Levels of Enterprise Integration: Study Using Case Analysis

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ABSTRACT

A primary objective of ERP is to integrate the various parts of a company. The articles proposes a six-level taxonomy of enterprise integration and discusses the ability of ERP to satisfy each of the six levels. We analyzed six well-known industry case studies that included IBM, Cisco, Tecktronic, Vandelay, China Holdings, and APD Manufacturing. We found evidence of the six levels of integration among the sample. APD and China Holding did not exhibit evidence of global integration, while the others did. System user (Level II) integration was missing from all except APD. Islands-of-technology integration seems no longer the dominant integration issue it was in the '80s. The dominant integration issues are functional integration, customer relationship management, and supply chain management.

Keywords: case studies; enterprise; ERP; islands of technology; levels of integration

INTRODUCTION

Today’s companies are subjected to many dynamic business forces including globalization, an increasingly volatile environment, fast changing customer demand, shorter product life cycle, increasing market diversity, higher knowledge intensity, operational transparency, up-to-the-minute online transactions, improved coordination, and rapid advances in information technology (IT) (Madnick, 1991; Scott-Morton, 1991). To mitigate these forces, companies resort to enterprise integration or business process reengineering. While ERP has lost some of its appeal as a comprehensive supply-chain management enabler (Saccomano, 1999), it is still the most sought after enterprise integration solution. It provides an integrated, comprehensive, updated, and realistic view of a company’s operation (Scalle & Cottelee, 1999; Sheu et al., 2003). Mabert et al. (2000) and Chalmeta et al. (2001) claim that the integration of a company through ERP improves company performance. This is why 70% of the Fortune 1000 companies have installed or experimented with ERP (Bingi et al., 1999) and the market may grow to $60 billion or more by 2004 (Callaway, 2000; Mabert et al., 2000).
ERP implementations are expensive (Mabert, 2000), involve considerable technical and financial risks, and the expected financial and business returns are very high. This is why CEOs and CFOs find it difficult to justify ERP expenditures when financial benefits are uncertain (Davenport, 1998; Deutsch, 1998; Sheu et al., 2003). Thus, it is important to understand the risks of using ERP as an enabler of integration because it has not always lived up to its reputation (Mabert, 2000). Two reasons are that it disrupts the business processes (Kremers et al., 2000; Scheer et al., 2000; Soh et al., 2000) and threatens corporate culture (Hasselbring, 2000). Disappointing ERP results (Gatiker, 2002; Saccomano, 1999; Scheer et al., 2000; Schulz, 2000; Markus et al., 2000) and intractable implementations are well known (Davenport, 1998; Deutsch, 1998; Sheu, 2003). Consequently, we decided to explore if various levels of enterprise integration exist in organizations and how effective ERP is in achieving them.

To satisfy our research objectives, we define six levels of enterprise integration and discuss the role of ERP. We then analyze six industry case studies for exploratory evidence of the six levels of integration. The published case studies used in this research serve as a reality substitute for industry practice, which is a widely accepted research method (Grant, 2002; Grant et al., 2003; Sheu et al., 2003). The evidence gleaned from the cases provides impetus for a larger, scientific study.

The rest of the article is organized as follows. The second section is a literature review of integration. The third section defines ERP and integration. A model of enterprise integration is proposed in the fourth section. The fifth section is an analysis of six case studies. The sixth section is a summary, including the limitations of the article. The article concludes with implications for future research.

**LITERATURE REVIEW OF INTEGRATION**

According to Mathew (1986), the primary components to be integrated in a manufacturing system are management information systems (MIS), computer-aided design (CAD), and computer-aided manufacturing (CAM). The components of MIS are master scheduling and control, distribution management, accounting and finance. CAM consists of process planning and control, process automation, and shop floor management. CAD consists of conceptualization, analysis, visualization and detailing. The primary vehicle for integrating the three components of integration is an integrated database. The article provides a starting point for discussing integration, but it has some limitations. First, major and necessary components of information systems such as decision support systems (DSS), office information systems (OIS), and expert systems (ES) that are required for management decision-making are missing. These components are now known as business intelligence (BI) in ERP packages. Second, there is no discussion of integration at the organizational level: that is, how well integrated islands of technologies support the stated organizational goals and objectives. Third, integration is confined to the internal organization and ignores the external environment that includes integration between geographically dispersed sites, and alliances between different companies. It also ignores the ability of multinational companies to effectively conduct business across diverse cultures, time, and geography. Finally, it does not consider in-
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