/trade grouping. Those include; governorate code #9 "Free Zone", country code "Gaza's citizens", "Asian Other" and "European Other".	The country code "Gaza's Citizens" was mapped to "Jordan" country code. Meanwhile, the historical records under both "Asian Other" and "European Other" were flittered and each record was recorded within the exact nationality of the investor. On the other hand, the "Free Zones" code was rejected on the TIIS system, since all "Free Zones" related data are included elsewhere.	The ISO country classification standard must be shared with MIT for adherence to eliminate similar problems in the future.
	Data Quality/ Data Availability	The data regarding the "Number of individual establishments" and "registered capital of individual establishments" was supposed to be presented on monthly basis starting from January, 1995 up till this current date. Data prior to 1995 (end of Dec. 1994) was supposed to be provided in one aggregated record. Any amendments on the registered capital should be recorded within the month of the change itself and not the month/year of establishment	The system provides non-cumulative figures as provided by the entity.	Incorporating cumulative data into the TIIS system, if the need arise for that.
	Adherence to international standards	Sector's definitions differ among the entities (i.e. Tourism sector in MIT consists of rent-a-car offices, and travel agencies, meanwhile hotels and restaurants are listed under service sectors)	Each entity's sector classification was accepted into the system, where necessary, user notes were displayed to clarify the definitions of the sectors per each entity.	Devise and implement a methodology to classify the sector's classification per each entity according to internationally recognized standards (ISIC classification), thus, minimizing any variations in terms of sectors definitions and ensuring the comparability of data.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIIS	Future Action Item (s)
CCD	Adherence to international standards	CCD's statistics are classified according to CCD's own sectors classification	CCD's sector classification was used in the TIIIS until further development in adherence to internationally recognized commodity classification standards (e.g. ISIC) is in place.	Coordinate with CCD and DOS to classify CCD's statistics according to internationally recognized standards, and accordingly reflect the development on TIIIS system.
	Data Quality	The countries/governorates list contains certain codes that do not comply with the international ISO standard, some other do not represent a country but instead an economic/trade grouping. Those include; governorate code # 9 "Free Zone", country codes: "European (Other)", "American (Other)", "Arab League", and "Asian (Other)".	The historical data under "European (Other)", "American (Other)", "Asian (Other)", and "Arab League", were filtered and each record was recorded according to the investor's nationality. Meanwhile, the "Free Zones" code within the governorate list was excluded since the data related to the Free Zones is being provided and displayed on the system elsewhere.	The ISO country classification standard must be shared with CCD for adherence to eliminate similar problems in the future.
	Data Quality/ Data Availability	The data regarding the "number of companies" and "registered capital of companies" was supposed to be presented on monthly basis starting from January, 1995 up till this current date. Data prior to 1995 (end of Dec. 1994) was supposed to be provided in one aggregated record. Any amendments on the number of companies/registered capital should be recorded within the month of the change itself and not the month/year of establishment.	The system provides non-cumulative figures as provided by the entity.	Incorporating cumulative data into the TIIIS system, if the need arise for that.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
	Data Quality	CCD's codes definition table within the database may not be linked accurately with the corresponding sector therefore, resulting in inaccurate data. (i.e. code "13" should correspond to the "Vegetable Farming", it is however, corresponded to the "Manufacturing of automobiles").	The data was accepted into the TIIS system as it is.	Setting up of another project to ensure the linkage of each code to the correct corresponding sector within CCD's database.
ACI	Data Quality	The ownership dimension with regard to the "Member industrial establishments registered in ACI" and the country "source of capital" with regard to the "Registered capital in member industrial establishments registered in ACI" can not be provided due to the duplication in the data registering process. (e.g. a Jordanian-French investment is recorded twice, once under the Jordanian nationality/source of capital and another under the French nationality/source of capital).	Both dimensions were not accepted into the TIIS system.	Devise and implement a methodology on data processing that will ensure accurate and reliable data without duplication.
	Data Quality	The total number of Member industrial establishments and registered capital classified according to ISIC is duplicated (i.e. an investment can be registered in several sectors).	The "Member Industrial Establishments registered in ACI" was accepted and provided into the system under ISIC classification, yet, the total was excluded.	A mechanism must be proposed and implemented to record the establishment's primary line of production/activity only within ISIC classification, so as to avoid any duplication.
	Data Availability	Data regarding the "Member Industrial Establishments registered in ACI" is not available within the period 1995-2004, according to the TIIS specific dimensions. The provision of this data requests an extensive level of efforts since it must be compiled from several internal databases.	Data will be available on the TIIS system starting from the year 2005.	Coordinating with ACI to ensure the construction of a comprehensive database consisting of all the data starting from the year 1995, according to TIIS dimensions and standards.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
	Country Classification - Adherence to international standards	Within the ISO classification, Serbia and Montenegro were classified as one country and under one code. On the 1st of July they got separated and each has its own code according to the UN classification.	The TIIS system is still referring to the code of "Serbia and Montenegro".	Modify TIIS' countries list and separate both countries under different codes. This should be an ongoing process to reflect any changes in countries statuses on the list used and presented by TIIS system.
ASEZA	Compliance to TIIS systems standards	ASEZ's trade and investment data did not qualify in terms of the data quality assurance checkups. The data errors could be generated from the views built by ASEZ's technical team.	ASEZ's trade and investment were rejected, due to the incompliance to the data quality assurance checkups which were done regularly.	The gaps within the views must be identified and fixed by ASEZ's technical team. Accordingly, thorough data quality assurance must be done and once the data is qualified it will be accepted into the TIIS system.
	Data Quality	Within ASEZ's legal status, a "General partnership company" and a "Limited partnership company" are recorded within the same code, although their legal definitions are quite different.	Due to time constraints that prevented the separation of both statuses into different codes, this code was accepted into the TIIS system.	Coordinating with ASEZ to separate both legal statuses into different codes, moreover, all the historical records must be filtered accordingly.
	Data Quality/ Adherence to international standards.	Within the registration process, the establishments' line of production(s) are registered randomly in either one of the ISIC digits available within ASEZ's database (2, 4, chapters, etc.), this leads to the duplication in data provided.	The highest level of ISIC classification used by ASEZ was accepted into the TIIS system, (2 digits level). The investment data was categorized according to this level, thus, minimizing the duplication as much as possible.	Coordinating with ASEZ to ensure that within the registration procedure only one level of the ISIC classification is accredited for registration purposes.
	Data Quality	Within ASEZ's list of countries two codes are available, the first is "Customs Area" and the second is "Aqaba Special Economic Zone". Both are not valid and not useful since no historical records or any expected records will be added into them in the coming future.	Since they are not being used effectively both codes must be excluded within the views built for the TIIS system. An action which was not preferable by ASEZ's team at this stage of the project. Therefore, both were linked to "Other" using the pre-mapping technique.	Coordinating with ASEZ to exclude both codes.

Entity	Type of Data Shortcoming	Description of Data Shortcomings	Action Item (s) Under TIIS	Future Action Item (s)
	Data Quality	Certain establishments are engaged, and therefore, recorded, in more than one line of production/activity in ISIC classification, thus, duplicating the data provided.	The data was accepted into the system, however, the totals are not provided for the user.	A mechanism must be proposed and implemented to record the establishment's primary line of production/activity only within ISIC classification, so as to avoid any duplication.
	Adherence to international standards	ASEZ's list of countries contains certain codes that do not comply with either national or international standards. These codes need to be clearly defined by ASEZ, such as; "Aqaba Special Economic Zone-Transit", "Free Zones" and "Retail goods within Aqaba Special Economic Zone".	The TIIS compiled the undefined codes within ASEZA's list of countries under other for future consideration.	Devise and implement a methodology to clearly define each of these codes, exclude the irrelevant ones, and link the needed ones to the ISO country classification. Moreover, the ISO country classification standard must be shared with ASEZ for adherence to eliminate similar problems in the future.

6 Sustainability of the Project

Stakeholders of the TIIS were made fully aware that the TIIS is not a “one-time” data collection effort, but a mission to build long-term sustainable data storage, administration, and quality assurance mechanism in order to produce recurrent reports and act as an information bank for trade and investment data.

To ensure that the TIIS is well-maintained, it was paramount to discuss the *championship and support* of the project in terms of management and funding with different governmental entities at a ministerial level. Concurrently, the consultants' team implemented an *automated data generation processes*; developed a *governance structure and operational procedures*, facilitated the assignment of *TIIS management body and staff* (refer to section 5) and communicated several messages with entities' representatives to stress the importance of the sustainability issues.

Because the sustainability considerations were detailed in different sections of this report, this section will focus on two main issues that were not discussed earlier in this report. They are: **The Championship and Support of the TIIS and the Automation of the Data Generation Process.**

6.1 Championship and Support

Throughout the TIIS working sessions that were regularly conducted with stakeholders, participants continuously raised the issue of the sustainability of the project beyond AMIR. Based on previous experiences, participating entities noted that many projects or systems that have been provided by consultants or donors were shelved or have become obsolete due to lack of attention, ownership and upgrading. In specific the following concerns were raised:

1. **Budgetary Concerns:** new initiatives are always a challenge for government. It is especially challenging now, due to revenue shortfalls and budget cuts.
2. **Commitment and Leadership:** this project needs fuel and direction and needs to be led by entities that have the position and power to implement its recommendations.
3. **Management and employee turnover:** It is important to institutionalize the system in order to keep it going irrespective of any ministerial re-shuffle, employee turnover, etc. For this reason, the TIIS consultants' team have developed operational procedures to ensure that additions, changes, and eliminations in TIIS content is noted, documented and processed according to pre-identified set of procedures, formats, and policies.

Therefore, among the eleven TIIS participating entities, (MIT, JIB, JIEC, ASEZA, Customs, CCD, CBJ, MoPIC, GPD, ACI and DOS), general agreement exists that the TIIS should be supported politically, managerially, and financially to be sustained. The TIIS, once built, will require ongoing operating and maintenance costs.

The bottom line is that now that the system is up and running and available live on DOS' website, there is a pressing need for a long term commitment to maintain it.

Three different entities were identified for possible sustainable support and championship for the project. Those are: the Ministry of Public Sector Development (MoPSD), the Ministry of Planning and International Cooperation (MoPIC), and the Ministry of Industry and Trade (MIT).

The three possible championing entities were approached. The MoPIC and the MIT showed a large interest in the TIIS and an appreciation to its benefits. Consequently, the consultants' team, MoPIC, and MIT have agreed on the following steps to ensure effective hand-over of the TIIS:

- The TIIS consultants' team drafted a letter that will be co-addressed by the Ministry of Planning and the Ministry of Industry and Trade to the TIIS stakeholders. A copy of the letter is attached in Annex IX.
- Upon sending the letter, the MoPIC and the MIT is planning to invite the stakeholders to a TIIS launch event
- The MoPIC has made the TIIS public by issuing a press release in two main Jordanian daily newspapers, Al Rai and Al Ghad.
- The TIIS consultants' team sent to the Ministry of Planning the TIIS documents including this report along with the contacts list for the TIIS assigned representatives and committees' members.
- The TIIS consultants' team asked the MoPIC to assign a TIIS Coordinator in order to ensure effective handling of the project. Naser Al Nahleh, from DOS was assigned to take the role of a TIIS Coordinator.
- The MoPIC and the MIT have expressed their will to present the TIIS to the Cabinet of Ministers (CoM) in order to secure the CoM political will and TIIS financing needs of an annual amount of US \$ 50,000 as licensing and maintenance fees. The annual licensing and maintenance fees can be further negotiated between the Government of Jordan (GoJ) and SAS
- The MoPIC has expressed their will to delegate the TIIS quality assurance function under the "Quality Assurance" department, a new department that is yet to be established within the DOS. The Quality Assurance department, in due course, will handle the TIIS quality assurance tasks along with other tasks that it will be entitled to do under its mandate.

6.2 Automatic Generation

The TIIS is maintained through a fully automated data-generation process, whereby all participating entities were asked to link their databases to the TIIS and schedule their databases to transfer data to the TIIS on pre-identified dates and times, referred to hereinafter as "refresh rates"

Annex VII lists the agreed upon refresh rates with the entities, i.e. the frequency and time of updates for each data set. It is imperative to constantly revisit the refresh rates to accommodate for any changes that may take place.

7 TIIS Suggested Expansion Plan

7.1 Step 1: Improve the current TIIS

During the past three years, great efforts have been expended to develop the TIIS. Now that the TIIS is up and running, it represents an excellent example on how to collect, store, standardize, manage, and publish data in a presentable and flexible manner. It also provides an edited methodology to develop other modules of the TIIS to ultimately attain a comprehensive information mapping of Jordan that avoids duplication and inefficiency.

The results of the data survey that was conducted throughout the project showed that a lot of house-keeping is needed at the data sources (i.e. participating entities) in order to notch up the quality of data they collect and/or provide.

Ideally, the TIIS should include all trade and investment related indicators. However, business and technical field visits to the relevant governmental entities through the course of this project showed that some important investment and trade indicators do not exist or do not qualify as quality data; therefore, they were excluded from the TIIS. The vision for the TIIS, under this option, is to include new trade and investment data as it matures, by cleansing and enriching data at each data source. This effort can be done by working on three fronts:

1. Develop and implement collection mechanisms for certain indicators that are currently not available (e.g. FDI, Exports by Trade Agreement, Investment and Trade in Private Industrial Estates)
2. Establish common classification and coding standards and rules based on either internationally recognized standards or common national standards to account for Jordan's particularities.
3. Cleanse and enrich TIIS current datasets by expanding the depth and breadth of investment and trade related data and work on other quality issues such as: duplication, incompleteness, etc. to eliminate any present errors and incoherencies.

7.2 Step 2: Transforming the Trade and Investment Information System into a Government Statistical Information System

In light of the Government of Jordan's current development approach, and in alignment with its detailed transformational phases, the following section will suggest a staged approach through which the TIIS can be expanded into a Government Statistical Information System. Although the following stages represent a fully-fledged Government Statistical Information System, the choice is for the championing governmental bodies to pick and choose from the different stages to arrive at the best complements of indicators that best serve its needs, additionally, these stages can be done either in sequence or they can overlap, hence, resulting in a shorter implementation period. However, again it remains the entity's choice to determine the most appropriate implementation schedule.

It is worthy to note that lessons learnt were borrowed from best practice models. Those are: The Irish business model "Forfás" and the Australian model "AIHW's METeOR".

Forfás is the Irish national board responsible for providing policy advice to Government on enterprise, trade, science, technology and innovation in Ireland. 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.

"AIHW's METeOR" is a repository for metadata standards which have been nationally approved for use in the Australian health, community services and housing assistance sectors and has been developed incrementally *over a period of ten years*.

Having mentioned that, it is apparent that the proposed system is not a quick-fix to data and information problem. It transcends the Australian model of being merely a metadata repository that contains only definitions and standards, but no real data, to actually comprise a data warehouse. The proposed system will be a metadata repository and will also contain actual data provided by the different entities. For this reason, the following proposed stages are spread over a period of 10 years, to present a realistic scenario of the development stages. An application is under development in this system that will unify the data from the different entities. It will also collect, transfer and manage data to a central repository that is then used to generate needed reports and provide accurate, consistent information.

Having been working on an integrated trade and investment information system since 2003, USAID/AMIR is presenting an expansion plan that can be put in place in order to transform the TIIS into a Government Statistical Information System by 2017. The plan takes into account the fact that Jordan is undertaking a reform process through its National Agenda, 2005. Since the Government of Jordan is eager to monitor the progress and achievements of its development endeavors through factual indicators, this project represents a tight and solid structure of synchronization and cooperation amongst the different governmental entities.

Government Statistical Information System Development Stages

- **Stage one (2007-2009):** Introducing the financial services and fiscal reform based-indicators, the Ministry of Finance and Central Bank of Jordan must both contribute to presenting top-notch and valuable indicators that pertain to five major areas: financial services sector structure and governance, banking sector and access to financing, Insurance sector, capital markets, and Jordan's fiscal reforms.
- **Stage two (2009-2011):** Although the Trade and Investment System already provides valuable cross-sector information, few other major indicators remains inexistent within the current system, most noticeably are the employment-related indicators, and other sector-specific indicators whereby their absence from the TIIS, was attributable to quality reasons and/or time limitation. To include these important indicators, this stage may encompass the following steps:
 1. All employment and vocational training related indicators must be "nationally-identified", thoroughly filtered to ensure lack of inaccuracies and incoherence, and classified in a consistent manner.
 2. The Ministry of Labor, Vocational Training Centers, and Social Security Corporation must collaborate and adopt a holistic approach in facing up the inefficiencies regarding the quality and availability of such data sets.
 3. Sector-specific indicators pertinent to export-oriented, labor intensive and capital-intensive industries (as mentioned in the National Agenda). For instance, the system might include indicators pertinent to the Tourism sector; productivity per unit of labor might be introduced as one of the key performance indicators for the Mining sector, etc. Some indicators might be also introduced regarding the

capital-intensive sectors, such as the ICT's sector value-added, as well as the R&D expenditure within the Pharmaceutical sector.

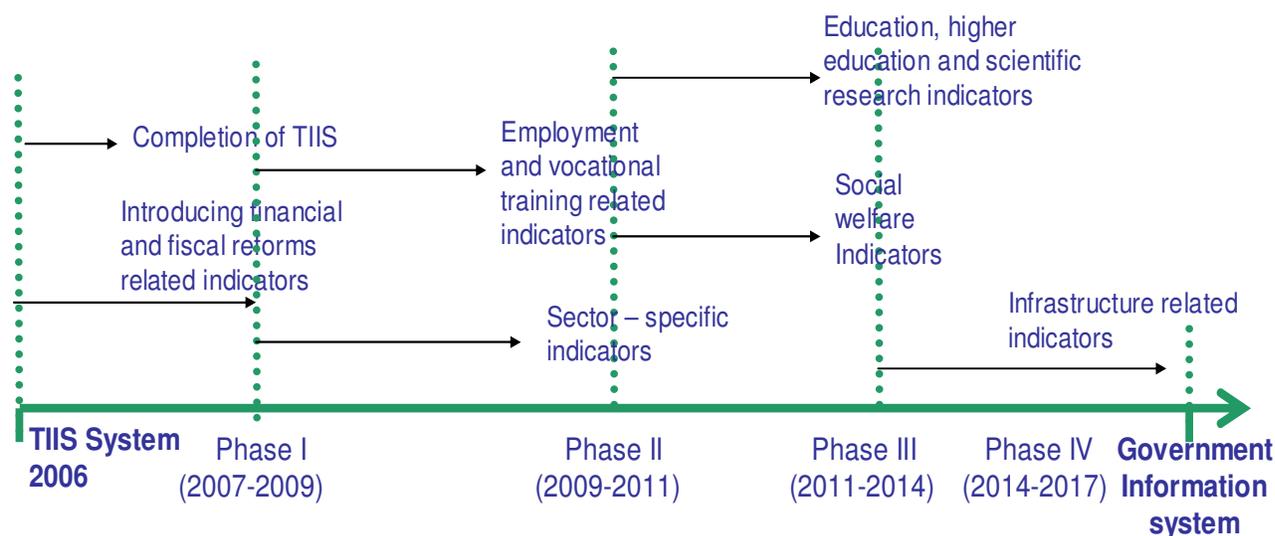
- **Stage three (2011-2014):** This stage must be directed towards two different, yet interrelated domains, the first being the social welfare domain that covers a wide array of public health care, poverty alleviation, and social security indicators and the second is education and higher education-related indicators. As reflected by the performance indicators set within the National Agenda, socioeconomic indicators need to be linked to the Ministry of Health, Ministry of Social Development and the Social Security Corporation.

In conjunction, the major education, higher education and scientific research indicators are to be collected from different entities such as the Education Council, Higher Education Council, the Vocational Education and Training Council and the National Center for Human Resources Development, thus, they must coordinate with each other to ensure cohesiveness among their standards and definitions.

- **Stage four (2014-2017):** Within this phase all infrastructure quality and cost related indicators must be gradually entered into the system; this theme covers the Water, Energy, ICT, Postal Services and Transportation sectors as well as Environment Sustainability. Implicitly, this requests the involvement of a large number of ministries such as the Ministry of Water and Irrigation, Ministry of Energy and Mineral Resources, Ministry of Transportation, Telecommunication Regulatory Commission, Ministry of Information, Communication, Technology, Department of Statistics, and Ministry of Environment. Therefore, there needs to be a clear and constructive collaboration and coordination mechanism, which ensures the accessibility of data from the proper source, and the unification of standards, definitions, etc.

It is hoped that the proposed Government Information System will possibly house all relevant information that will help better the decision making process and the development endeavours in Jordan.

The graph below shows the implementation timeframe to transform the TIIS as it stands today to a Government Information System over a period of ten years.



8 General Recommendations

- **Maintain and continuously improve the TIIS:** The data included in the TIIS represents the main indicators on trade and investment. Ideally, the TIIS should have included the whole set of investment and trade related data. Unfortunately, this was deemed impossible given the data unavailability, technical considerations, and other project-related factors: project time and budget limitations. Although the TIIS project has improved the data quality in general and at the data source level as evident, it was unable to solve all data related issues. Moreover, the needs and requirements of the planning and decision making process are anticipated to grow and change frequently. Consequently, data collected should be viewed as a base, and it is extremely important to continuously improve and adapt this base of gathered indicators to suit these changes.
- **Commitment to the TIIS operational procedures:** In order for the TIIS to include updated information and to incorporate any changes that may occur at the data source level, it is of utmost importance to abide by the operational procedures that are detailed within this report in Section 5.2. The processes and mechanisms created at the time of writing this report reflect the current situation and should therefore evolve and continue to be updated in light of changes based on practical experience and changes in environment or counterparts.
- **Activate the role of TIIS champions and provide administrative and management support:** Without an active role of the TIIS champions there is a real risk of this system being shelved and becoming obsolete due to the lack of attention, ownership or continuous upgrading. For this reason, the consultants' team strongly urges that immediate and serious consideration be given to taking an active role in championing and providing support to the TIIS.
- **Secure the sufficient funding needed** to maintain the TIIS. This includes the annual licensing and maintenance fees of US \$ 50,000 and other costs that may result from administrative requirements such as staffing of dedicated personnel for the TIIS at DOS as the system matures. The licensing and maintenance fees of SAS can be further negotiated through the GoJ.
- **Allocate a considerable amount of time for testing:** The consultants' team recommends that the TIIS be extensively tested by various data users over a period of six months. Upon completion of the testing phase, further modifications could take place. Additionally, this testing period is expected to reflect on the governance structure and the operational procedures resulting in a refined structure and improved processes
- **Incorporate the Business Registration Number for economic entities in Jordan within the TIIS:** The DOS is currently working on assigning a unique business registration number⁵ for economic entities in Jordan, whereby each economic entity will be identified by its "Business Registration Number" across government organizations. Upon completion of this effort, the DOS should incorporate the business registration

⁵ The primary purpose of using a business registration number is to ensure disclosure on the public record of the economic activities undertaken by economic entities.

number within the TIIS statistics. This should serve as the backbone of statistical indicators in Jordan on both fronts (investment and trade).