Developing A National EDI Strategy

Benita Cox, Sherine Ghoneim and Hatem Zorkani
The Management School, Imperial College of Science Technology & Medicine, 53 Prince's Gate, Exhibition Road, London SW7 2PG
Telephone: 0171 594 9164; e-mail: b.cox@ic.ac.uk

Presents a framework for the establishment of an EDI (Electronic Data Interchange) strategy for countries that are still in the process of developing their EDI policies. The CIC framework is described which considers the importance of the Context (political, economic, and social), the Infrastructure (technical requirements) and the Capacity to Change (to accommodate dynamic requirements and technology developments) in developing a national EDI strategy. The framework is applied to Egypt with particular reference to the implementation of EDI in the Customs and Excise Authority.

Introduction

The role of electronic commerce and electronic data interchange (EDI) in particular, is rapidly evolving in the face of increasing pressure from global markets to provide standardised methods and practices for international free trade. A World Bank study conducted in 1995 endorsed the use of EDI and electronic commerce as critical components of a trade facilitation strategy1. Developing nations, therefore, find themselves in the position of having to rapidly adopt their traditional trading practices in order to participate in international free trade. For many of these countries the barriers to achieving this are different and more complex than in the developed nations. In this paper, we discuss the importance of considering the ‘Context’ (political, economic, and social environments); the ‘Infrastructure’ (technical requirements) and the ‘Capacity to Change’ in developing a national EDI strategy. These elements are integrated in the CIC framework which is applied to Egypt.

The CIC framework is based on research conducted in Britain into the critical success factors for successful EDI implementation at an organisational, industrial, and national level. The results of this previous research2-6 have been compared, contrasted and integrated with results of research conducted both in the United States of America and Germany7-9. In this paper the CIC framework is briefly described and applied in a case study of the Customs and Excise Authority in Egypt where intense pressure exists to move towards compliance with international standards and changing trade practices.

The CIC Framework

Successful development of a national EDI strategy requires that an analysis be undertaken of the Context, Infrastructure and Capacity to Change. We examine each of these factors, in turn, and discuss their importance within the Egyptian context.

Contextual Environment for EDI

Political Environment

It is crucial that due attention be given to the political environment into which EDI is to be introduced. Of primary importance is the role of Government in establishing successful national EDI strategies. Singapore is a clear example of a successful Government sponsored EDI initiative, whereas Latin America has achieved limited success with trade facilitation initiatives primarily due to the lack of serious Government intervention1. In Europe, there have been many initiatives, both national and international, aimed at establishing European-wide EDI policies and standards. The European Commission has, e.g. allocated ECU 30 billion to spend over the next 10 years to establish a pan-European EDI infrastructure. Likewise, Egypt is under pressure to extend IT policy, in general, and EDI specifically. A World Bank study conducted in 1995 endorsed the use of EDI and electronic commerce as critical components in trade facilitation. Based on this study, recommendations were put forward to the Egyptian Cabinet of Ministers in May 1997 which identified many immediate priorities to boost
Egypt’s trade performance as part of a continued pursuit of trade and the promotion of foreign direct investment (FDI). These recommendations were primarily concerned with introducing customs, inspection, regulatory and procedural reforms to strengthen Egyptian competitiveness in the world markets, accelerate the pace of moving goods into and out of the country, improve the reliability of importing and exporting processes, and generally reduce the transaction costs of exporting. Although, considerable effort has been made by the Egyptian Government to enhance the transparency of trade procedures, this remains problematic as is detailed in the case study of the Customs and Excise Authority described below. The Egyptian Government has now lent its support for the implementation of EDI but sees its role as a regulatory one, securing funding and providing the required infrastructure, rather than implementational.

**Economic Environment**

Trade liberalization and economic transformations in recent years have necessitated the review of existing systems used for processing trade documentation. In Europe, the emergence of the Single European market is a good example of this. Prospects for faster economic growth in the Middle East and North Africa, in particular, have been associated with the ability of policy makers to hasten integration with the world commodity and capital markets through structural adjustment and trade liberalization. Egypt as a member of the World Trade Organization (WTO) is committed to participation in the international markets for goods, services and capital. This commitment involves liberalizing imports, promoting exports and encouraging foreign direct investment. Such development strategies entail removing barriers to trade that require reforming traditional standards, procedures and agreements, which facilitate international trade. For example, members of the WTO must abide by the requirements for custom valuation. This implies that Egypt will have to alter existing customs valuation procedures. In this paper we, therefore, consider the impact of these requirements on the Egyptian Customs and Excise Authority and EDI implementation policy in general.

**Social Environment**

Studies in Europe and The United States of America have highlighted the power of the business community to drive forward the adoption of electronic trading standards. For instance, in Britain the success of the introduction of EDI may largely be attributed to the pressures exerted by the business community to establish standards. The United Kingdom initiated EDI for trade facilitation purposes early in the 1980s. The British Simpler Trade Producers Board (SITPRO) and the UK Article Numbering Association worked towards developing TRADACOMS which is a national standard and which caters for domestic business requirements. Egypt is coming under increasing pressure from the business community to adopt information technologies, which allow them to react more flexibly, and promptly to changing market demand.

**Infrastructure**

The extent to which a nation is able to adopt a new technology is heavily dependent on the state of its existing infrastructure. “In 1985, Egypt had the vision to develop solid strategy to build the information infrastructure”

Part of this strategy was achieved through establishing information and decision support centres at both central and local government levels. In addition, nationwide databases were developed and major improvements in both telecommunications and informatics achieved. Strategic alliances were formed with international high profile world leading organizations in information technology and close bilateral co-operation with European Union countries was established to share experience and know-how. In addition, Egypt has participated in the UNCTAD’s Trade Efficiency Program, aimed at establishing a worldwide network of trade facilitation centres called Trade Points. These trade points are laboratories where the latest information and telecommunications technologies, such as EDI, are applied to trade (UNCTAD, unpublished work, 1992). It is interesting to note, however, that Trade Point’s plans to introduce EDI to the Egyptian market did not materialise. EDI services in Egypt are limited to access to international service providers. Neither the philosophy nor the facility is available on a national basis. Use is confined to a limited number of multinationals committed to communicating with parent companies or trading partners. Dependence is primarily on one service provider. Experience in those countries where EDI has been successfully implemented highlights the importance of the role of EDI coordination authorities and value added network service providers. Organisations such as EDIForm in the Netherlands, and the EDIA (EDI Association) in the UK, play a crucial role in co-ordinating activities. Egypt, likewise, requires the appointment of
a national EDI service provider as well as a single, well-funded, one stop trade promotion agency with strong affiliations and networking capacity with various trade bodies.

**Capacity to Change**

A major determinant of the success of a national EDI strategy is the community's capacity for change, in particular, to achieve process change. For example, Schwabe and Kimberley point out that international trade processes are typically characterised by complexity and redundancy. Some document handling procedures are surrounded by 500-year-old practices. A typical international trade transaction can take as many as 150 different documents to process. This complexity is not only a result of the multiplicity of organisations involved in the supply chain, but is also a product of multiple data entries. Those nations where there is community resistance to the alteration of traditional business processes are impeded in their development of EDI. India, e.g., where resistance to change is strong committed itself in 1993 to domestic EDI usage but in 1995 there were no more than 200 users in the region.

Process change presents a major challenge for Egypt. In order to consider in detail the difficulties in changing processes in Egypt and the potential for EDI to alter this situation we consider the case of the Egyptian Customs and Excise Authority (CEA).

**The Egyptian Customs and Excise Authority (CEA)**

Egypt's Customs and Excise Authority (CEA) was established in the early nineteenth century (1819) as the legitimate gateway for imports and exports. The CEA mission has focused, since its inception, on generating revenues for the national treasury through duties applied to imports and exports. Customs duties alone have accounted for approximately 30 percent of tax revenues over the past 5 years and 12 percent of all government revenues (World Bank Report, unpublished work, 1997). Consequently, the efficiency of customs revenue collection is crucial.

Egypt's CEA is organized along four geographical directorates, namely Cairo, Alexandria, Suez, and Aswan. Each directorate is responsible for the gateways at Egypt's borders with the outside world. Within each directorate, several CEA outlets exist, e.g., the Alexandria directorate handles both Alexandria and Damietta seaports in addition to Egypt's Western borders with Libya. Each directorate is organised around two functional layers: the operational and financial layers. The operational layer is mainly responsible for the validation of regulatory permits and documentation as well as the valuation of goods and the application of various duties and taxes. Whereas the financial layer is primarily concerned with duty collection and management of warehouse transactions.

Each directorate has distinct functions and features, dependent on the type and value of goods exchanged. For instance, in terms of transaction volume, the Cairo directorate handles around 300,000 consignments each year, whereas Alexandria handles only 70,000 annually, however, in terms of value, Alexandria handles 82 percent of the total value of goods imported and exported. Consequently, automation was initially launched in Alexandria which has evolved as the Central Computer Department.

Since the inception of the process of automation at CEA, initiated in the mid 1980s through a French Government initiative, the focus has centered around Alexandria, being the largest revenue generator. Since then, only 12 other outlets have been automated while the majority of outlets are still based on manual processes.

As Egypt embarks on a new era of economic reform, the accelerated need for exports to offset the deficit in the trade balance on the one hand, and the challenges posed by GATT to the developing countries on the other has meant that, the role, mission and objectives of Egypt's CEA is undergoing a rapid change. Progress in achieving this desired change is hindered by numerous inspection agencies and layers of regulations which slow the movement of goods to and from international markets, hinder trade promotion, administrative efficiency and encourage theft and fraud.

To illustrate the complexity of the situation and justify the potential benefit of adopting EDI, we commence by analysing the procedural flow of the documentation of imports through the CEA.

**Flow of Information Through Egypt's Customs and Excise Authority (CEA)**

The flow of documentation through the CEA is detailed in Figure 1 and may be described in three distinct phases.

**Stage 1: Receipt of Goods**

The shipper delivers goods to the designated CEA warehousing facility accompanied by the original ship-
mented. The content of a shipment would normally contain several consignments, each owned by a specific importer. In addition to the manifest of shipment document, the shipper also delivers one complete set of shipping documents for each and every consignment within that shipment. These shipping documents include: commercial invoices, packing lists, bills of lading, insurance certificates together with any special requirements documentation. The law in Egypt for imports requires a minimum of three original sets of shipping documents to accompany the goods — the first set goes to the CEA whilst the second and third sets are dispatched directly by the shipper’s agents to the beneficiary and consignee of the goods, respectively. Handling and storing of goods are charged to the importer with a grace period of one week for clearance of the goods. The shipper’s agents notify beneficiaries and consignees on the arrival of goods to expedite the clearing process.

Upon receipt of a shipment, goods, are logged into the warehouse audit control system as per the Manifest documentation. The audits are, however, registered on a shipment basis and do not contain the details of each consignment. This lack of detailed data in the Manifest document represents the first loophole in the system. Warehouse theft is primarily due to the lack of detailed information in the Audit Control System.

Stage 2: Clearing Procedures

In order for goods to be cleared the following documentation and procedures need to be completed:

Application Form

The importer is responsible for collecting the bill of lading together with the shipping documents and filling in an import clearance form (hand written) to include details of the consignment as well as the importer and exporting company. This form together with the set of original shipping documents is then submitted to a computer department at the excise outlet.

Reference Number

The computer department then issues a unique import certification number, making a specific consignment of a specific shipment, to the importer. However, the
information contained in the import clearance form completed by the importer is not logged into the CEA computer system at this stage, details are only keyed in when the whole process is complete.

Inspection
Goods are physically inspected to ensure that the commodity is legally permitted to enter the country and that the importer's documentation conforms to import requirements and regulations and that there is consistency between form details and product and the detailed Harmonized Commodity Classification System (HS) classification document.

Valuation
In the valuation phase, the commercial invoice for goods is compared with price lists of previous similar imports, or the personal judgment of the evaluator. As a result, serious error rates in establishing value and in tariff classification occur. First, the database of values used by customs is based on historical data from previous importations and does not contain the value of goods other than those determined at the borders. Secondly, there is incompatibility between this system which is based on the Brussels Definition of Value (BDV) and the WTO valuation principles. It has been suggested that the existing system will hinder Egypt's efforts to migrate to the WTO valuation principles. This stage is, highly judgmental and is subject to manipulation. Valuation and classification of goods are a result of negotiation between importers and customs officers and there is a lack of tight control over the inspection and valuation processes, which paves the way to fraud.

Duty Computation
The result of the evaluation stage is an HS code number and the duty to be paid by the importer.

Payment
Payment terminates the clearing procedures, including handing over the shipping documents in exchange for a payment receipt and a goods' release authorization.

CEA Central Registration Process
The documents then follow an audit check to confirm their accuracy and are forwarded to the computer section to be keyed in (at automated outlets), or simply stacked in paper form to be sent to the central computer department in Alexandria for data entry. Details are then logged onto the system, for the first time, after having completed the import clearance process.

Stage 3: Release of Goods
Once release of the goods has been authorized the importer can withdraw his goods from the CEA warehousing facility and the consignment is deducted from the manifest details. In the case of delay in clearing the goods, the importer has to settle storage fees prior to final release. If any goods are received damaged, defective or incomplete, the importer has to notify the insurance companies with his claim prior to release and document the claim in the presence of a CEA representative. Theoretically, the CEA should return to the shippers' agents their shipping manifest thus offsetting any liability. This does not take place, however, due to inefficient consignment data management.

This system lends itself to several problems leading to serious delays of data (average 2 months, sometimes up to 6 months). These delays are mainly due to: lack of automated information; the requirement for central registration irrespective of port entry (which requires data entry); inefficiencies because of the multiple layers in the system; inconsistency in data registration (no single coherent record of product type, quantity or value) and subjective valuation of products (e.g., eye glasses, may be either classified as a medical aid or a luxury item — each are subject to completely different customs duty valuation).

Upon complete or partial withdrawal of a consignment, the customs audit control deducts the value and tonnage of this particular consignment from its shipment manifest.

Challenges
Egypt's CEA would evidently benefit from the introduction of EDI, however, major strategic and organisational barriers exist:
First, the staff are well acquainted with the existing systems and have an in-depth knowledge of system loopholes and a vested interest in maintaining the current structure. Evasion of duty through false valuation is notoriously difficult to prove and prosecute.
Secondly, the CEA organizational and cultural setup is by definition very rigid and there would be considerable resistance to alter inter and intra organizational power relations.
Thirdly, the peripheral outlets (which are still manually operated) and which report to the centralized sys-
tems, have enjoyed a grace period of delay of one to three months to complete any one operation and their fear of change is likely to inhibit any fundamental structural re-engineering programs.

Fourthly, the Strategic alliance in place with the French organization in-charge of operating and maintaining the central computing department is funded by the French Government which has recently renewed its funding and maintenance contract of the system till 1999. This alliance does not allow for any tampering with the existing system nor is it flexible.

Proposed Solution

Although a fully-fledged EDI implementation strategy together with a fundamental business process re-engineering initiative may contribute significant benefits to the CEA, the given constraints do not allow for such privilege. However, an initial phased approach leading eventually to business process re-design may be introduced through the simple application of an EDI system, external but parallel, to the CEA flow of information processes which shadows the data processed. This would be transparent to the public, but avoid the major threats associated with a new implementation.

The solution centers around the introduction of one/two PC stations at each CEA outlet throughout Egypt. These stations could maintain direct links to global EDI networks utilized by most shippers worldwide. The shippers’ core data is electronic and is usually transferred to the ship after deportation using EDI standards to avoid unnecessary delays at the port of export. The same data stream could be transmitted (shipping documents and Manifest) to CEA stations adopting EDI standards and protocols. The data, received directly from the shipper using EDI could include not only aggregate Manifest details, but also consignment details. This detailed data could be captured electronically at the Warehouse Audit Control. The major achievement is therefore the capture of detailed data.

A Phased Approach

A three-phased approach to meet CEA specific barriers and challenges is proposed:

Phase 1—EDI Introduction

An introductory stage is proposed in which EDI is used to shadow existing process. The warehouse audit control system will ensure the capture of detailed consignment data which will then be electronically processed and await the goods release authorization which will in due course be deducted from the debit manifest according to the consignment details. This minor alteration does not interfere with any of the operational layer processes but provides the following benefits:

Information Control

Detailed line items will be received from the shipper prior to docking which will provide immediate access to information, cut down on time delays, include a complete record of information including customs code and product description and provide control of warehousing inventory.

Theft Control

The automatic tracking of products in process versus products released will be much better controlled and thus reduce opportunities for theft. Similarly, dumping processes will be better controlled ensuring abiding by legal frameworks (minimum period respected, before products are auctioned to prevent insurance fraud).

Fraud Control

Audit for valuation of import goods could take place in advance, since details of a shipment would be available prior to the actual docking of the goods. This would eliminate possible fraud by ground operators.

Audit Control

This proposed system would also provide a more centralised audit of the functions of the CEA and help set the stage for expanding this pilot phase to a full and comprehensive EDI implementation.

Process Control

This pilot could be further extended to provide an enhancement to the existing paper process by enabling a pre-set form to be printed for importers upon submission of consignment.

Although, the proposed initial phase is confined to producing accurate data and providing initial information control, it provides the potential to streamline business processes, and provide the initial control over the identified system loopholes.

Phase 2—EDI Development/ Diffusion

This phase would be set up at the operational level and would entail the use of a PC terminal at the initial
Figure 2 — Full EDI solution

Phase 3 — Establish an EDI Gateway

Ultimately the CEA would benefit from the implementation of a fully-fledged EDI solution (Figure 2). Such implementation would, however, involve simplifying processes, removing excessive and obsolete controls, shortening and easing lines of communication and using both bar-coding and EDI for rapid, accurate transfer of data between computers. It would also require alignment with trading partners' systems and the adoption of international electronic commerce standards. However, given the existing constraints this may only be considered as a long-term strategy.

Conclusions

The case of the CEA described above illustrates how the role of EDI, in a simple application implementation, will not only reap efficiency gains but also embrace national goals to fight fraud and protect national savings. Safeguarding of US$ 350 million as a result of the proposed EDI implementation is estimated*. It also demonstrates how models of successful technological implementation strategies in the developed nations need to be adapted when applied to the developing counties. Our proposal is that this be done within the CIC framework.

The development of a successful EDI strategy must give due attention to the context on an individual nation basis, what works for one country may not necessarily apply to another. For example, Singapore has seen the introduction of a highly successful government driven EDI initiative whilst India has been less successful de-

*Interview with Mr. Hatem Zorkani in his capacity as Advisor Cabinet Information and Decision Support Centre and Consultant to CEA Efficiency Development Program, 16 June 1996.
spite Government support. In North America EDI has been successfully driven by the private sector rather than Government initiatives whilst in Hong Kong the totally private initiative funded by trading companies resulted in considerable delay in adopting EDI. Demand by Egyptian business to develop an EDI industry did not make progress until Government backing was received.

The sophistication of the Infrastructure must also be examined on a case by case basis. The introduction of EDI in countries such as the USA, Europe, and the Far East differs greatly from its introduction in the Middle East and North Africa. However, there are several valuable lessons to be learned from those countries which have already completed the implementation process. For example, the role of Value Added Network (VANs) providers is critical. Britain, where a single VAN provider was endorsed in the early stages of development has been highly successful in the introduction of EDI, whereas in South Africa and Brazil where several VAN providers are represented, EDI development is hampered due to local competition. Further the development of standards is crucial to success. In Britain the existence of SITPRO and the ANA (Article Numbering Association) which developed the national EDIFACT standard ensured that the UK adopted a lead position in EDI in Europe, whereas Japan and Korea with almost no equivalent and operating about 1000 VANs acknowledge this as a barrier to electronic trade.

Finally, we suggest that a nation’s capacity to change is an important determinant of successful EDI implementation. Careful consideration needs to be given to existing procedures and attitudes to change as illustrated in the CEA case study. The existing state of awareness of EDI is also important —lack of success in EDI implementation in Hungary, e.g., may be seen as a result of lack of awareness of its benefits.

**References**


**Benita Cox** is a senior lecturer in Information Management at Imperial College of Science Technology & Medicine. She holds an MSc in Management Science and a prize winning PhD in Artificial Intelligence from Imperial College. She has published widely in the area of Intelligent Tutoring Systems, Computer Learning and Electronic Data Interchange.

**Sherine Ghoneim** has an Economics degree from the American University in Cairo and an MSc in Management from Boston University. She has worked for many years in the EDI industry. She is at present undertaking research in this field at Imperial College.