Time-Based Competitive Advantage through EDI for Buyer-Supplier Alliances

Akemi Chatfield  
*University of New South Wales*

Philip Yetton  
*University of New South Wales*

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Electronic Data Interchange (EDI), a subset of Inter-organizational Systems (IOS), refers to the computer-to-computer exchange of structured data files. EDI involves two distinct types of EDI users: initiators and adopters (Nygaard-Andersen and Bjørn-Andersen 1994). The initiator of an EDI initiative invests significant resources to develop EDI applications and to promote the EDI network to its trading partners. A key driver for the initiator’s EDI investment is to gain a competitive advantage from improved relationships with their suppliers and customers. Supporting this strategy, Cash and Konsynski (1985) conclude that new strategic opportunities are created by Interorganizational Systems (IOS), asserting that these network technologies are a new strategic weapon that “redraws competitive boundaries”. Against that, more recently, Benjamin, de Long and Scott Morton (1990, p. 35) conclude: “Gaining competitive advantage from EDI applications is much more difficult than it might appear.”

This paper is motivated by the contradiction found in the literature about the arguments for EDI use and its effects on strategic benefits. The contradiction in the literature reflects a gap between theory and practice. In this paper, we start filling the gap by focusing on time-based competitive advantage, a subset of the potential strategic benefits, and by addressing the following research questions: What is the role of EDI in time-based competitive advantage for buyer-supplier alliances? Under what conditions does the EDI initiator build a sustainable time-based competitive advantage?

In the paper, we present a case study of Honda’s time-based competitive advantage through EDI for its alliances with external suppliers. The key findings are that time-based competitive advantage through EDI requires strategic EDI use by the adopters and that their strategic EDI use is strongly influenced by existing cooperative relationships between the initiator and the adopters. The results have implications for the future research as well as for managers who are concerned with gaining a strategic payoff from EDI investment.

Contradiction between Theory and Practice

While there are successful EDI investments made by American firms such as American Airlines and Wal-Mart, certainly, the difficulties described by Benjamin and others are common and wide-spread in practice. In her study of Fordnet, a proprietary EDI initiated by Ford of Europe, Webster (1995) observed the absence of collaborative buyer-supplier relationships, which are presumed in the literature to emerge through EDI use. This gap between theory and practice was also observed by Clemons and Row (1993) in their case study of the impact of manufacturer-initiated EDI and other information technologies on manufacturer-retailer relationships in the consumer packaged goods industry. They report limits to the potential strategic payoff from new EDI-enabled logistics management practices because of “considerable resistance” by expected adopters. Finally, Bensaou (1993) finds mixed results of the impact of EDI use on interfirm cooperation in the automotive industry. He reports that EDI use was positively related to the improved interfirm cooperation among the Japanese buyer-supplier relationships, whereas he found little impact of EDI use on the US counterparts.

Method

Our focus on the impact of EDI on time-based competitive advantage required a strategic EDI initiative that was successfully implemented. This “selection bias” is a direct function of the research questions addressed in this paper. Strategic EDI initiatives that failed, caused by extraneous factors, such as a lack of top management support or inadequate EDI knowledge, are not relevant to our research focus. Honda’s EDI initiative was successful with a high rate of diffusion across its supplier value chain and its strategic benefits are central to performance. Honda is widely recognized as a leading world-class time-based competitor (Blackburn 1991).

Given the contradiction between theory and practice discussed above, we adopted the inductive theory-building case study method discussed by Eisenhardt (1989) and successfully used in IT research by, for example, Clemons and Row (1993) and Henderson and Lentz (1995-1996). Theory-building case research does not develop a priori hypotheses. Instead, it enables us to extract rich data in detail and to encourage novel constructs and propositions to emerge inductively through the process of field investigation.

The case study was conducted in 1995 at various initiator and adopter sites in Japan. Open-ended interviews were used, rather than structured interviews with a priori questions, with the focus on identifying whatever factors were considered important by interviewees. Twenty-three interviews with senior managers and EDI/IT managers at the initiator’s sites often lasted over two hours, and often multiple visits were required. The initiator was asked to provide a list of adopters that could be interviewed. All interviews were recorded. In addition to the initiator’s head office, visits were made to twelve of its adopter’s work sites, including
auto assembly and component manufacturing plants. When possible, the primary source data were validated with external sources and documents. In addition, we analyzed secondary source data, which include the company publications (Annual reports 1965-1997) and a number of Japanese books written by Honda’s two founders: Soichiro Honda (e.g., Honda 1963) and Takeo Fujisawa (Fujisawa 1986). The two founders have strongly influenced Honda’s current management philosophy and practice.

Honda and its EDI

While the company was established in 1948, Honda started manufacturing its first car, N360, in 1966, which makes Honda the last entrant to the Japanese automobile industry. The domestic market was very competitive, dominated by Toyota and Nissan, with ten other automakers. Despite its last mover disadvantage, Honda had rapidly grown to number three in production and sales in Japan (Japan Automobile Manufacturers Association 1998). Furthermore, while the last entrant in Japan, Honda was the first Japanese automaker to establish overseas production plants in the US and in Canada. Unlike Toyota, Honda entered without a joint venture partner. Honda is, today, a global automaker, with production plants in 34 countries and regional R&D centers in Japan, North America, and Europe.

For many manufacturing industries, including the automotive industry, how quickly the firm responds to customer needs importantly depends on its speed to market. Honda adopted time-based competitive strategy in the early 1980s. This is a value-added strategy based on the extension of the principles of just-in-time (JIT) and total quality management (TQM) to the entire production system (Stalk and Hout 1990; Blackburn 1991). Honda understood the importance of involving all functions within the firm and also including external suppliers.

At Honda, high quality buyer-supplier collaboration is essential to its core business processes. Like other Japanese automakers, Honda organizes its production systems based on a variant of JIT inventory control methods. Honda’s time-based competitive advantage requires that Honda had to take time out of all parts of the supplier value chain: supplier component design, component manufacturing, quality control and JIT delivery to Honda assembly plants. Mr. Fujisawa, first vice president and co-founder, was credited for his role in identifying the growing complexity within Honda that was due, in part, to its subcontracting practice. Honda outsourced 70-75% of its components. Honda launched in 1970 its first ‘All Honda Idea Contest’ among its employees, which received 996 entries suggesting different ways to improve the workflow. Honda implemented many ideas throughout the 1970s, and continuously improved its internal flows of information and efficiency of problem-solving at the factory floor levels.

Honda’s integrated EDI system is a proprietary network system developed in the mid-80s. It is integrated with Honda’s corporate database and such strategic information systems as JIT production management system. It is also integrated with its manufacturing process technologies, such as computer-aided design and manufacturing systems (CAD/CAM). Honda’s EDI was widely diffused to its external suppliers. In addition, nearly all first-tier suppliers made significant changes to their internal processes and integrated Honda’s EDI applications with their internal applications. This high systems integration by the suppliers enables Honda and each of the networked suppliers to exchange a wide variety of company specific and relation specific information (such as purchase orders, forecast for production, just-in-time production schedules, and 3-D CAD drawings of parts and components) in a timely manner.

Time-based Competitive Advantage

Honda has grown from a turnover of $230,000 in 1949 to almost $40 billion in 1994 (Fortune, August 1995). Despite the recession and the increasing competition from import cars in Japan, Honda’s sales were up 13.3% to $43.4 billion in 1998 and it is one of the only two Japanese auto companies (the other is Toyota) showing a profit (Clark 1998). Honda has maintained its profit margins as it has grown. Its profit margin for 1997-98 was 4.5% which compares very favorably with Toyota (3.2%) and Nissan (1.2%) (Forbes 1998). Customer satisfaction for Honda cars was ranked as number one by an independent agency in the US based on its customer surveys (J. D. Power and Associates 1997). Honda’s high performance sustained over time is due, in part, to its time-based competitive advantage realized by its buyer-supplier alliances.

In this paper, we focus on a subset of the potential strategic benefits from time-based competitive advantage (Stalk, Evans, and Shulman 1992; Stalk and Hout 1990; Stalk 1988; Blackburn 1991). Honda’s product development cycle was used by GM and Ford as the best practice benchmark. The managers interviewed reported that Honda’s high performance was related to its superior lead time in launching a new vehicle. Their view is consistent to the external evaluation of Honda. Using a basic measure of the time it takes a production facility to return to production capacity, Honda was rated first and Toyota second among North American manufacturers analyzed (General Motors, Ford, Chrysler, Toyota and Honda) in launching a new vehicle (Smith 1998).

Our case analysis reveals that Honda’s integrated EDI system plays a central role in managing interfirm interdependence and collaboration with its external suppliers. Honda’s first-tier suppliers manufacture and
deliver parts and components to Honda plants according to Honda’s JIT production schedules. In addition, key first-tier suppliers design new parts and components.

It is clear that the centrality of EDI is not unilaterally decided by Honda, but rather, it is mutually agreed by all parties involved. They share the common desire to effectively manage high level interfirm interdependence and complexity. It is also found that the centrality of EDI in buyer-supplier alliances depends both on close interfirm cooperation established prior to EDI network implementation and on mutual agreement to leverage EDI for time-based competitive advantage. Specifically, the initiator and the adopter mutually agreed to share strategic and proprietary information such as production schedules and CAD drawings across the traditional firm boundaries.

Because of external stickiness associated with the traditional organizational boundaries (von Hippel 1994), Honda’s capability in building close and cooperative relationships with external suppliers is critical for its sustainable time-based competitive advantage. For this reason, it is unlikely to find high-level EDI centrality in adversarial relationships, where the buyer as the initiator uses coercive power to enforce its EDI network to all suppliers (for example, Ford in Webster (1995)). High-level EDI centrality is also unlikely when EDI initiatives are merely to automate the existing interfirm workflow or are largely cost-cutting measures, without clear top management vision for strategic deployment.

**Discussion and Conclusions**

From the perspective of the initiator, the problem of realizing strategic benefits, in part, stems from the interdependent nature of the benefits derived from EDI and, as a result, from the importance of the strategic use of EDI by the adopters. While some initiators use their coercive power to demand adoption (e.g., Webster 1995), in general, initiators cannot control how different adopters use EDI in their internal processes. As the nature of EDI benefits is interdependent (Riggins and Mukhopadhyay 1994), initiators cannot realize benefits without a critical mass of adopters adopting network technology. While a high rate of adoption is necessary for tactical benefits, strategic benefits also require adopters to use EDI strategically in ways which they create value in interfirm joint action (Massetti and Zmud 1996).

This strategic use of EDI by adopters typically requires adopter cooperation in undertaking joint action with the initiator, such as new product design and just-in-time delivery of components. To do this, the adopter frequently has to make significant changes to its internal processes. Strategic benefits are unlikely when initiators and adopters use EDI to simply automate existing interfirm information flows and decision processes (Johnston and Vitale 1988; Benjamin, de Long and Scott Morton 1990; Clemons and Row 1993). In practice, many initiators simply automate the existing interfirm processes and avoid internal restructuring, leaving inefficient processes intact or ignoring overall interdependence across processes (Hammer 1990; Davenport and Short 1990; Willcocks and Lester 1996).

It follows that a firm’s unwillingness to re-engineer its internal systems is a barrier to capturing the strategic benefits of EDI which require significant changes to internal processes, such as internal systems integration of EDI applications with internal information systems (Nygaard-Andersen and Bjørn-Andersen 1994; Swatman, Swatman and Fowler 1994).

Evidence from case studies of six Fortune 100 firms suggests organizational and sociodisciplinary factors rather than financial and IS knowledge resources are the critical sources of resistance to change (Liker, Fleischer and Arnsdorf 1992). Many large firms, despite their financial and technical resources, experience difficulty integrating computer-aided design (CAD) with computer-aided manufacturing (CAM). A lack of internal systems integration between these technologies and the resulting difficulty of transferring design data across functions limits the firms’ use of information technologies and they do not realize the potential strategic benefits.

These empirical findings are consistent with the problem of internal systems integration experienced in the 1980s. In 1982, Robert Benjamin published a forecast of the state of information technology in the year 1990, where he made seven predictions for IT in the future. Benjamin and Blunt (1992, p.8) report that all the predictions for IT made in 1982 were realized, except one. That is the prediction: “The 1980s will be a decade of integrating applications across functions.”

So to capture the potential strategic benefits from EDI investments, organizational changes need to be made bilaterally by the initiator and the adopters to integrate EDI with both internal information systems and internal business processes to take advantage of the interfirm electronic links.

This paper examines the gap between theory and practice, in the specific context of EDI-enabled time-based competitive advantage. In the prior EDI research, direct causality is assumed to exist between EDI use by network members and strategic benefits accrued to the EDI sponsor organization. However, the prior research results are inconsistent. This paper analyzes Honda’s best practice in time-based competition that leverages buyer-supplier collaboration. Analysis finds the central role of EDI in building a sustainable time-based competitive advantage. However, realizing a time-based competitive advantage is not possible without first establishing cooperative relationships prior to initiating EDI. It is because buyer-supplier alliances that want to leverage EDI for a competitive advantage must effectively manage high-level systems integration and high-level commitment to joint action of strategic importance.

“References available upon request from author”