SMEs: Likely Candidates for EDI Technology

Powerful Computer-Based Information systems (CBIS) and inter-organisational systems (IOS) such as Electronic Data Interchange (EDI) are changing the way organisations do business. EDI has become a necessary business tool for many large companies. For example, corporate America's EDI market is expected to grow to $6.4 billion by the turn of the century. Further, it is predicted that almost 90% of all businesses will use some form of electronic data transfer in their operations by the end of the century. New business practices such as Just-In-Time (JIT) manufacturing and Quick Response Retailing (QR) rely on the transfer of transaction data to gain a competitive advantage in the market place. Speed, responsiveness, productivity and improved customer service are becoming key to corporate survival. For these reasons, EDI has become the key enabling technology for business-to-business commerce and electronic trade around the globe.

Although much is made of the potential advantages of inter-organisational systems such as EDI, many firms adopt EDI without adequate forethought. In consequence, these firms do not take complete advantage of the full potential of EDI technology and hence obtain little competitive advantage from its use. Under what conditions should businesses consider themselves likely candidates for EDI implementation? Based on a research study conducted in the USA on the impact of EDI on small to medium-size enterprises (SME), this article describes some of the factors that top managers must consider when deciding whether their organisation is a good candidate for EDI adoption.

Electronic Data Interchange
Electronic Data Interchange (EDI) is the computer-to-computer interchange of business transactions that conforms to specified standards over a communications network that includes at least two trading partners. These interactions include the interchange of common commercial information typically consisting of purchase orders, shipping notices, invoices, related acknowledgements, funds transfer with banks, etc. EDI automates the slow, labour-intensive exchanging of transactional documents in paper form via fax and/or regular mail. The EDI enterprise is the hub of activities. Hubs represent the accumulation point for transactions from multiple trading partners. For example, Wal-Mart is a hub with more than 5000 electronic hookups with its vendors. The trading partners can be viewed as spokes (vendors, customers, etc) become part of the extended EDI enterprise. Large spokes can be hubs of their own supplier, customer networks. Most SME's tend to be spokes for large hub organisations.

EDI requires five key elements:
- Electronic mail for rapid personal (administrative) communications;
- On-line networks for rapid communications such as third party or Value Added Networks (VANS);
Special Features: ISPs

- At least two organisations conducting joint business transactions electronically (trading partners).
- Standard protocols for file and message transfers. This is accomplished with trading partner agreements regarding data coding and formatting rules. Standard EDI message formats can be those developed by industrial organisations (eg, TDCC/EDIA, VICS, WINS), proprietary (eg, General Motors), national (ANSI X12) or International (UN/EDIFACT).
- Data processing task(s) at both (all) organisations pertaining to a transaction are supported by independent application systems.

There are three generic approaches to implementing EDI links:

Direct EDI link between vendor and customer using a modem and telephone line. Many large hub organisations own and operate a private network service (eg, Wal-Mart) that all business partners are required to use. Trading partners establish communications using a dial-up link to the hub's network. While a majority of these hubs do not charge for their network service, trading partners do have to pay all phone charges.

Indirect EDI links through value-added networks (VAN) or 'third party electronic clearing houses.' These independent EDI networking vendors provide all the necessary software and communications services and essentially perform the function of an electronic post office for numerous business partners. Trading partners place their business documents in 'electronic envelopes' identifying the sender and receiver. The document is mailed to the VAN after setting up a dial-up link via phone lines. The VAN will either forward the document to the hub organisation's computer automatically or place it in the receiver's mailbox for pickup at a later time. Major transmitting electronic documents and messages. This approach is essentially similar to the direct communications link except that the Internet access charges are substantially lower than the other options.

Due to the lack of seamless standardization within industries at the present time, it is quite likely that a firm will simultaneously use more than one approach for EDI transmission. For instance, a spoke enterprise in the automotive industry might utilize an indirect link with most of its buyers except in the case of major EDI hubs such as General Motors or Ford who may require the company to use their own specific direct EDI systems to link with each of their production facilities. In such an event, the spoke enterprise may end up assuming the burden of maintaining multiple EDI systems.

Appropriateness of EDI Implementation

When is an organisation a candidate for EDI implementation? Appropriateness of EDI refers to the conditions under which a business should consider themselves likely candidates for EDI implementation. In two case studies and an extensive survey of SMEs in the USA, it is found that at least four distinct conditions must exist before an organisation should consider itself a likely candidate for EDI implementation.

The first factor relates to the internal/external business and technological environment varia-
ables that impact an organisation. For example, if the nature of the business situation in which a firm operates is such that there is an increasing use of EDI in its industrial sector and that internal systems and business processes are adaptable to EDI, then a firm is a good candidate for EDI implementation.

The second factor relates to the potential organisational readiness and trading partner support available to the candidate firm. Availability of financial resources and trading partner support and co-operation are two examples of the variables that make up this factor.

The third factor relates to the potential for positive financial impact of implementing a technology like EDI. When inventory carrying and servicing costs are high and the volume or frequency of orders and other business transactions is high, a firm can generate substantial savings by using EDI.

The fourth factor relates to the potential of EDI to achieve enhanced workflow productivity. This factor emphasizes the potential ability of this technology to substantially reduce the time and resources spent on creating and managing the flow of business documents.

**When is EDI go for it?**

Tests for ‘Appropriateness of EDI’ (Pre-conditions for EDI adoption)
- Internal/External Business and Technological Environment
- Increasing use of EDI in your business sector (e.g., Just-in-time, Quick time retailing)
- Customer service expectations are high
- Fundamental way of doing business in the industry is changing
- Current internal systems are easily adaptable to EDI
- Management is enthusiastic and supportive
- Trading partners are concentrated
- Current state of computerization of your business is conducive to EDI implementation
- A major customer or supplier wants you to implement EDI

**Workflow Productivity**
- Loss of time due to paper flow is substantial
- Management of paper flow consumes excessive personnel or financial resources.

The answer to the question ‘when is EDI appropriate for a firm’ essentially requires assessing a multifaceted set of variables. SME owners/managers attempting to assess the appropriateness of EDI for their organisation must understand the significance and impact of all the conditions listed in the above table prior to implementing EDI. This is one way small-to-medium-sized firms can truly realise the full potential of this essential technological element of the future world of electronic commerce and trade. It is also necessary for larger hub firms to assist smaller spoke firms in achieving the potential operational efficiencies and long-term strategic benefits of EDI technology through a careful consideration of all pre-conditions necessary to engender its success. Otherwise, EDI will never surpass the status of a high-tech ordering and invoicing ‘fax machine’ for many small and medium-sized organisations in the value-chain.

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