

Complementary controls and ERP implementation success

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Abstract

Many organisations have sought to improve their competitiveness by investing in advanced information technology, such as Enterprise Resource Planning (ERP) systems. They have implemented ERP systems for a variety of reasons, including solving year 2000 issues, reengineering business processes, and facilitating e-business. The implementation of an ERP system and associated changes in business processes, however, is not straightforward. ERP implementation projects are but another example of an information systems development project that needs to be controlled, yet the implementation of an ERP system is significantly different than a traditional system implementation. Control can be exerted by both formal and informal means [Kirsch, L.J., V. Sambamurthy, D-G. Ko, and R.L. Purvis. 2002. Controlling information systems development projects: The view from the client. *Management Science*. 48(4): 484–498]. Research has demonstrated that single modes of control are not sufficient, rather that a portfolio of control modes should be utilized. We expand upon this concept and suggest that this need for a mix of overlapping and redundant control mechanisms identified in the literature is explained through the use of the theory of complementarity [Milgrom, P. and J. Roberts. 1990. The economics of modern manufacturing: Technology, strategy and organization. *American Economic Review* 80: 511–528; Milgrom, P. and J. Roberts. 1994. Comparing equilibria. *American Economic Review* 84: 441–459; Milgrom, P. and J. Roberts. 1995. Complementarities and fit: Strategy, structure, and organizational change in manufacturing. *Journal of Accounting and Economics*. 19: 179–208; Topkis, D.M. 1998. *Supermodularity and Complementarity*. Princeton University Press]. Surveys of chief information officers and internal auditors were conducted to obtain data on the controls used in ERP implementations. We find that

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groups of complementary controls need to be employed in the implementation of ERP systems to achieve a successful implementation.

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1. Introduction

As markets become more competitive, organisations seek new business opportunities to enhance their competitiveness. Often, organisations focus on improving their agility, i.e., the speed at which they can respond to consumers, improve service, enhance product quality and improve production efficiency. It is commonly accepted that information technology should be used to fundamentally change the business (Davenport, 2000). Many organisations, therefore, seek to improve their competitiveness by utilizing advanced information technology, such as Enterprise Resource Planning (ERP) systems.

The implementation of an ERP system, however, is not an easy task. It is a major project and as such requires the organisation to pay attention to a variety of stakeholders (e.g., management, information systems professionals, line workers, consultants, and trading partners) and the management of their motivations and expectations (Sambamurthy and Kirsch, 2000). Without sound management and control of both the implementation process and the organisational changes, an ERP system implementation can be a difficult and risky process (see, for example, Cameron and Meyer, 1998; Davenport, 1998; Deutsch, 1998; O'Leary, 2000).

ERP implementations differ from traditional systems analysis and design projects in scale, complexity, organisational impact, user participation, cost and business impact (Bagchi et al., 2003; Grabski et al., 2001). ERP implementations typically impact the entire organisation and are generally associated with business process reengineering (Davenport, 2000). Traditional analysis and design projects generally minimized business process reengineering, with the software written to match current business processes; whereas in ERP implementations software modifications are generally minimized, resulting in significant process and organisational changes. Costs associated with ERP projects are significantly higher than traditional projects, and failure can be devastating for an organisation (for example, the FoxMeyer Drugs bankruptcy (Hyde, in press; Scott, 1999)). Finally, the dynamics of user participation in the implementation of ERP systems are different than user participation in traditional systems development projects (Bagchi et al., 2003).

Even though ERP implementations are different than traditional systems design projects, creating this new enterprise information system requires technical processes, social processes, and controls similar to those utilized in traditional systems development projects. The acquisition, management and control of the technical skills and relationships among the diverse group of stakeholders are required (Beath and Orlikowski, 1994; Kirsch, 1997). Control of information systems development projects is different than other control environments (Kirsch, 1996). Evidence exists that client liaisons to systems development projects utilize a variety of control modes over the project leaders and teams depending upon the measurability of outcomes and understanding of the development process (Kirsch et al., 2002). There is also evidence that a portfolio of control modes is used in systems development projects (Boland, 1979; Orlikowski, 1991; Henderson and Lee, 1992; Kirsch, 1997). Unfortunately, the theory of portfolios of control modes does not completely explain the control portfolios utilized (Kirsch, 1997).

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