

# Reengineering as a Framework For Accounting Systems Study

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## Abstract

*Widespread criticism of the traditional accounting information system (AIS) suggests a significant opportunity for the next generation of AIS professionals – the reengineering of accounting processes. In this paper, the author describes how the reengineering framework can be used in the accounting systems curriculum to emphasize core business processes rather than tasks, identify opportunities for radically improving accounting processes, gain a basic understanding of the methodology of reengineering in an accounting context, and gain hands-on experience with reengineering in a real-world accounting application. Students learn to view the organization from the perspective of its core processes and distinguish them from tasks and financial transactions. Students learn to “think outside the box” by examining the process independent of old implementations and constraints. Students also learn to critically evaluate technological solutions by examining their impact on the process.*

## Introduction

Although accounting information systems (AIS) appear to have benefited immensely from advances in information technology, critics claim that the conceptual focus of such automated systems has essentially remained unchanged from their pencil-and-paper counterparts (Walker and Denna, 1997). Among the weaknesses often cited are high-level data aggregation, limited scope of transaction (event) characteristics, external reporting focus, and overly restrictive controls. Traditional AISs have also reinforced natural organizational disincentives and the tendency toward “stovepipe” organizations by attempting to assess performance across artificial boundaries and arbitrary time periods. Hollander, Denna, and Cherrington (1996, pp. 77-78) point out that

accounting has for many years been referred to as the *language of business*. Yet, as technology has changed, and business processes have grown, the AIS has become less and less descriptive of business processes.

As many companies reexamine their mission, they tend to shed non-core processes. Non-value added functions are eliminated while other services, considered necessary but not “core”, are out-sourced. Because accounting and finance activities have long been looked upon as non-value added, they are often targets of cutbacks and cost containment (Vollmers, 1997). Clearly accountants need the capability to preempt outside attempts to reengineer the accounting function.

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*Readers with comments or questions are encouraged to contact the author via e-mail.*

Many of the AIS shortcomings presented above suggest a significant opportunity

for the next generation of AIS professionals – the reengineering of accounting processes. In the following sections, the author describes how the reengineering framework can be used in the accounting systems curriculum to: (a) emphasize core business processes rather than tasks; (b) identify opportunities for radically improving accounting processes; (c) gain a basic understanding of the methodology of reengineering in an accounting context; and (d) gain hands-on experience with reengineering in a real-world accounting situation.

### **The Concept of Reengineering**

Reengineering is a radical management intervention that focuses on the redesign of core business processes. Proponents of this approach believe that the ineffectiveness of most organizational processes stems from a “division of labor” mentality held over from the industrial era production lines. These processes have become fragmented through over-specialization and spread across departmental boundaries. As a result, such processes require more effort to coordinate, and it is often difficult to determine who is responsible for the entire process. Reengineering advocates believe it is necessary to fundamentally rethink the process without being restricted (or influenced) by past process designs. Reengineering seeks to eliminate process fragmentation, thereby reducing handoffs and complex communications across departmental boundaries. At the same time, the process must address the issues of customer satisfaction. Work is organized around key business processes and performed in natural sequence at the appropriate location (Hammer and Champy, 1993). Nevertheless, reengineering has stirred controversy in some circles because it calls for the dismantling of the old system, and demands dramatic rather than incremental improvement.

### **Reengineering as an AIS Framework**

In his seminal article “The Third Wave Breaks on the Shores of Accounting,” Robert K.

Elliott describes the traditional accounting information system as an artifact of the industrial era. According to Elliott, industrial age organizations are characterized by rigid hierarchical management, focus on tangible assets and cost, and a tight control mentality (Elliott, 1992). Accounting systems developed to support such organizations reflect these characteristics through their account structures and reporting capabilities, typically providing a user view restricted to transactions affecting tangible assets and formats conforming to GAAP. Critics further point to the inflexibility of the traditional AIS to represent alternative business views.

Traditional AIS study tends to reinforce the departmentalized view of business transaction processing. Accounting educators need only to examine current AIS textbooks to find complex columnar flowcharts depicting highly departmentalized operations. Focus tends to be placed on the routing of transaction documentation and various control mechanisms (example: the three-way-match in the acquisition cycle) rather than coherent business processes. However, in defense of traditional AIS pedagogy, most organizations still behave as depicted in the textbook.

One suggested alternative is to have the accounting system mirror the business process instead of the functional organizational structure. Walker and Denna (1997) propose an event-driven approach to database modeling that focuses on the core organizational processes rather than traditional arms-length financial transactions. Using a relational database to capture the relevant events, resources, and agents (process partners or participants) an organization can capture information that can be used to support multiple views of the process, including the traditional financial view. The event-driven approach championed by Denna and his colleagues appears to have been influenced by reengineering and is consistent with the reengineering model.

New audit approaches such as the KPMG Business Measurement Process seek to

expand the view of the auditor to include the client's strategic processes (Bell, Marrs, Solomon, and Thomas, 1997). This monograph contrasts *the strategic systems lens* (view) with the more traditional transactions lens:

*Traditionally, auditors have assessed audit risk and tested significant accounting transactions using a transactions lens. As with a camera lens, a transactions lens frames the assessment within a narrow or limited field of view. Instead of focusing the auditor's attention on the broad business context surrounding the transactions...the transactions lens more narrowly focuses his attention on the transactions as stand-alone events, thereby increasing the risk that the auditor might misconstrue their context, meaning and purpose (Bell, et al., 1997, p. 20.)*

Bell, et al. argue that today's auditor should direct his or her inquiry using a strategic systems lens in which the auditor thinks in the context of the client's core business processes and how they relate to a firm's external environment. In other words, the financial statements should make sense in the context of the auditor's understanding of the client's core processes.

Many large organizations are integrating core business processes throughout the supply chain by implementing enterprise resource planning systems such as SAP R/3. These comprehensive systems assist organizations in re-engineering business practices, maintaining on-line communication and database linkages across the organization's supply chain. For example, the R/3 "business blueprint" provides a formalized methodology for engineering business processes and mapping them to the R/3 system. The set of standardized business processes captured by the R/3 software is intended to incorporate "best practice" based on SAP's more than 25 years of enterprise systems experience. The major consulting firms see the number of ERP implementations skyrocketing over the next several years (Jenson and Johnson, 1998).

The author asserts that accounting students need a lens through which they can view the core processes of an organization, assess their effectiveness, and bring appropriate information technology to bear in redesigning these processes. The author has employed re-engineering as an integral part of the conceptual framework for his graduate level accounting systems course over the past 3 years. The course uses reengineering as the *lens* by which accounting and information systems technologies are viewed and evaluated. In the view of the author, the reengineering model provides the following benefits:

Process emphasis: Students learn to view the organization from the perspective of its core processes. They soon learn how to recognize processes and distinguish them from tasks and financial transactions. Reengineering provides a method for designing coherent processes.

Fundamental redesign: Students learn to "think outside the box" by examining the process independent of old implementations and constraints.

Effective use of technology: Students learn to critically evaluate technological solutions by examining their impact on the process. Students learn to recognize solutions that merely "pave the cow paths."

Recognizing symptoms of broken processes: Broken processes usually manifest themselves through key symptoms, such as excess or complex communications, excess inventories, time delays, and customer dissatisfaction (Hammer and Champy, 1993). It is usually very easy for students to spot these symptoms during their site visits.

#### **Introducing Reengineering into the Graduate AIS Curriculum**

The masters level Accounting Information Systems course at Utah State University is designed to explore the impact of emerging in-

formation technology and management paradigms on accounting information systems. The texts for the course presently include *Reengineering the Corporation: A Manifesto for Business Revolution* (Hammer and Champy, 1993) and a locally published *Accounting Systems Anthology* (a collection of current journal readings compiled by the instructor). This anthology is revised and updated for each offering of the course to ensure that the latest materials are made available to students. A listing of the topics covered in the most recent offering is presented in Appendix A.

Reengineering topics make up the first four educational modules in the course. They include: (1) Reengineering the Corporation (Hammer and Champy, 1993), (2) Reengineering Case Study: The Travel Reimbursement System, (3) Reengineering the Accounting Information System, and Modeling Business Processes.

The first reengineering module focuses on the general principles of reengineering as presented by the Hammer and Champy (1993) book. This book describes the symptoms of broken business processes, their causes, and a normative methodology for process design. Several reengineering case studies of well-known organizations are also presented. In the second module, students are required to apply reengineering principles to diagnose and conceptually redesign an actual travel authorization and reimbursement system. The third module exposes students to readings from current accounting journals describing real-world cases of accounting reengineering. Finally, in the fourth module, students learn how to model event-driven information systems using entity-relationship diagrams. Throughout the remainder of the course, students use the reengineering "lens" to evaluate emerging technologies and management paradigms in the context of their accounting systems impact. In addition, student teams perform a walkthrough of a real-world business system and perform a conceptual reengineering of one of its processes. This activity is described in the fol-

lowing sections.

### Conducting the Student Reengineering Site Visits

Student teams arrange their own site visits with organizations for the purpose of conducting a mock reengineering intervention of an existing accounting application. Past projects have included applications such as accounts payable, time and billing, payroll, revenue and collections, and manufacturing. A letter from the instructor to the participating organization briefly outlines the objectives of reengineering project and emphasizes that this activity is purely an educational activity and should not be construed by either party as a consulting project (Appendix B). However, students may share project results with the companies if requested to do so. To avoid imposition on the companies, student teams are instructed to limit their contact to two visits: (1) a brief initial contact for purposes of arranging and setting the scope of the walk-through; and (2) the actual walkthrough visit. Students are asked to limit the actual walk-through to no more than 2 hours. The instructor also stresses that professional conduct and dress should always be observed. Students are expected to adhere to a strict timetable and to periodically report progress toward project completion (Appendix C).

Project teams use the framework described in *Reengineering the Corporation*, (Hammer and Champy, 1993). Consistent with the book, students are encouraged to take a fresh look at the application, trying not be constrained by the existing implementation. Students are also encouraged to be imaginative and to feel free to make a radical (Hammer and Champy, 1993) change. Students are warned against "paving cow paths."

Students are asked to document their reengineering interventions in the manner described here. First, describe how the team adapted the Hammer and Champy reengineering

concept to approach the reengineering of your application. Second, what symptoms does the application have that suggest the need for reengineering? (Examples: task fragmentation, overly specialized labor, too many handoffs, lack of attention to ultimate customer, pointless controls, non-value added processes, etc. Third, describe the reengineered application. What processes are eliminated? What processes are added? How is staffing effected? How will the application's customers be better served? What is the impact on internal control? What additional technology is required to implement the proposed solution? What time and cost savings can be expected? What productivity gains can be expected? Forth, prepare a before/after systems flowchart to reflect the reengineered application. Fifth, provide exhibits as appropriate (example: documents that would be eliminated or changed with the new process).

### **Examples from Student Team Reengineering Projects**

Student teams have had the opportunity to visit a wide variety of organizations in the course of their reengineering projects. They have included retail, service, manufacturing, education, software development, government, healthcare, construction, and ranching organizations. Brief examples from two of these team projects are provided in the following paragraphs.

One team focused on the revenue accounting office of a state funded developmental training school. In diagnosing this system, students noticed that cash receipts were being handled by an individual that was not required to do so, raising an internal control concern. They also found that revenue data were being entered as many as five or six times for various purposes (logs, registers, reports, etc.). The students determined that the existing system was too inflexible to meet the output needs of the various information customers, thus requiring the redundant entry of data. The students designed a con-


ceptual solution involving a bank deposit lock-box (to simplify mailroom cash receipt operations). Where the existing system required three employees to open mail and perform various tasks with the receipt data, the reengineered system requires one employee to perform all entry tasks. The data is entered only once into a database system that can accommodate flexible reporting requirements. The process also eliminated the task of writing receipts by hand and replaces it with computer generated documentation. Single entry of data virtually eliminates reconciliation - all outputs are generated from one set of data. Because the process is simplified with checks being sent directly to the bank, control mechanisms to document the various "hand-offs" were unnecessary.

Another team approached the reengineering of the billing / electronic payments process within a service bureau specializing in the processing of insurance claims. Essentially, this process involved billing healthcare providers for claims processing services. In their walk-through of this claims processor, students noted a lack of integration between the claims processing billing system and the firm's accounting system. Transaction files generated by the claims processing system were printed out and re-keyed into the accounting system. In addition to causing delays of several days to the billing process, several control steps had to be initiated to make sure that the re-keyed data matched the output from the claims processing software. The student's revised system combined several steps into one (formerly they were performed by multiple departments at multiple locations) and revised the claims processing system to process the provider's claims processing fees immediately and issue an electronic billing for such fees. This step also confirms to the provider that their claims transfer was received as was processed. The accounting system entries (accounts receivable and general ledger) are also generated at the same time and exported to the accounting system. The final results of the student team recommendations was to shorten the cycle time,

eliminate several stages of voluminous printouts, eliminate re-keying, and eliminated the need for several reconciliatory control steps.

Although participating organizations are cautioned that the reengineering projects are educational activities, and not actual consulting engagements, the organizations are usually very interested in the results, and frequently adopt portions of the student's process designs.

**Conclusion**

Accounting systems have come under attack for some time for failing to meeting the expectations of users in the area of core process support. It is clear that major improvements must be made to these systems. Accounting students must be given the tools to assess the effectiveness of the accounting processes they will operate as well the skills to radically improve such processes. Reengineering offers a process-oriented, customer centered approach to analyzing systems and information technology. As such, it can serve as an effective framework for evaluating the systems and technologies that students learn about in their AIS studies. 

**References**

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7. Walker, Kenton B., and Eric L. Denna, "A New Accounting System is Emerging," *Management Accounting*, Vol. 79, No. 1, pp. 22-31, 1997.

**Appendix A: Accounting Systems Topics Covered**

- ◆ Reengineering the Corporation
- ◆ Reengineering Case Study: The University Travel Reimbursement System
- ◆ Reengineering the Accounting Information System
- ◆ Modeling Business Processes
- ◆ Electronic Decision Makers
- ◆ Accounting Systems on the Web
- ◆ Electronic Commerce and the Internet
- ◆ Intranets, Network Computers and "Java"
- ◆ Web Security Issues
- ◆ Accountants and Information Technology Consulting
- ◆ Client Server/Data Warehousing
- ◆ Toward a Paperless Systems Environment
- ◆ The "Third Wave" and the New Assurance Services

**Appendix B: Letter to Participating Companies**

To Whom it May Concern:

As part of their class project, students in the Utah State University Accounting Information Systems class are required to make arrangements with the accounting (finance) department of a local company to observe (walk-through) an accounting-related application (or applications). The first phase of their project is to document

the processes observed. After completing their documentation of the existing application, students will go through a conceptual reengineering process using reengineering methods learned from their readings and classroom lectures. Please note that the second phase (the reengineering portion) is an academic exercise only, and will not require the participation of your company. However, if you are interested in the results of their activities, the students will be happy to share them with you. Nevertheless, I would emphasize that this activity should not be construed in any way to be an actual consulting engagement.

I have asked the students to limit their company visits to two: 1) a brief initial visit or telephone conversation to arrange the visit and determine the scope of the walk-through and how it will be conducted; and (2) the actual walk-through which should be limited to two hours. I have asked the students to complete their visits by \_\_\_\_\_.

Based on the favorable reactions of students who have been through such exercises before in my class, I believe that this activity will enhance the student's ability to understand and apply concepts in the challenging area of accounting information systems. Therefore, the students and I would be very grateful for your participation in this project.

**Appendix C: Project Schedule and Due Dates**

**May 9, 199X.** Memo from each group to instructor (1 page) describing company, its products and operating environment, the contact personnel, the application tentatively selected for review, and the planned strategy for conducting the walkthrough. Brief class presentation (5 minutes or less).

**May 30, 199X.** Walkthrough visit should be completed prior to this date. Progress report (1 page memo to instructor).

**June 13, 199X.** Reengineering progress report (1 page memo) describing preliminary findings.

**June 20, 199X.** Submit final documentation for project. Class presentation of findings.

