Electronic Invoicing and Remittance:
Extending EDI for Competitive Advantage

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The use of Electronic Data Interchange (EDI) technologies can prove to be a strong, strategic initiative for many businesses. However, to leverage these potential benefits, organizations must be able to transform ineffective operating procedures and explore alternative implementations of EDI. The project reported here illustrates how a major Fortune 500 corporation was able to meet the challenge of extending their EDI utilization using specific cycle time reduction techniques. Specifically, they identified various means to reduce the cycle time for electronic bill presentment and payment that should result in improved customer service, increased cost savings, and enhanced revenue.

Many organizations consider Electronic Data Interchange (EDI) technologies to be a valuable strategic tool. If implemented correctly, EDI can provide significant benefits in managing business partner relationships (Riggins and Mukhopaphay 1994). Benefits include increased efficiencies of operation, reduced transaction costs, and improved customer satisfaction (Johnson and Vitale 1988). Unfortunately, EDI utilization can also introduce new problems into the organization. Specifically, the requirements associated with paperless processes can have a major impact on organizational procedures and controls (Scala and McGrath 1993). Furthermore, traditional implementations of EDI using proprietary value-added networks have proven to be quite cost prohibitive for many small to medium sized customers (Williams and Frolick 2001). Nevertheless, organizations continue to focus on extending their use of EDI technologies to achieve competitive advantage.

This article reports the results of a joint research project conducted by the FedEx Center for Cycle Time Research and a major Fortune 500 corporation. The use of EDI as an electronic billing solution is a key strategic initiative for this firm. They are committed to increasing customer use of EDI and improving performance in all EDI-related areas. The objective of this project was to identify cycle time reduction opportunities within the EDI invoice adjustment processes of the Electronic Billing Services group.

The paper is organized as follows. The first section provides background information about the organization and project being reported. Next, an overview of the electronic invoicing and remittance activities within this corporation is presented. Particular attention is given to those procedures that impact the volume of EDI invoice adjustments. This is followed by a discussion of specific opportunities for improvement and specific recommendations for cycle time reduction of the EDI invoice adjustment processes. The final section presents the project conclusions.
Project Background

The company studied here has long been a leader in logistics and supply chain services. This firm is a $23 billion global family of companies with over 200,000 employees worldwide. The organization prides itself on a strong customer focus and the use of technology for competitive advantage. As such, they were an early adopter of traditional EDI, using this channel for connecting with a variety of trading partners regarding all aspects of the business relationship. Of particular importance is the use of EDI for electronic billing.

The revenue operations division of the business is committed to identifying opportunity through cycle time improvements and error reduction. Seeing a prospect for improving the electronic bill presentment and payment functions within the organization, the revenue group approached researchers from the FedEx Center for Cycle Time Research (the Center). The revenue group presented their four overarching goals:

- Increase customer use of EDI
- Reduce volume of EDI invoice adjustments
- Improve performance in all EDI-related areas
- Identify best performing EDI products for the company and its customers

Although each of these goals is important, the project team decided to concentrate its efforts on reducing the volume of EDI invoice adjustments. We believed that focusing on the cycle time of EDI invoice adjustments would lead to (1) reduced costs for processing EDI invoice adjustments, (2) accelerated application of funds, (3) significant improvements in customer satisfaction, and (4) allow for an increase in EDI usage with little or no increase in staffing levels.

The project began March 2000 and recommendations were delivered August 2000. Project participants included researchers from the Center, as well as representatives from all affected business units. The research team’s role in the project was to:

- Examine and assess the current EDI invoice adjustment procedures
- Explore ancillary processes and work groups that influence the volume of EDI adjustments
- Survey all IS and technology applications used in the EDI invoice adjustment workgroup
- Analyze the performance measurement system and performance levels of the EDI invoice adjustment workgroup
- Conduct a comprehensive review of business literature to identify “best practices” in EDI process performance

The project team conducted interviews with key personnel in each of the workgroups that make up the Electronic Billing Services. In addition, we spent a significant amount of time observing the work being performed. This approach resulted in an in-depth understanding of the process and brought to light some of the more subtle issues involved. The project team also conducted a literature review focusing on current best practices in using EDI for competitive advantage.
Electronic Invoicing and Remittance

Electronic billing solutions provide significant cost savings for both the organization and its customers through the reduction of paper, printing, postage, imaging, and keying expenses. A comparison of invoice and remittance costs for paper versus electronic processes within this organization reveals a dramatic difference (Table 1). In addition, electronic invoicing and remittance increases the accuracy of the data and reduces the time to apply the customers' payments.

Currently, approximately, 32% of the firm’s revenues are invoiced and remitted electronically. In light of the substantial savings in transaction costs, executive management is committed to increasing the volume of electronic remittance by 20% per year. Figure 1 shows this forecast for EDI remittance volume at the time of this study. Furthermore, this increase should be achieved without adding incremental costs or resources and with a reduction in the cycle time associated with accurately applying customers' payments.

Before this goal can be achieved, the Electronic Billing Services group must address the inefficiency that exists in the current electronic invoicing and remittance processes. One critical deficiency centers on the application of customers' payments. As stated previously, the focus of this project was to identify ways to reduce the volume of EDI invoice adjustments. These invoice adjustments are the product of inaccurate invoicing and result in delayed application of the customers' payments. Customer satisfaction deteriorates rapidly in the face of numerous iterations of invoice adjustments. To understand how we might improve this situation, we must first look at the electronic invoicing and remittance overall.

Figure 2 shows a general view of the electronic billing process. Customers wishing to participate in electronic invoicing and remittance must first go through a customer set-up procedure. During this process, appropriate software is delivered, data handling is established, and testing of the invoice/remit cycle is performed. Once this is complete, electronic invoicing and remittance begins. The invoices are presented to the customers electronically. The customer determines whether or not to accept each charge on the invoice. If the customer accepts items on the invoice, an electronic remittance is returned for that amount. However, if the customer identifies discrepancies in the invoice, the items in question are passed back to a group responsible for invoice adjustments. Each item is researched and once resolved, resubmitted for another invoice to the customer.

Overall, we found the electronic invoicing and remittance to be a complex process. Customers have many options for implementing electronic invoicing and there are variations within each option. The process is not streamlined and appears to be the result of reaction to needs rather than planning. Furthermore, seemingly small actions early in the process have a large impact later in the process.

Preliminary interviews with members of the organization allowed us to determine specific areas of focus for this study: customer set-up, remittance, and invoice adjustments (shaded in figure 2). These work functions were determined to have a
direct impact on the volume and processing of invoice adjustments. The next section presents the findings of the project team.

**Opportunities for Improvement**

Initial assessment of the various work groups within Electronic Billing Services (EBS) revealed highly motivated personnel with a strong customer focus. Many key employees had significant years' experience and projected a favorable attitude toward change. However, communication and coordination between the work groups was critically lacking. The insufficiency in shared knowledge between process groups provides the greatest opportunity for improvement. The problems arising from this lack of shared knowledge fall into two categories: communications between groups and communications with customers.

Not only do the various functional groups within EBS operate independently, they are physically located in different office space. As a result, what should be an integrated process has become highly modularized. The consequences of seemingly small actions on the part of one group can be detrimental to another work group later in the process. For example, the Customer Set-Up function fulfills special customer invoicing requests without a complete understanding of the implications of these special requests on the back-end processes. Unfortunately, there is no opportunity to engage in cross-functional learning which could provide the necessary "big picture" view.

The standalone nature of the EBS functions prevents any one group from being able to respond to all of a customer's needs. Since each group focuses on a different aspect of electronic invoicing and remittance, no one function has a comprehensive view of a customer at any given point in time. As a result, there may be customers experiencing high levels of invoice adjustment activity, but without customer level information it is impossible for EBS to respond appropriately. In addition, if a customer has a question about the electronic billing process, they may need to speak to several different people before the issue can be resolved due to the specialization within the work groups.

Another key opportunity for improvement involves the choice of electronic billing products available to customers. As mentioned in the introduction, EDI can be cost prohibitive and complicated for small to medium sized firms to establish. Consequently, many customers struggle with the implementation of EDI invoicing and remittance. These difficulties continue with use of EDI and result in repetitive invoice adjustment activity. Alternatives to traditional EDI products could provide reductions in the volume of invoice adjustment activity.

**Recommendations for Cycle Time Reduction**

Cycle time reduction efforts have proven effective for organizations looking to reduce costs and improve customer service. The key to success is identifying "points of leverage" where a small change
will have a large impact on the cycle time of the process (Wetherbe 1995). Leverage points can be classified as Management/Organization, Human Resource, Product Management, Operations, and Interorganizational in character. Our analysis of the EBS electronic invoicing and remittance activities revealed several points of leverage with opportunities for cycle time reduction: simplifying, standardizing, co-locating, integrating, identifying, and informing (Wetherbe 1995). The specific leverage points and ensuing benefits realized by the firm are discussed below.

**Co-Locating & Integrating.** The first recommendation presented here involves co-locating and integrating the different EBS functional work groups. Co-locating is a Human Resources approach used to increase productivity by placing key personnel in physical proximity to one another (Wetherbe 1995). The ease of access to different groups should improve communications between the groups. There is evidence that co-location is necessary for the success of projects involving cross-functional teams (Wetherbe and Vitalari 1994). Similarly, integrating (an Operations leverage point) entails more closely coupled processes or activities thereby reducing the disconnection exhibited in the existing modular arrangement (Wetherbe 1995).

Shortly after the conclusion of the project, all electronic invoicing and remittance operations were consolidated into one EBS location. Benefits from this move were realized almost immediately. One significant gain related to this project was the increase in the amount of applied customers' payments (reduced unapplied cash). See figure 3 for a graphical representation of this trend.

**Simplifying & Standardizing.** Simplifying and standardizing are two related operational approaches (Wetherbe 1995). Simplifying requires reducing the complexity of the business processes. As the organization grows and adapts, processes are often modified and restructured. Unfortunately, the end result is typically more complexity and less efficiency. Another by-product of organizational growth is a lack of standard operating procedures. Standardization requires that everyone performing a particular process use the same, prescribed set of rules. The concepts of simplifying and standardizing provide the basis for the second major recommendation.

It was suggested by the project team that EBS establish a central help facility for customers. This introduces simplification by removing the complexity from the customers' process of obtaining electronic billing help. In addition, since the help function is centralized there is a guaranteed level of standardization. As a result, EBS did in fact launch a centralized customer service facility to handle electronic invoicing and remittance inquiries. Invoicing and remittance analysts who have been trained to handle all types of customer requests staff the service center. Customer satisfaction measures are expected to improve as a result.

**Informating.** “Informating” is an operational point of leverage used to reduce process cycle time. The underlying principle of "informating" is to make the necessary information available to those who need it, when they need it (Wetherbe 1995, Zuboff 1988). Organizations are finding it more and more necessary to provide the same types of information to various functional areas of an organization.
in order to be more competitive and responsive to customers. For example, a unified view of the customer, regardless of the business function, is critical for resolving customer requests or problems. Likewise, as a product moves through the development life cycle, it is important for various divisions to have access to the same product information.

It was stated earlier that no one function within EBS has a comprehensive view of the customer. Therefore, it was recommended that the invoicing and remittance analysts be provided with the necessary and complete customer level information required to respond to customer inquiries and problems. Approximately one month after this project was concluded, EBS implemented customer level error reporting. As a result, the remittance process cycle time has been reduced from 30 days to 5 days.

**Identifying.** The final point of leverage identified here is the identifying approach to cycle time reduction. Improvements in cycle time can be achieved by first identifying what the customer wants early in the process development and then providing the customer with what he wants. As a result, organizations typically find process time is reduced dramatically since the customer knows exactly what to expect and you are satisfying the customer’s needs in the beginning.

Due to the inherent obstacles in the implementation and utilization of traditional EDI, it was recommended that EBS complement the existing EDI with Internet based bill payment products. This was supported by the general move toward Internet based commerce activities by many firms, particularly small to medium sized businesses. The organization responded to this recommendation by introducing an Internet based invoice and remittance tool that provides small and medium sized customers access to electronic invoicing and remittance benefits without the challenges of traditional EDI. It is expected that this will provide a means for increasing the number of customers utilizing electronic invoicing and remittance.

**Conclusions**

This article reports the results of a successful cycle time reduction project. The Electronic Billing Services invoice and remittance structure and processes were effectively modified to bring about a reduction in the invoice adjustment cycle of electronic billing. Each of the recommendations presented by the project team differs in magnitude of effect and impact on the organization. However, taken as a whole, these initiatives will result in increased customer service, cost savings, and revenue enhancement. Continued attention to these opportunities for cycle time reduction will help this organization meet the challenge of growing their electronic remittance activity.
References


Mitzi G. Pitts, Ph.D., is an Assistant Professor of Management Information Systems in the F. She received her Ph.D. in Information Systems from the University of Maryland, Baltimore. Dr. Pitts prepares her students for careers in IT by emphasizing the development of technical, organizational, and problem solving skills in real-world project environments. Her research focuses on understanding the behavior of systems analysts during the development of information systems. Of particular interest are the communication processes between systems analysts and end-users. Dr. Pitts’ research and teaching benefit from her varied industry experience that includes extensive systems analysis and development for both large and small organizations.
### Tables and Figures

#### Table 1. Invoice and Remittance Transaction Costs: Paper versus EDI-based

<table>
<thead>
<tr>
<th>Cost Per Transaction (FY00)</th>
<th>Paper</th>
<th>EDI-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invoicing</td>
<td>$0.56</td>
<td>$0.45</td>
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<tr>
<td>Invoice adjustments</td>
<td>$3.62</td>
<td>$0.12</td>
</tr>
<tr>
<td>Remittance</td>
<td>$0.19</td>
<td>$0.02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$4.37</strong></td>
<td><strong>$0.59</strong></td>
</tr>
</tbody>
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#### Figure 1. EDI Remittance Volume Forecast

![Graph showing EDI remittance volume forecast]
Figure 2 - Electronic Invoicing and Remittance

- **Customer**
  - Person 1

- **Invoicing & Remittance**
  - Customer Set-up
  - Invoice
  - Accept
  - Remittance
  - Electronic Invoicing

- **Adjustments**
  - Adjustment procedure
Figure 3. EDI Total Unapplied Cash

Unapplied Cash $ (in millions)

Week Ending

1/21/00  2/5/00  2/20/00  3/6/00  3/21/00  4/5/00  4/20/00  5/5/00  5/20/00  6/4/00  6/19/00  7/4/00  7/19/00  8/3/00  8/18/00  9/2/00  9/17/00  10/2/00

Project

$18.2

$3.4