

# **Effective Inter-Organizational Information Sharing in the Government Sectors Applied on The Egyptian International Trade Point Sector and the International Trade-Related Sectors at the Ministry of Trade and Industry**

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**Abstract:** The Egyptian International Trade Point (EITP) is a nonprofit governmental sector at the Ministry of Trade & Industry (MTI), for supporting business community especially the Small and Medium Enterprises (SMEs). One of its main aims is providing required information for implementing international trade operations. Due to the dynamic business environment, much of the trade information need to be regularly collected and updated from different international trade-related sectors (ITSs). This research project aims to achieve an effective inter-organizational information sharing (IOIS) between EITP and ITSs at MTI, through proposing an Inter-organizational system (IOS), and a suggested model of implementation, for facilitating information obtainment through an integrated database via one stop international trade information center (EITP) which increases the organizational efficiency, hence improving the information service delivery to businesses and decision makers.

**Keywords:** “Cross boundary collaboration”, “Exchange of information”, “Information integration”, “Information sharing”, and “Knowledge sharing”.

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## **1. Introduction**

As public programs and services grow more complex and interdependent, different governmental authorities are facing various difficulties in order to provide services in an effective and efficient manner. In order to overcome these difficulties, it is necessary to convert the administrative processes and establish an effective inter-organizational information sharing (IOIS).

The exchange of information through information technology (IT) leads to achieve strategic advantages for the government sectors enabling them to improve the organizational efficiency and the decision-making process, and enhance the quality of their programs and services. Moreover, the inter-organizational information sharing in the government sectors highlights the importance of the backstage of the e-government (G2G processes). The success of e-government depends largely on what has been referred to as “unified” government. This is the main issue for G2G e-government: the use of e-government to enhance cooperation within the government.

For the EITP sector as an information service provider, there is an urgent need to provide trade information service to businesses under a smooth working environment with an effective communication channels with all information suppliers involved in international trade whether inside or outside the Ministry of Trade & Industry, but as a first step this research project is applied only on EITP & ITSs at the MTI.

IOIS is not only useful to provide better information service to businesses through a one stop information center (EITP), but also to achieve a unified and a standard storage for international trade information, data exchange and interoperability of ITSs' resources which increases the efficiency of partner governmental sectors at the Ministry of Trade & Industry and promote the process of decision making.

This paper consists of five sections, which are:

Section one: (Introduction): presents the background, research problem, research objective, then ends with the structure of the paper.

Section two: (Previous studies): reviews the most important contents of the previous studies on the inter-organizational information sharing.

Section three: (Descriptive analysis): includes a descriptive analysis of the influence of the general and task environment of the Egyptian International Trade Point (EITP), examining the factors influencing information sharing in the international trade-related governmental sectors at the Ministry of Trade & Industry, and exploring the effectiveness of the inter-organizational information sharing.

Section Four: (Proposed system): presents a proposed system description, model of implementation, SWOT analysis, and system expected benefits.

Section Five: (Conclusion and future work): includes conclusion, scope and limitations, contributions, and future work recommendation.

## **2. Previous Studies**

### **2.1. Overview**

Today, information is one of the most precious resources in the organization. In the public sector, information is required by government agencies and used by employees in the performance of their daily duties, and at the same time as an input to government agencies in providing services to citizens and businesses. However, to provide better services, the information available for each government agency is not adequate, and must rely on information from other government agencies as well. It means that government agencies need to exchange information with other government agencies. (Kamal, Singh, & Ahmad, 2012)

Although the recognition of the importance of information sharing, it is considered a very complex issue. So it is important to determine the factors that affect the exchange of information.

### **2.2. The Data-knowledge Hierarchy**

According to literature, information and collected raw data are the most frequently shared information between government agencies. (Yang & Wu, 2015) The frequency of knowledge sharing is much lower. (Yang & Wu, 2013)

### **2.3. Levels of Information Sharing**

Information sharing is the process of transmitting information. (Meer, 2014) According to (Yang & Maxwell, 2011), research in information sharing focuses on the interpersonal, intra-organizational, and inter-organizational levels.

### **2.4. Inter-organizational Information Sharing Purposes**

The purpose of inter-organizational information sharing can be classified into six types: information search and verification, information aggregation, business process chain, innovative service, experience-based knowledge sharing, and crisis and emergency.

The specified purposes do not represent a comprehensive list but provide an initial perception to grasp the functions and roles that IOIS plays between government agencies. (Yang & Wu, 2013)

### **2.5. Integration Dimensions**

In (The Comptroller and Auditor General, 2013) report, integration in government refers to the working coordination arrangements between multiple departments or organizations involved in related public service or program.

The integration across hierarchical levels is the vertical integration, while integration within the same level with different functions is the horizontal integration.

### **2.6. Types of Inter-Organizational Information Sharing**

In horizontal information sharing, a government organization usually uses several types of IOIS with other government agencies according to their tendencies. The five major types of IOIS in the horizontal dimension are: Paper-based Information Sharing, Electronic Media Storage, Electronic Interface (E-Interface), Electronic Gateway (E-Gateway), and Government Service Platform (GSP).

### **2.7. Theories Defined**

#### **2.7.1. Organization theory**

Organizations can be considered as open systems receive information as inputs from the surrounding environment, to re-send it as outputs to the environment again.

##### **2.7.1.1. Organizational environments**

We mean by the organizational environment all the factors likely to impact the operational performance of the organization. (Yang, Liu, & Wang, 2013)

There are two domains of the environment influence:

1. The general environment (societal) affects all organizations in a particular society (Similar for all organizations).
2. The specific (task) environment which directly affects an individual organization. (Different for each organization).

The specific (task) environment has a direct impact on the decision-making process and achieving objectives. Organizational task environment includes: customers, suppliers, distributors, competitors, government regulations, trade unions, technology, etc.

The organization-environment interaction occurs through the linkages between organizations in the task environment which are referred to as “inter-organizational” relations. (O’Callaghan, 1991)

#### **2.7.1.2. Inter-organizational systems (IOSs)**

“Inter-organizational systems (IOSs) are defined as automated information systems shared by two or more separate organizations”. (O’Callaghan, 1991)

Three environmental models are proposed:

1. “The deterministic Model” presupposes the existence of previous relationships between the organizations under a stable environment within a formal framework of continuous interaction and commitment according to clear criteria before applying IOS.
2. “The proactive Model” sees IOSs as a mean of controlling the effect of the task environment on the organization.
3. “The information Model” sees IOSs as an assistant factor in the treatment of information which is received as an input from the surrounding environment

#### **2.7.2. Resource dependence theory**

Scarcity of resources and unpredictable changes are the most important reasons for considering that the environment is uncertain, which makes organizations need to cooperate with other organizations that control their resources through a system of cooperation and clear agreements to ensure access to the necessary resources to provide its services. (Rossignoli & Ricciardi, 2014)

The process of obtaining the resources is necessary for increasing organizational efficiency and effectiveness. Information is one of the most valuable resources needed by the organizations. (Seo, 2011)

#### **2.7.3. Theories conclusion**

- This research project depends on both theories, where EITP depends on ITSs, it is not self-sufficient but depends on other organizations for the resources it needs to provide its services. EITP needs to interact with other ITSs to procure an ongoing and abundant flow of resources to satisfy its stakeholders. So, using IOS through “The proactive Model” where IOSs will be used by Egyptian International Trade Point (EITP) that want to affect their task environment “International trade-related sectors/authorities” (ITSs).

### **2.8. Factors Influencing Information Sharing in the Government Sector**

In 2011, Tung-Mou Yang, presented the latest model of factors influencing inter-organizational information sharing from three perspectives: Organizational Perspective, Technological Perspective, and Legislation & Policy Perspective.

- This research attempts to use the latest comprehensive model by Tung-Mou Yang (2011), and adopts its three perspectives as focal points for discussion and examination in our proposed research project. So it will be discussed in details in the following section.

## **3. Descriptive Analysis**

### **3.1. Describing the Influence of the General and Task Environment of the Egyptian International Trade Point (EITP)**

Since the official opening of Egyptian International Trade Point (EITP) in 1994, as a nonprofit governmental sector at Ministry of Trade & Industry (MTI), for helping and supporting business community especially Small and Medium Enterprises (SMEs), one of its main aims is providing required information for implementing trade operations.

EITP’s business function as information service provider, requires to get trade information from many government agencies inside and outside the Ministry of Trade and Industry. Through advances in information and communication technology (ICT), sharing information across organizations has become more feasible. However, information sharing between EITP and other governmental bodies is a complex task.

Employees in EITP receive trade information inquiries on a daily basis, and due to the dynamic business environment, much of the trade information need to be regularly updated. To require information from any other governmental agency, they must prepare a formal request, which means a documentary cycle with more than one managerial level ending with the approval of the Head of EITP to address this governmental body. In spite of all these bureaucratic steps, there is no guarantee to receive a response to the inquiry from the concerned authority.

EITP sector has 17 branches (sub trade points covering many governorates), to serve the business community all over the country. Unfortunately, they all face the same problem, it is even possible to say that the problem is becoming more complex as we move away from the capital.

There is no doubt, EITP is affected by the external environment, which can be illustrated as follows:

On the political side, political turmoil and successive governments change after the revolution of January continued for a long period, have a general negative impact on the inter-organizational information sharing, because even these limited communications almost are based on personal relations between Heads of government agencies.

Recently, Egypt witnessed developments towards achieving political and governmental stability, coinciding with the new Administrative Reform Laws. So, there is greater interest in improving the performance of the governmental sector, which requires the removal of barriers to achieve this goal, one of the most important for EITP is the problem of “lack of information sharing”.

While on the economic side, the Egyptian economy is still after more than six years of revolution January 25, suffering from the problems that hinder it from growing. Despite attempts by governments after the other to reform the economy, which was one of the main objectives of the revolution, the political events experienced by Egypt hindered many of these efforts.

No doubt, business community has been faced extra difficulties during these years after revolution, which require more help and support from governmental bodies concerning trade, to overcome this phase. Government of Egypt, with all its agencies including EITP, should focus on developing appropriate policies and procedures necessary to enhance enterprise competitiveness that will ultimately lead to increasing the volume of Egypt's exports and economic growth.

As for the social aspect, it is important to take into consideration the prevailing social culture on the issue of sharing information, in general there is a relative resistance from individuals to disclose the information and share it with others. Furthermore, interpersonal information sharing can become more complicated performed within an organizational context. Based on the perception that information is power, more worrying is that information can be hoarded as an asset to protect one's place and enhance individual status and identity.

As for the technological side, with the advancement of information technology, the effectiveness and efficiency of inter-organizational collaboration can be enhanced. Information sharing activities can be considered as IT projects involving information systems construction, organizational structure change, and business process re-engineering.

Regarding the internal environment, reforms in the public sector aimed to enhance the efficiency and effectiveness of its services, which can significantly improve the customer experience, by delivering outcomes based on customer' needs, expectations and preferences.

It is very important to realize the customer-employee relationships. For EITP's customers from business community, there are high expectations in service level due to the formal role of EITP for trade facilitation. In addition to the rapid developments in business communities, which require employees to make a greater effort to achieve customer satisfaction.

For the EITP's employee as a service provider, it is very important to provide needed utilities for the performance of service under a smooth working environment with an effective communication channels with all parties involved in business process improvement. Otherwise the employee will be unable to achieve the desired goal, and may be blamed without guilt. One of the most important obstacles is the problem of “lack of information sharing”

### **3.2. Examining the Factors Influencing Information Sharing in the International Trade-related Governmental Sectors at the Ministry of Trade & Industry**

#### **3.2.1. The organizational perspective**

Regarding ITSSs, they are not in different geographical areas as they are all locating in Cairo, they all share the global vision, mission, and values of MTI. Although having different objectives they do not have competing interests, they have a common goal of providing help and support to businesses and to increase the Egyptian Exports. ITSSs have different operations, procedures, and work flows, but the proposed new system for IOIS will not require radical changes in their work flow, so there is no need for the concerns of autonomy loss.

Inter-organizational information sharing relationships depend primarily on the element of trust, which plays a key role in the success of those relationships. The most important factors helping to build that trust between government institutions participating in IOIS are: transparency, clarity of roles and responsibilities, and respect for institutional autonomy and privacy. And based on the perception that information is power, so worrying of the negative effect of IOIS may be eliminated if the system allows to show clearly the source of the information to the recipient of the information service.

Leadership can be utilized as a force to promote inter-organizational coordination between EITP & other ITSs. We can take advantage of leadership as an encouraging factor to the cooperation between organizations in the field of information sharing, which is achieved by providing a clear vision and guidance about how to achieve it, in addition to providing the necessary resources. Therefore, the support of top management helps to start and continue inter-organizational information sharing.

### 3.2.2. The technological perspective

We can improve the efficiency and effectiveness of institutions through applying inter-organizational information sharing systems. The advances in information technology helped for the possibility to achieve. According to our case, the ITSs in MTI can implement a “joined-up” system linked with EITP that will have the role of the “single window” or the “one stop trade information center” for businesses, to facilitate the cross boundary collaboration, without making changes in the original current systems in each sector. Furthermore, the shared trade information will be at the non-confidential level.

The proposed IOS depending on cloud computing achieving a centralization of resource management, and compatibility of the heterogeneous hardware and software resources. The technological capability of these sectors is sufficient enough to implement such system, led by EITP which has the long experience in using information technology & electronic communications, in addition to the potential technical support from Ministry of Communications & Information Technology (MCIT).

### 3.2.3. The legislation & policy perspective

The researchers suggest that trust can be built, cooperative coordination is facilitated, and risks are reduced, when building IOIS, through legal and political regulations, which provides a framework and a guidance to clear and formal mechanisms for cooperation and implementation to deal with information that is shared.

This research argues that in our case a mandatorily minister decree for the required IOIS collaboration with the detailed guidance that clearly define the circumstances that information collected in one agency can be shared to other agencies. This approach will help eliminate the hesitation of sectors to share information when they realize that collaborations are under a legislative mandate.

## 3.3. Exploring the Effectiveness of the Inter-organizational Information Sharing

Depending on (Yang & Wu, 2015), their research focusing on how can the involved organizations measure the effectiveness of cross-boundary information sharing systems. They relied on their research on the case study of Taiwan's e-government.

They suggested in their study using three constructs to measure the effectiveness of IOIS, which are: information quality, system quality, and service quality.

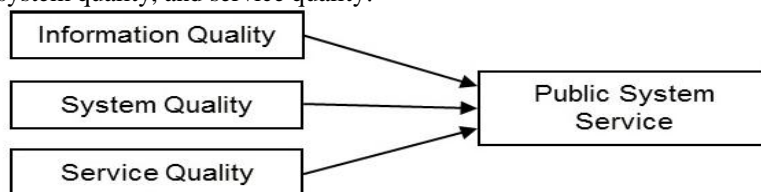


Figure1: The constructs to perceive the effectiveness of IOIS

### 3.3.1. Information quality

Information quality is the most important construct to examine the effectiveness of IOIS. The better quality the shared information, the more effective, efficient, and sustainable the involved government organization.

In sum, eleven measures of information quality are identified and presented to know how government agencies perceive the effectiveness of IOIS:

1. Accuracy: the degree that shared information is correct and free of error.
2. Completeness: the details of shared information fulfill what is required by an information requestor in terms of amount and specific items of information.

3. Comprehensiveness: the content of shared information covers a greater detail rather than the minimum requirement of an information requestor.
4. Consistency: the style, format and structure of shared information consistently comply with the requirement of an information requestor.
5. Understandability: what degree an information receiver can understand and interpret the meaning of the shared information from an information provider.
6. Timeliness: whether the time spent to retrieve shared information can be tolerable or acceptable for an information receiver to fit its needs.
7. Currency: whether shared information can meet the real-time information need of an information receiver.
8. Variation: the extent to which the content of shared information changes in terms of time.
9. Reliability: shared information from an information provider is perceived with confidence to be reliable, dependable and trustworthy by an information receiver.
10. Relevance: the degree the shared information from an information provider fits the need of an information receiver.
11. Accessibility: the degree of challenge for an information receiver to access the shared information from an information provider.

### **3.3.2. System quality**

Information systems usually modify the existing the business processes to obtain information sharing benefits. Information systems is an essential factor to facilitate inter-organizational information sharing.

In sum, eight measures of system quality are identified to know how government agencies perceive the quality of interoperable technical infrastructure in IOIS:

1. Availability: an information system is ready and accessible for use whenever a user has to use the system for the purpose of inter-organizational information sharing.
2. Responsiveness: whether the responding time of an information system can be tolerated and acceptable by its users when the system is used to retrieve shared information.
3. Reliability: the degree that an information system can correctly process and transmit shared information.
4. Capability: whether an information system can sustain a user's needs to share and retrieve information.
5. Compatibility: the degree that a government agency's utilized information system to share and retrieve information can be compatible with the information systems of other agencies.
6. Security: whether an information system can securely transmit shared information among government agencies and maintain secure control to access the shared information.
7. Usability: the degree that the design and user interface of an information system are convenient for users to operate.
8. Maintenance: the degree of effort and cost that are needed to sustain and keep an information system running properly.

### **3.3.3. Service quality**

The service quality here means the services provided by information system professionals in information sharing projects.

In sum, three measures of service quality are identified, and government agencies use the measures to evaluate the quality of information services that information system professionals provide in IOIS:

1. Communication: whether well-maintained channels exist to enable smooth and unobstructed dialogues between information system professionals and information system users.
2. Responsiveness: whether information system professionals can promptly react and respond to information system users' questions and requests.
3. Assurance: whether information system professionals are believed to be capable of resolving the problems that information system users' encounter, and users are also satisfied.

## **4. Proposed System**

### **4.1. System Description**

G2G trade information sharing can be described as a cloud computing application to establish an effective inter-organizational information sharing (IOIS) between the Egyptian International Trade Sector (EITP) and the international trade-related governmental sectors (ITSs) at the Ministry of Trade & Industry (MTI), for facilitating information obtainment through an integrated database via one stop international trade information center (EITP) which increases the organizational efficiency, hence improving the information service delivery to businesses and decision makers.

**4.2. Expected Customers**

1. Trade Information Service Provider:
  - Egyptian International Trade Point “EITP”.
2. Trade Information Service Suppliers:
  - Partner sectors (ITSs) of the Ministry of Trade & Industry.
3. Clients:
  - Businesses (Key customers).
  - Researchers & agencies.

**4.3. Levels of Information Sharing**

Inter-organizational information sharing (IOIS) is the concern of this research project, where focusing on the information sharing between the Egyptian International Trade Point sector and the international trade-related sectors at the Ministry of Trade and Industry.

**4.4. Inter-organizational Information Sharing Purposes**

The purpose of sharing information between EITP & ITSs is “Information aggregation”, achieving an integrated database via one stop international trade information center (EITP) which increases the efficiency and effectiveness of its business operation, hence improving the information service delivery to businesses and decision makers.

**4.5. Integration Dimensions**

In this research the dimension of collaboration between international trade-related sectors (ITSs) is a horizontal integration, where the “one-stop shopping” concept can be achieved through the Trade International Trade Point (EITP).

**4.6. Types of Inter-organizational Information Sharing**

Government Service Platform (GSP), is the proposed type of IOIS in this research project, where it integrates the information of ITSs to provide online one-stop service to businesses through EITP.

**4.7. Model of Implementation: Cloud Computing**

It is clearly noticeable the increasingly expansion and complexity in the processes of e-government, which requires the selection of an appropriate model to be applied in a manner to ensure efficiency and user satisfaction.

Cloud computing consolidates data stored in a huge number of separated computers to gather the resources through network, and provide on-demand self-services according to the users 'needs, where users do not need to build their own IT infrastructure and can focus on their business. They can access various resources on the network, and pay according to their usage.(Hashemi, Monfareedi, & Masdari, 2013)(You, Sun, Xu, Liu, & Liu, 2012)

**4.8. SWOT Analysis**

The following table represents the strengths, weaknesses, opportunities, and threats analysis for the proposed project.

Table1: SWOT Analysis for the Proposed IOS

<p><b><u>Strengths</u></b></p> <ul style="list-style-type: none"> <li>• Flexible &amp; friendly utilization.</li> <li>• Cost &amp; effort effective.</li> <li>• A single contact point and online access.</li> <li>• Independence of time and location.</li> <li>• Compliant facilities.</li> <li>• Expandability.</li> <li>• Adaptive to future needs.</li> </ul>	<p><b><u>Weaknesses</u></b></p> <ul style="list-style-type: none"> <li>• Financial pressure.</li> <li>• Bureaucratic system of management.</li> <li>• Inefficient communications among different governmental sectors.</li> <li>• Post training required.</li> <li>• High speed Internet connections requirements.</li> </ul>
<p><b><u>Opportunities</u></b></p> <ul style="list-style-type: none"> <li>• Common vision &amp; mission between partner sectors.</li> <li>• The potential technical support from the Ministry of Communications &amp; Information Technology.</li> </ul>	<p><b><u>Threats</u></b></p> <ul style="list-style-type: none"> <li>• Security Concerns. (Data Security)</li> <li>• Lack of specific standard regulation.</li> <li>• Slow decision making process.</li> <li>• Hierarchy in organizations.</li> </ul>

<ul style="list-style-type: none"> <li>Emerging technology.</li> </ul>	<ul style="list-style-type: none"> <li>Resistance to change.</li> <li>Power failure.</li> </ul>
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#### 4.9. System Expected Benefits

The following table summarizes the expected beneficial changes of using the proposed project: (APCICT, 2010)

Table2: Expected Beneficial Changes of Using the Proposed Project

From	To
Paper-based processes	Electronic-based processes
Sector-oriented procedures	Service-oriented procedures
Various government contact points	A single contact point
Department-level information management	Government-wide information management

## 5. Conclusions, and Future Work

### 5.1. Conclusion

This research project argues that the key issue for G2G e-government is the use of e-government to support intra-government collaboration. With advances in information and communication technology, sharing information across organizations has become more feasible. Although government agencies are aware of the importance of information sharing as an important approach to increasing organizational efficiency and performance, but it can be a complex task.

Recognizing there is a persistent problem, the research starts with the following broad problem Statement:

“How to facilitate inter-organizational information sharing in the government sector ?”

The research project objective is to achieve an effective inter-organizational information sharing (IOIS) between international trade-related governmental sectors (ITSs) at the Ministry of Trade & Industry (MTI), for facilitating information obtainment through an integrated database via one stop international trade information center (EITP) which increases the organizational efficiency, hence improving the information service delivery to businesses and decision makers.

This research project attempts to use the latest comprehensive model by Tung-Mou Yang (2011), for examining the factors affecting the IOIS between EITP & ITSs at MTI. These factors may be inter-organizational success factors (Yang & Maxwell, 2011), or barriers to inter-governmental collaboration. (EZZ & Papazafeiropoulou, 2006).

By describing the influence of the general and task environments of the Egyptian International Trade Point (EITP), and examining the factors influencing inter-organizational information sharing from the three perspectives: Organizational Perspective, Technological Perspective, and Legislation & Policy Perspective. It is found that there are many success factors that can facilitate the inter-organizational information sharing between EITP and ITSs at MTI. So this research project proposes an Inter-organizational system (IOS), and a suggested model of implementation, for facilitating information obtainment through an integrated database via one stop international trade information center (EITP) which increases the organizational efficiency, hence improving the information service delivery to businesses and decision makers.

### 5.2. Future Work

This research project is a step of an ongoing journey for enhancing administrative processes at the Ministry of Trade and Industry. It needs a future work based on an actual data from the sectors at the ministry.

Furthermore, this research project could be conducted to extend the scope of the research to be applied on EITP which provides trade information service to businesses, with the other suppliers sectors of international trade information whether inside or outside the Ministry, for creating an unified standard storage and integrated database covering all the international trade information in Egypt.



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