E-Transformation from EDI to Web-based B2B Frameworks

Minsoo Kim
Department of Systems Management and Engineering, Pukyong National University
San 100, Yongdang-Dong, Nam-Gu, Busan, 608-739, KOREA
Tel: +82-51-620-1545, E-mail: minsky@pknu.ac.kr

YoungSeok Ock
Department of Systems Management and Engineering, Pukyong National University
San 100, Yongdang-Dong, Nam-Gu, Busan, 608-739, KOREA
Tel: +82-51-620-1545, E-mail: ysock@pknu.ac.kr

Dongsoo Kim†
Department of Industrial and Information System Engineering, Soongsil University
1-1 Sangdo 5-Dong, Dongjak-Gu, Seoul, 158-743, KOREA
Tel: +82-2-820-0688, E-mail: dskim@ssu.ac.kr

Abstract. Lots of EDI-VAN companies are in need of transforming their business transaction systems into Web-based e-Business frameworks because of high cost and closed structure of EDI systems. This research proposes several e-Transformation strategies for EDI-VAN companies to adopt Web-based e-Business frameworks such as ebXML and RosettaNet. Four transformation alternatives are presented and transformation procedure for a medium-sized company is described. The result of this work can be used as a practical guideline for EDI companies to develop their own transformation strategy suitable to its scale and capability, while minimizing the impacts on the pre-existing business processes and information systems.

Keywords: EDI-VAN, ebXML, RosettaNet, e-Business Standard, E-Transformation.

1. INTRODUCTION

The many companies have been using EDI (Electronic Data Interchange) systems to exchange business documents with their trading partners since the very inception of EDI in 1970’s. Among those early EDI adopters quite a lot of companies are still using traditional EDI system over the VAN (value-added network) to conduct and manage their processes. VAN providers exclusively handle all the services such as connectivity, protocol conversion, security, auditing and mailboxes. They charge for every transaction they handle and the subscribers have to use a dialup modem to connect to the closed VAN and thus initiate the transaction, which results in the onerous batch processing.

IT (Information Technology) environment has undergone considerable changes for the past 30 years, which affects the enterprise structures and business activities and thus induces significant changes in traditional EDI-VAN systems. The main cause of those changes is the rapid dissemination of the Internet. Now, the Internet is recognized as a cost-effective alternative to replace the closed EDI-VAN environment (L. Pak. 2003, Nahid. 1998).

Many EDI-VAN companies have already transformed their business systems into Web-based e-Business systems, and more and more companies are considering such an E-Transformation. Both the advancement of the Internet technologies and the propagation of e-Business standards such as ebXML (e-Business using XML) and RosettaNet accelerate the changes in B2B (Business-to-Business) environment (ebXML. 2001, Sanjay. 2003, Jagdev. 2001).

In this research, we propose four E-Transformation strategies for traditional EDI companies to adopt Web-based e-Business standards together with the selection criteria. Each strategy is explained in detail and the trans-
formation procedures of two representative strategies are given. The result of this work can be used as a practical guideline for an EDI-VAN company to develop its own transformation strategy (Ying. 2003, Youcef. 2004).

The rest of this paper is organized as follows. Section 2 explains the paradigm shift of e-Business standards. Section 3 and 4 present four E-Transformation strategies and the selection criteria of each strategy. Section 5 explains about the hybrid approach. Section 6 provides the procedures of two transformation strategies for mid-size companies. Finally, we conclude this paper in section 7.

2. EVOLUTION OF E-BUSINESS STANDARDS

2.1 Overview of EDI Standard

EDI is a standard for computer-to-computer exchange of machine-readable business documents. With EDI, business documents can be sent directly from one computer to the other, which eliminates manual data entry errors and thus improves data quality and processing efficiency. The benefits of EDI include cost saving, superior customer services, enhanced internal processing, higher business visibility and improved organizational competitiveness (Nahid. 1998, Simon et al., 2000).

At first, EDI had been used to exchange information within a company or related groups with a proprietary format, so the range of its utilization was quite limited. As there grows the needs for exchanging information between companies within an industry, vertical industry standards for EDI were established. After these industry standards, national standards supported by each government were developed. The X.12 and GTDI (Guidelines for Trade Data Interchange) are the typical examples of those national standards developed by ANSI (American National Standards Institute) and Europe respectively.

As the business became global throughout the world, the limitations of those national EDI standards were revealed, which led to a joint development of international EDI standard by standardization organizations of USA and Europe under the support of United Nations. As a result of these efforts, UN/EDIFACT (EDI for Administration, Commerce and Transport) was approved as an international standard by ISO (International Organization for Standardization) in 1987. In spite of it all, vertical industry standards and proprietary communication standards of each VAN vendors coexist in the field and X.12 is still widely used in North America (Nahid, 1998, Martin, 2002).

2.2 Threat to Traditional EDI

With rapid evolution of information technologies and the Internet, lots of companies have introduced a variety of enterprise information systems including ERP (Enterprise Resource Planning), CRM (Customer Relationship Management), SCM (Supply Chain Management) and BPM (Business Process Management) to manage their business activities efficiently. As the competition among companies becomes intense, companies are especially in need of process integration between those information systems to cope with the sensitively changing market and thus improve their competitiveness. However, it is very difficult to satisfy those business requirements with the traditional EDI-VAN system.

In EDI-VAN environments, business activities are performed within a closed network using a proprietary translation and communication software. Therefore, there is a fundamental limitation that EDI-VAN cannot support open and flexible transaction environments. All trading partners should use the same VAN service to communicate with each other. Transaction cost increases in proportion to transaction volume. Furthermore, since business documents are exchanged in batch mode, it is very difficult to handle transaction activities requiring real-time response.

Increasing risk cost is a more serious problem than transaction cost itself. Maintenance of outdated EDI system is problematic. It is difficult to hire a maintenance staff for old-fashioned system and EDI vendors usually set a pretty high price on maintenance and upgrade service.

Another limitation of EDI-VAN is that it lacks in flexibility. To cope with changes in business environment such as modification of business processes and addition of brand-new products or services, it is necessary to develop or modify translation software. However, illegible binary format, riveted data fields, and difficult document mapping make it hard to touch EDI translation software. Besides, extra development cost to integrate EDI system with enterprise information systems such as ERP, SCM, and CRM is also required (L. Pak. 2003, Ying, 2003).

As is described above, EDI-VAN systems are difficult to cope with changes in business environments. However, it is also difficult to eliminate the old EDI system at a time, because core business functions such as order processing, financing and invoicing are still carried out based on the EDI system. Migrating core functions to the Internet environment without any considerate plan or fine control may affect the company negatively.

2.3 Emerging Web-based e-Business frameworks

There have been several alternative EDI technologies to overcome the limitations of traditional EDI systems, which include Open-EDI, Internet-EDI, Web-EDI, Interactive-EDI, and XML/EDI. These technologies were mainly developed to provide additional Internet connection services over the VAN so that VAN vendors withhold existing EDI users from secession. So, they have a significant difference from the Web-based e-Business frameworks, which are basically open.

Web-based e-Business framework is an environment