CHAPTER 7

ELECTRONIC TRADE DOCUMENT SYSTEM DEVELOPMENT

Information and communication technologies (ICT), including e-commerce, have been identified as keys to trade facilitation. Effective electronic and automated trade systems can increase transaction speed and make the regulatory system more transparent and predictable. For example, e-payment systems allow traders to pay custom duties or settle trade transactions in seconds rather than hours or days; and electronic trade document systems allow them to apply and obtain the necessary papers in minutes rather than days or weeks.

As international trade volume is on the increase, the traditional paper-based system is slow and will not be able to cope with the rising amount of international trade transactions. Furthermore, important trade partners are increasingly using computers to do business, forcing others to also use electronic media, or else lose the markets.

ICT may be applied to any of the trade processes or procedures, including the buying process, the payment process, and the shipping process. However, an important ICT application for governments to consider is the implementation of an Electronic Trade Documentation System (ETDS) to make the regulatory process seamless. One of the most successful examples of such a system is Singapore's Trade Net System.

In this Chapter, a case study of that system is used as the starting point for our discussion on how to successfully implement an ETDS. The case study is non-technical and focus on system development and adoption issues. It is based on material from TDB's archives as well as interviews with existing and former TDB, Singapore Customs and SNS officers that were involved with the TradeNet project.

1. Singapore's TradeNet System

The TradeNet system, which has been operational since 1989, is an electronic data interchange (EDI) system that allows computer-to-computer exchange of inter-company business documents in an established format between connected members of the Singapore trading community. It links multiple parties involved in external trade transactions, including 35 government institutions, to a single point of transaction for most trade documentation tasks, such as processing import and export permits and certificates of origin.

a) *Background*

The idea of the TradeNet System originated back in 1979. Given the constraint Singapore faced in terms of its size, the Singapore Government realised that information technology (IT) could provide special opportunities for the economy. A Committee on National Computerization (CNC) was established in 1979 to develop specific recommendations on ways Singapore could pursue a future in the IT field.

In 1980, the CNC issued a report stating that Singapore could become a world leader in the creation and use of IT. To do so, it would have to mobilize its efforts and create a coherent plan of development. A special statutory board, the National Computer Board (NCB), was created to develop programmes to build Singapore into an IT society. Its first major effort was to bring computerization to government agencies under its Government Computerization Project.

One of the areas targeted for improvement was external trade. This resulted in concentrated efforts to implement IT in the port and airport, an important factor leading to TradeNet.

b) *The Need for TradeNet*

The Singapore Trade Development Board (STDB) was responsible for trade facilitation. As a trade promotion body, STDB was ever mindful of the need for trade facilitation when it was regulating trade. This was to ensure that while Singapore maintained its status as a reliable trading nation of integrity, the

manufacturers and exporters were not unduly hampered with cumbersome systems and procedures in their conduct of external trade. It established service standards for the processing of trade documents, i.e., two days for normal service and two hours for urgent service.

However, with the shortage of labour looming in the 1980s and the need for quicker turnaround of goods for just-in-time (JIT) stock inventory management, the STDB considered the service standards for the approval of permits, which spanned from two days to four days, not satisfactory. A quicker processing system was required.

In addition, in 1985 Singapore experienced it first recession. The Government response was the establishment of a high-powered Economic Committee to review the weakness of the Singapore economy and to chart new strategies to improve its economic competitiveness. One of the recommendations was to expedite the use of IT to improve trade competitiveness. In 1986, Hong Kong, China, a major shipping competitor, revealed that it was creating a trade oriented EDI system (TradeLink), which further strengthened Singapore's resolve to implement TradeNet.

c) *The Development of TradeNet*

STDB was given the task of mobilizing the trade community and became the coordinating point among various agencies such as Customs and Excise, Port of Singapore Authority, and Civil Aviation Authority of Singapore. A TradeNet Steering Committee was created to oversee the process. It was subdivided into three working subcommittees, one each for sea shipping, air shipping, and various government agencies. NCB staff was appointed to support each subcommittee. Each subcommittee developed a profile of essential trade documentation activities, which were integrated by the NCB staff into an "Integrated Procedures Report". This became the focal point of procedural reform discussions. Efforts were made to reduce the 20 forms used in international trade into a single online form to serve nearly all trade documentation needs in Singapore. This form was the core of the new computerized system.

To emphasise the Government's commitment to this project, in 1986, Mr. Lee Hsien Loong, then the Minister for Trade and Industry (and currently Deputy Prime Minister), announced publicly the TradeNet project. This also had the effect of speeding up the work of various committees and officials involved. It also gave the TradeNet team full authority and resources to proceed.

In March 1988, Singapore Network Services Pte Ltd (SNS) was created to own and operate the TradeNet system. SNS is owned by the four key agencies involved in developing the system – STDB (55 per cent), Port of Singapore Authorities (PSA) which runs the port facilities (15 per cent), Civil Aviation Authority of Singapore (CAAS) which runs Changi International Airport (15 per cent), and Singapore Telecoms which runs the country's telephone system (15 per cent). SNS contracted International Business Machines (IBM) to develop the system. IBM had sub contracted other local software houses to develop and write the respective interchange software programmes and related modules.

The first transaction on TradeNet was a shipping application submitted on 1 Jan 1989. Approval of the shipment was returned 10 minutes later. By December 1989, TradeNet had 850 out of 2,200 possible subscribers, and handled about 45 per cent of all trade documentation for sea and air shipments.

Due to overwhelming response, STDB changed the date for the use of TradeNet for all transactions to be made mandatory from early 1993 to early 1991. By mid 1991, 1,800 subscribers were using TradeNet to process 95 per cent of trade documentation requirements.

d) *Costs Involved*

The direct capital cost of TradeNet's development, i.e., contract cost to IBM and other sub contractors was in excess of S$20 million (in 1987). This does not include the costs incurred by various agencies in conceiving the project, developing requirements and specifications, managing contract or establishing SNS.

A company wanting to join TradeNet had to pay a one time connection fee of S$750, a monthly charge of S$30 for a dial-up port, and transaction costs of

S$0.50 per kilobyte of transmitted information (the average declaration requires 0.7 kilobytes). A company also needed to have the necessary hardware for local processing of applications and transmission of the coded EDIFACT data. The minimum required PC configuration then cost about S$4,000, and software between S$1,000 and S$4,000.

However, the indirect cost to a company in making changes to procedures and protocols required for adoption of TradeNet was less clear than the direct costs. For some companies, the conversion was minimal because they already had the relevant systems in place. For companies with no prior experience in doing business with computers, the change was more difficult.

Today, the user pays a one-time set up fee of about S$1,500 and a yearly maintenance fee of about S$1,200. In addition, the user pays S$6.50 for each transaction or declaration made through the system.

e) *Assistance to Small Firms*

While joining TradeNet posed no problems for larger companies, which already had significant in-house computer capabilities, not all smaller companies were willing to invest to join TradeNet right away. STDB developed three plans to help these companies. One, they could use the facilities of service centers; two, they could go direct to STDB where data would be captured by available officers; three, STDB could open public terminals where access and assistance could be obtained for a modest fee.

f) *Redeployment of staff*

Prior to TradeNet, trade documents especially inward and outward declarations, were manually processed by clerical and support staff under STDB's Import and Export Office (IE). In 1988, just before the introduction of TradeNet, the IE section numbered around 160, including supervisors and support staff. Today the number of staff handling trade documentation related activities is around 70.

However, the introduction of TradeNet did not result in massive retrenchment of IE staff. Instead, the STDB carried out a staff redeployment exercise. As many of the IE staff had institutional knowledge, some were sent for further training and upgrading and later deployed to other sections. For instance, with electronic processing of trade documents, more staff would be needed for the "back end " checking, i.e., post clearance verification. As STDB was adopting more risk management tools for trade control purposes, retrained staff was redeployed into the Export Certification Unit where they were involved in verifying certificate of origins and conducting factory inspections. Some were redeployed as trainers to train companies on how to use the TradeNet system to process their trade documents.

In addition, the STDB as a whole was also expanding as it undertook more trade promotional functions. Therefore, the former IE staff were retrained and redeployed into these new divisions.

g) *Benefits from TradeNet*

Turnaround time for processing typical trade documents was reduced from two to four days to as little as 15 minutes. This resulted in productivity improvements. Studies suggest that TradeNet reduced trade documentation processing costs by 20 per cent or more. Users of TradeNet found that there were significant savings accruing from filling out a single online forms versus over 20 paper forms in the past.

TradeNet streamlined trade procedures and protocols, which made the entire trading community more competitive internationally. The use of clerks or couriers to transport trade documents to various agencies was eliminated, leading to savings in time and better deployment of staff and vehicles. Staff no longer needed to stand in queues and wait for documents to be cleared. Faster turnaround made it possible to better organize shipments and overall productivity. Several freight forwarders reported savings of 25-35 per cent in handling trade documentation as TradeNet operates 24 hrs as opposed to using agencies that open only during normal office hours.

Benefits also accrued to government agencies using the system. Customs moved from a system of post-approval of applications to pre-approval, such that Customs duties are now pre-paid through electronic means and Customs receive payments faster. The ETDS also enabled faster compilation of more accurate and complete external trade statistics. This is possible because the data from the documents need not be re-keyed in by the Government agencies to compile the trade statistics.

Such accurate statistics will not only serve the private sector better by providing them with timely trade statistics for market analyses and marketing policy formulation but also help the Government agencies for their use in trade policy, trade surveillance and trade monitoring.

h) *Enhancements to TradeNet*

In 1999, further enhancements were made to the TradeNet system called TradeNet Plus. TradeNet was made to be Y2K compliant and processing time was reduced to one to two minutes.

More importantly, it was migrated into a web-based platform where users can now access TradeNet via the Internet, instead of using leased lines. This makes it cheaper for traders to link up with TradeNet, since users are charged only S$30 per month.

2. Issues for System Development and Implementation

The Government agencies that are involved in the development and implementation of the ETDS must consider the following issues:

a) *Lead Agency for System*

To develop and implement the new system, there must be a lead agency to spearhead the concept and co-ordinate activities of all the parties to be involved in the new system. Since it is a regulatory system, a government agency should head the project. At the initial stage, the lead agency would be structuring the multi-agency steering committee by identifying the members. The lead agency itself will chair this committee and acts as liaison between the steering committee and the government. In the Singapore case study, the lead agency was STDB.

The lead agency is therefore responsible for drawing up the concept of the system, set the policy direction for change and setting up the mechanism to implement the new system. The final blueprint of the ETDS based on feedback and discussions with all members of the steering committee and sub-committees is fine tuned by the lead agency and submitted to the government for endorsement, funding and implementation.

The lead agency will be responsible for the ETDS until it is directed to hand it over either to a private operator or a newly established government agency specifically established to operate the ETDS.

b) *Primary Users of the System*

The system is being developed to ensure the efficiency and integrity of the trade and Customs documentation system. The primary objective is to enable the government agencies to receive the trade and Customs documentation electronically for processing and approval. The government agencies are therefore the primary users of the system. The government agencies will be justified to take the initiative in consultation with the private sector to study and set up the new system for the benefits of all participants.

c) *Support from the Private Sector*

The private sector will use the new system to prepare and submit their trade and Customs documentation for processing and approval. A change is required to move from manual submission to electronic submission. The government agencies must ensure that the new system has the total support of the private sector, especially since the initial set up costs are significant.

d) *Partial Government Grants and Financial Assistance*

To defray part of the expenses and to enlist support, the government agencies may consider giving grants and other financial assistance to the first group of companies willing to participate in the new system. After the introductory period and when the system is in place and working smoothly, the government agencies may terminate this financial assistance.

e) *Training and Technical Support*

Comprehensive training programmes need to be developed to train the staff of both the public and private sectors on how to operate the new system efficiently. Such courses should be conducted regularly well in advance of the system implementation. Ready technical support in the form of a Help Desk and technical support teams must also

be set up to provide immediate assistance when a user has problems in understanding or operating the system.

f) *Secrecy of Processing Criteria and Data*

The new system allows the private sector to prepare and submit trade and Customs documents to the government agencies for processing and approval. The processing criteria for these documents are built into the system. These criteria should be kept secret so that no one can override these criteria to get their documents wrongfully approved.

The system will also allow compilation of trade statistics from the documents submitted for processing. Again, the data in the system should be kept secret from disclosure.

g) *Legislative Powers for New System*

To provide the legal basis for the new system, there must be regulations that will empower the government agencies to set up the system for use by both the public sector and the private sector. The regulations should provide for complete and accurate electronic submission of the data to the system by the users for processing and approval.

Severe penalties including fines and imprisonment may be meted out for those who abuse the system and use it for false declaration and for those who hack into the system to cause mischief or to steal data.

3. Critical Success Factors

To ensure the successful implementation of the new system, the government lead agency should consider the following critical success factors:

a) *Commitment at the Highest Level*

To develop and implement the new system successfully, the lead agency must ensure the commitment from the government at the highest level for change, for computerization and to facilitate trade. In the Singapore case study, the then Minister of Trade and Industry provided full support to the TradeNet team.

The government found it useful to set a deadline for the new system to be developed and implemented.

b) *Multi-Agency Steering Committee*

At the policy level, the lead agency should set up and chair a multi-agency steering committee with private sector representation as early as possible. The Steering committee will consider policy issues and set the direction for the sub-committees to work out the procedures and implement the system. This will ensure private sector support for and use of the new system when it is developed. This steering committee may draw its membership from the National Trade Facilitation Body (NTFB) discussed in Chapter 5. The steering committee will consider policy issues and set the direction for the sub-committees to work out the procedures and implement the system.

c) *Sub-Committees*

The steering committee should set up a series of sub-committees comprising of representatives from both the public and private sectors to look into the following:

- Simplification of documentation and procedures – The work of this sub-committee will be to review the existing documentation requirements and operational procedures that will result in a more efficient port clearance of cargo. The sub- committee will also look into the harmonization and standardization of the practices and procedures for the business community.
- Development of a Community System – This sub-committee may look into an overall integrated trade and Customs documentation system using Information Technology (IT) and Internet to better service the trading community.
- Data Administration – For this, the sub-committee may examine the coverage and definition of trade data and published statistical reports for dissemination through the system.

These sub-committees will complete their studies within a set deadline and submit their reports to the steering committee for consideration.

d) *Establishment of a Corporate Vehicle*

The private sector on its own may not be prepared to take the risks to put forward the necessary large capital outlay to develop and implement a system that essentially performs a regulatory function for the government. To overcome this, the lead agency may consider setting up a company with shareholders from both the public and private sectors. This was done in the case of Singapore's TradeNet system where a separate corporate entity, Singapore Network Services Ltd. (SNS) was created. The company will have the necessary capitalisation to develop and operate the system.

With such joint participation, there will be no fear of the company making a monopoly of the services and charging high fees for their services. The fees to be imposed for such services may be determined on a cost-plus basis.

e) *Technical Service Providers*

To provide for competition, the lead agency may select a number of (the actual number will depend on the volume of daily transactions to be handled) service providers to develop software to run the system. The software developers will sell their software to the business community based on their marketing and merit. After the sale, they will provide the training and technical support to their customers to operate the system efficiently. The lead agency will work closely with these technical service providers with regard to technical problems to be resolved, updates on the specifications for development of new software and feedback from the users on the new system.

Encouraging the technical service providers to make the software more user-friendly and to develop the functionality of their software is important. In Singapore, software vendors help companies integrate the TradeNet system into their computer system so that they can use the system not just to obtain approval of the permits, licenses and certificates but also for other uses such as invoicing, stock inventory and compilation of customers' statistics.

f) *Phased Implementation*

To ensure success, the lead agency should consider a phased implementation of the new system. Phased implementation *does not* mean that, in a first phase, each government institution or party develops and implements its own system, and that, in a second phase, these institutions or parties then attempt to merge their existing systems together. Rather, it means strong cooperation between all institutions and parties involved in implementing an integrated system of limited scale or scope, followed by a full-scale or scope implementation. This may take two forms as follows:

- Selected Documents and Goods – During the initial period, the system only accepts the simpler type of documents such as those for non-dutiable and non-controlled goods for processing. After the system has been tested and stabilized, the lead agency may consider to expand the system to accept for processing the documents for other goods such as dutiable, controlled or quota items.
- Pilot Group – The system could initially be configured to accept a pilot group of users in the initial period. At launch, it is not certain that the new system will operate smoothly. It will be a disaster if the "big bang" method is adopted and fails. This will affect the entire business community. For the first phase, a pilot group of users may be accepted to use the system. After the system has been found to function well, then the lead agency may open the system gradually to other users.

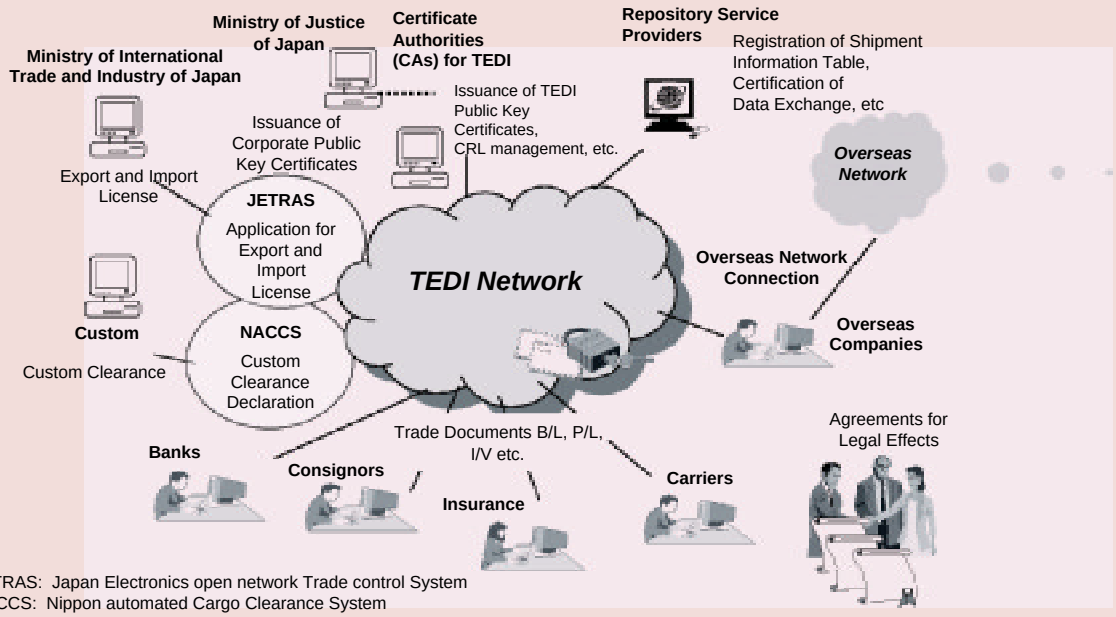
Once the system is found to be working smoothly, the lead agency may then set a deadline for all users to use the system following which they will have to pay a punitive charge if they continue to use the manual system for submission and processing.

g) *Establishment of Document Service Centres*

The setting up of document service centres is critical to the acceptance and success of the new system. There may be a large number of SMEs that do not have the daily volume to justify buying a computer system to prepare and submit their trade and Customs documents.

Box 7.1 The TEDI System in Japan

The Trade and Settlement EDI System (TEDI) is a nationwide initiative of the Ministry of International Trade and Industry started in 1998. The original objective of the TEDI system is to reduce time and cost incurred in trade administration and operation by standardizing and exchanging electronic trade documents over safe and reliable networks. More than just an automated trade document system, TEDI aims to become a total trade and Customs documentation system (TTCS), as discussed in this Chapter. Hence, the automated regulatory and trade documentation system will be seamlessly integrated with other online trade-related service systems such as freight and warehousing booking systems, payment systems, credit and insurance systems.



JETRAS: Japan Electronics open network Trade control System
NACCS: Nippon automated Cargo Clearance System

TEDI participants include trading companies, banks, insurance companies, carriers, and infrastructure companies. TEDI is being designed as an open system able to accommodate both domestic and overseas companies, and allowing for interconnectivity with both domestic and overseas EDI services through the use of open specifications and common protocols. TEDI uses XML document format in compliance with the EDIFACT and SWIFT standards. Companies using TEDI will be able to develop interfaces to suit their specific needs.

The government of Japan has recently proposed that all APEC member economies adopt or connect to the TEDI system to facilitate regional trade.

Source: "Private Sector participation in Capacity Building and Technical Assistance", NTT Communications Corp., 2001 (www.ntt.com) and "Trade Electronic Data Interchange: Concept and Function" by Mr. Kokichi Watanabe, TEDI Advanced Networks Inc. (www.tedianet.com), APEC Workshop on Trade Facilitation Principles, Bangkok, 2002.

For such enterprises, the lead agency should encourage the use of document service centres. These centres are registered users of the new system. However, instead of preparing and submitting the documents for their own trade, they do it on behalf of the SMEs. They will levy a fee to provide such services.

4. Total Trade and Customs Documentation System (TTCS)

The ETDS is a mean to an end and not an end in itself. The lead agency, when developing the ETDS, should consider the use of the system through Internet and to provide for expansion of the system at a later phase, not only to perform a regulatory role such as the electronic registration of traders, but also to link the system to offer other services within the country such as warehousing, financial and insurance services, and with other countries such as exchange of shipping information and documents.

When the TTCS is implemented, the business community will realise the full benefits of the system in tune with their overseas trade partners who are similarly using their computers and conducting their international trade with greater efficiency.

5. Conclusion

Electronic trade documentation systems can greatly facilitate trade. Documents are obtained and processed easily and in a short period of time, which allows companies to practice just-in-time (JIT) stock inventory management and dramatically cut production costs.

ETDS typically result in significant savings in terms of paper, manpower and transport costs. More importantly, implementation of a national ETDS insures that domestic importers and exporters do not get excluded from international supply chains because they cannot exchange or process trade documents efficiently enough compared to competitors in other parts of the world.

Successful development of an ETDS requires a strong commitment from the government to lead the effort. Close collaboration between government and private sector is required.

While it is true that the initial costs of setting up an ETDS may be large, both in term of capital and human resources, preliminary steps can be taken by government and countries who cannot afford a full-scale ETDS at this time. These include standardization, harmonization and simplification of the current paper trade documentation system to prepare for future automation, investment in national telecommunication infrastructure and related human resources (perhaps as part of a national IT master plan), and development of a legal framework to support electronic information exchange.

6. For Further Reading...

- More information about Singapore's TradeNet can be found at http://www.tradenet.gov.sg.
- Singapore's TradeNet and most other electronic trade and Customs systems are EDI systems. Self guided EDI training is provided by ECE/ESCAP at: www.unece.org/trade/training/welcome.htm. An introduction to EDI is also available at http://www.edi.wales.org/feature4.htm#ABC.
- EDIFACT is the communication standard used by most EDI systems. Information on EDIFACT is available at www.unedifact.org.
- Legacy EDI systems are now being updated to take advantage of the Internet. Information about ebXML, a communication language that facilitates exchange of professional and trade information via the Internet may be found at www.ebxml.org.
- The benefits of paperless trading have been recently evaluated in this 2001 study "Paperless Trading – Benefits to APEC" available under / Publications & Library/Free Downloads at http://www.apecsec.org.sg/.