Implementation Management of an E-Commerce-Enabled Enterprise Information System

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INTRODUCTION

The integration of enterprise systems and the supply chain to an organization is becoming more critical in an ever-changing, globally competitive environment. Quick response will require close relationships, especially communications and information sharing among integrated internal functional groups as well as the suppliers and customers of an organization. Texas Instruments (TI), headquartered in Dallas, Texas, has come to realize this requirement for building and maintaining its competitive edge. Thus, it sought to implement an enterprise resource planning (ERP) system with a focus on linking it with a global electronic commerce (e-commerce) setting, an innovative and current issue (Weston, 2003).

There were a number of major players, including project management direction from Andersen Consulting Services, software vendors such as SAP and i2 Technologies, hardware vendors such as Sun Microsystems, and various suppliers and customers of TI.

The purpose of this case is to provide some aspects of implementation of strategic systems that provide valuable lessons for success. We begin and rely on the foundation of a strategic systems implementation model, which is initially described. A description of the case follows, with the various stages as related to strategic systems implementation described. We complete our discussion with implications and conclusions.

BACKGROUND

A process-oriented framework for ERP management is presented to help guide the discussion of this case (see Cliffe, 1998; Davenport, 1999; Miranda, 2002; Sarkis & Sundarraj, 2000).

The elements include the following:

- Strategy formulation and integration—One of the results of this step in the process is determination of an organization's core competencies that need specific technology support.
- Process planning and systems design—Also known as the reengineering phase, three studies are usually undertaken at this stage, and they are named AS-IS, SHOULD-BE, and TO-BE.
- System evaluation and justification—Here, analysis focuses on the economic, technical, and operational feasibility and justification of the system.
- System configuration—As a packaged software system, there are likely to be discrepancies (at the detailed level) between the needs of an organization and the features of the software. Hence, a significant amount of effort can be expected to configure the system or the organizational processes in order to produce an alignment between them.
- System implementation—The implementation stage can be classified into startup, project management, and a migration handing the switch over from the old to the new system.
- Postimplementation audit—This last "feedback" stage, although very important from a continuous-improvement perspective, is one of the more neglected steps.

As can be seen, the process suggested above can be arduous, but this necessary effort must be anticipated for the successful integration of complex and strategic systems into an organization.

IMPLEMENTING A GLOBAL ERP SYSTEM AT TI

Company Background

Texas Instruments Incorporated (TI) is a global semiconductor company and the world's leading designer and supplier of digital signal processing (DSP) solutions and

analog technologies (semiconductors represent 84% of TI's revenue base). The company has manufacturing or sales operations in more than 25 countries and, in 1999, derived in excess of 67% of its revenues from sales to locations outside the United States. Prior to the implementation of ERP, TI had a complex suite of stand-alone nonintegrated marketing, sales, logistics, and planning systems consisting of thousands of programs that were based on many independent databases and were running on proprietary mainframe systems.

OVERVIEW

Since the 1980s, TI had used a highly centralized infrastructure utilizing proprietary mainframe computers for meeting its IT requirement. As the first step toward global business processes, certain planning processes and systems were standardized in 1989. Starting in 1996, TI underwent a company-wide reengineering effort that led to the implementation of a 4-year, $250 million ERP system using Sun Microsystems' hardware platform, SAP AG's ERP software, i2's advanced planning tools, and Andersen Consulting's implementation process. In 1998, Texas Instruments implemented the first release of the ERP system, which primarily consisted of a prototype implementation of the i2 system running on a Sun E10000 platform. In early 1999, TI began rolling out the second release. In the middle of 1999, TI completed the i2 Technologies software implementation as part of the third release. Finally, TI turned on the remaining financials, and new field sales, sales, and distribution modules. A high-level architecture of TI's pioneering ERP implementation consists of SAP and the i2 system for advanced planning and optimization. The system is a pioneering large-scale global single-instance implementation of seven modules (finance, procurement and materials management, logistics, planning, field sales, sales, and marketing) for all of TI's divisions, and it is in use by 10,000 TI employees to handle 45,000 semiconductor devices and 120,000 orders per month. This solution also enabled global Web access to information for TI's 3,000 external users at customer, distributor, and supplier sites.

STAGES IN MANAGING THE GLOBAL ERP SYSTEM IMPLEMENTATION

Strategy Formulation

Traditionally, TI was primarily running what was called a "commodity" business, wherein orders were received, manufactured, and shipped as a batch. Mass customization combined with the maturity of TI's business caused it to reexamine its goals and strategies. TI started its shift toward a more customized product environment.

Within this new customized product environment, TI had a number of customer needs that could not be met easily. Thus, the goal was to determine the appropriate processes and information systems that must be put in place in order to support such agile design and manufacturing strategies. Another goal was a move toward supplier-managed inventory and customer-managed orders. Finally, standardizing systems was another integrative corporate goal. TI made extensive use of metrics. Strategic goals are translated into tactical and operational quantifiable objectives.

Process Planning and Systems Design

TI conducted a massive reengineering effort for the whole organization, with the goal of setting standard processes globally. The major result of this effort was to declare that all inventory and manufacturing management be done globally.

TI decided to implement a single-instance ERP system so as to fully leverage the system's capabilities to support the flexibility and standardization demanded by global processes. After site visits by major ERP vendors, TI selected SAP mostly because of its scalability to handle voluminous amounts of data.

System Justification

A budget of approximately $250 million was set for the implementation. The justification of the system was done using a combination of tangible and intangible factors at both the enterprise and business-unit levels. Standard hard-justification measures such as ROI and IRR were used to ensure the financial viability of the project.

Through this business case justification, acceptable financial returns, along with strategic factors such as competing effectively within a given niche market, and operational factors, such as global inventory management, all played roles in ERP's justification at TI.

System Configuration

The goals and processes entailed numerous and significant changes to all aspects of the business process design of the system.

Implementation

In this phase, concepts and goals were translated into tangible action, and as a result, it is perhaps one of most