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Abstract

Enterprise Resource Planning systems that provide a packaged solution to data management problems across an enterprise are widely implemented in modern organisations. Ongoing efforts to deliver productive outcomes from implementing ERPs have ensured that this is an area of great interest to IS researchers and practitioners. This paper investigates the notion of ‘fit’ of ERP to organisation with respect to the integration of data, processes, systems and practices implicit in an ERP and the coupling between an organisation’s subsystems. The outcomes of an intensive case study of a challenged ERP implementation highlight some of the risks of introducing an ERP into an organisation which can be described as a loosely-coupled system.

Keywords: ERP, loose coupling, misfit, organisational fit, tight coupling

1. Introduction

Enterprise Resource Planning Systems (ERPs) are packaged (customisable) software applications, which aim to provide a fully integrated solution to major organisational data management problems. They support both core administrative functions, such as human resource management and accounting, as well as key business processes, such as warehousing, production, and client management (Rosemann 1999). ERPs are already well documented in the Information Systems literature as being difficult to implement within budget, within anticipated time frames and with functionality which is satisfactory to end users (Glover 1999; Mabert 2002). Understanding ERP implementation is an important issue for IS practitioners and researchers because they are a major financial and human investment for any organisation (Parr, Shanks et al. 1999; Davenport 2000) and impacts of poor implementation in any organisation are far reaching.

Some researchers have identified the importance of the fit between a packaged enterprise-wide system and the implementing organisation (Weill and Olson 1989; Willcocks and Griffiths 1994; Sumner 1999; Soh and Siew 2005). We are particularly interested in understanding how individual parts of the organisation interact, in the dependencies between them and in the level of ‘fit’ of a packaged ERP with that organisation.

One of the most powerful benefits claimed for ERP systems is integration (Davenport 2000). In order to achieve data and systems integration, business processes must be standardised and integrated across the organisation. The outcomes of attempts to integrate data, systems and business processes across an organisation will depend, in part, on the way that individual parts of the organization interact with each other prior to the ERP implementation. Identification of
internal organisational cohesiveness and interdependence between structural elements or units within an organisation (loose or tight coupling) as a basis of reflecting on the ‘fit’ of an ERP to an organisation is a topic that has not yet been widely explored by researchers. In this paper we use the lens of coupling to examine this relationship and its potential impacts on ERP implementations.

The influence of the fit of an ERP with an organisation’s historical coupling patterns is explored in a four-year in-depth case study observation of an ERP implementation in a large Australian service organisation. Firstly the paper reflects upon the notion of coupling and the nature of loosely coupled systems. We then explore some aspects of the fit between a loosely coupled organisational system and an ERP. The paper concludes by noting the impact of misfit of coupling in the implementation of a business transforming ERP in an organisation described as a loosely coupled system.

2. Loosely coupled systems

Coupling refers to internal organisational cohesiveness that reflects the structure of relationships and the degree of interdependence between organisational units (Orton and Weick 1990). Focusing on the relationship between autonomy (loose) and interdependence (tight) of coupling of elements or systems within an organisation, the language and concepts underpinning the idea of ‘loosely coupling’ were developed to explain the observable disunity, instability and non-responsiveness visible in the majority of organizations (Weick 1989). Systems that are uniquely identifiable but with only weak links between them can be described as ‘decoupled’ (Spender and Grinyer 1995). Loosely coupled systems are composed of elements or structures that have their own identity and are logically separate but which are impermanently or weakly related or coupled, depending on their common elements and their need for interaction. Loosely coupled systems are comprised of elements which are simultaneously recognizable as individual parts but which are responsive as a whole system, while, in contrast, a tightly coupled system can be identified by its cohesiveness and responsiveness as a whole, where the distinctiveness of the individual subsystems is less noticeable than the integrated whole (Firestone 1985; Spender and Grinyer 1995).

Although loosely coupled systems are characterised by minimal centralised control these organisations survive, and even thrive, in strongly competitive environments. Loosely coupled systems are robust and competitive due to the following characteristics:

- Adaptiveness: Being loosely coupled improves the organisation’s sensitivity to its environment because individuals are able to forge strong links into the external environment: they are sensitive to changes in that environment and free, within the organisational setting, to adapt quickly to those changes. This allows local adaptations and creative solutions to develop (Weick 1976).

- Flexibility and responsiveness: Strong relationships and partnerships with different groups of clients, together with capacity to quickly refocus activities in individual parts of the organisation, allows loosely coupled systems a high level of flexibility to respond to market needs (Weick 1989).

- Persistent and buffered: Although adaptable to externally generated drivers, the stand-alone and relatively independent nature of loosely coupled systems reduces risk to the whole organisational system by allowing breakdowns or failures to occur and be remediated without damaging the entire organizational system. Loosely coupled systems are often stable, enduring, resistant and slow to respond to change as a whole system. Often described as
persistent systems (Orton and Weick 1990), this characteristic also makes loosely coupled systems difficult environments for senior management to control and direct. Although slow to respond to change at the organisational level, loosely coupled systems effect change through mechanisms to adapt to, assimilate and accommodate change within individual parts of the organisational system (Orton and Weick 1990).

- Satisfying and effective: In addition, loose coupling allows individuals considerable freedom and self-determination to grow and adapt the business to the benefit of the organization as a whole (Orton and Weick 1990). They have considerable autonomy to experiment and to shape their work through more localised, devolved priority setting. There is little pressure to conform. Self-contained, authoritative workgroups facilitate supportive team environments. Effectiveness is supported by opportunities for experimentation and close relationships with clients. This freedom to respond quickly and creatively to client needs, together with strongly held shared values, all contribute to the effectiveness of loosely coupled systems and provide a satisfying, empowering work environment (Orton and Weick 1990).

Having briefly explored the characteristics of ‘coupling’ and the nature of a loosely coupled system, we now reflect upon the nature and coupling in an ERP.

3. Fit between an Organisation and an ERP

The literature provides many insights into the nature of organizations and the way they have been viewed over time. Morgan (1997) has identified metaphors for organizations, each of which are underpinned by a specific interpretation of organisational purpose and activity. Metaphors include viewing organisations mechanistically or bureaucratically, where they operate in a routinized, efficient, reliable and predictable way; scientifically, where responsibility for work shifted from the worker to management; as organisms in open and closed systems; as political or cultural systems or as psychic prisons and as chaotic, complex systems (Morgan 1997).

In relation to the development of a packaged ERP, a review of these metaphors highlights the number and range of inherent views, assumptions and biases - often unspoken and unrecognized - which underpin thinking about organizations. These views are translated, by ERP developers, into computer systems which support organisational operations. “Technology developers (not merely package developers) inscribe their vision or view of the world in the technology they create” (Soh and Siew 2005). The inscription of a particular vision of the nature of organisations and of the type of ‘best-practice’ processes in an ERP raises the issue of fit.

A strong focus on ‘fit’ theories or ‘contingency theories’ is evident in early IS literature (Weill and Olson 1989). There are also a number of areas of fit of a non-customised (vanilla) ERP to an individual organisation explored in the literature. Some compare ‘package embedded structures’ - such as those arising from a developer’s reference organisation’s practices, norms, country or industry regulations - with the implementing organisation’s structures that arise from the organisation’s specific history, experience, management decisions and preferences (Soh and Siew 2005). Davenport considers both business and technical factors in determining whether an ERP is a good fit for an organisation (Davenport 2000) and Sumner identifies task complexity and organisational capacity to redesign business processes as issues of fit (Sumner 2000).

We believe that an alternative lens for viewing an organisational system and its ‘fit’ with an ERP is coupling. This involves a comparison of the nature of the organisation, how it is shaped in response to its environment and with the inherent connections and coupling intrinsic in a vanilla ERP. What are the coupling characteristics of an ERP system and can it be described as loosely or tightly coupled?
• Integrated: Underpinned by a single database which supports a number of functional modules, one of the main benefits of an ERP is integration of core data from across the whole organisation (Parr, Shanks et al. 1999). An ERP implementation aims to consolidate data from previously isolated legacy systems (often located in individual organisational subunits) into one fully integrated management information system to support strategic decision making (Davenport 2000).

• Specified: Segmentation of an organisation’s activities and a detailed analysis of business processes, together with minute and detailed specification of procedural steps in every activity, is a key part of an ERP implementation (Kallinikos 2004). In addition, “knowing what” (declarative knowledge) in an activity is separated from “knowing how” (procedural knowledge) (Kallinikos 2004).

• Standardised: A major benefit of an ERP is the implementation of one standard way of carrying out all activities across the organisation. Often referred to as ‘best practice’ these standardised procedures are undertaken by individuals in standardised roles that have specific accountabilities.

The implementation of an ERP has the effect of tightening coupling, giving rise to possible misfits in loosely coupled organisations, as shown in Table 1.

<table>
<thead>
<tr>
<th>Attributes of a Loosely Coupled system</th>
<th>Attributes of ERPs</th>
<th>Analysis of Misfit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptiveness</td>
<td>Single way of carrying out each activity (compliance to procedural logic)</td>
<td>Vanilla ERP allows very limited opportunity for adaptation or workarounds to meet specific client needs</td>
</tr>
<tr>
<td>Flexibility &amp; Responsiveness</td>
<td>Minutely procedural and selective modes of participation limit flexibility</td>
<td>Specifying the procedural steps in every activity can limit flexibility to respond to client’s needs</td>
</tr>
<tr>
<td>Persistent and buffered</td>
<td>Integrated data across functional modules</td>
<td>Changes/ errors in core data have immediate impact on all functional modules across the whole organisation</td>
</tr>
<tr>
<td>Satisfying and Effective</td>
<td>Procedural vs declarative knowledge with standardisation of roles and accountabilities</td>
<td>Roles post-ERP implementation have reduced specialist expertise as the system implements rules embedded in procedural logic.</td>
</tr>
</tbody>
</table>

Table 1: Analysis of coupling misfit

4. Research Methodology

This research examines the influence of organisational coupling on an ERP implementation in a loosely coupled organisation. It is exploratory because the identification of internal organisational cohesiveness and interdependence between structural elements or systems within an organisation (loose or tight coupling) as a basis of reflecting on the ‘fit’ of an Enterprise Resource Planning System to an organisation is a new research topic and is yet to be explored in the IS literature.

A four year, single in-depth case study of a challenged implementation was chosen in order to develop the required depth of understanding of the complexities of ERP implementations and organisational coupling. Depth was especially important in understanding the nature and history of the coupling of systems. The need to understand the provenance of that coupling suggested that long-term engagement with one organisation would be an effective research strategy.

Direct observation of the interaction of key ERP stakeholders, in-depth unstructured field interviews and a comprehensive document review yielded a rich and complex set of data. Review of a large number of key internal and external documents such as internal reports, external
5. Some Findings and Discussion

5.1 Loose coupling at Coastal

The ERP implementation, broad in both scale and scope, in a large Australian service organisation (that we have called COASTAL) was selected. The implementation was neither a clear success nor total failure. Rather, it was a challenged implementation: one that ran over budget, is operational and supporting business processes, but not delivering full functionality. Prior to the implementation of the ERP, COASTAL was composed of several loosely coupled organisational units which operated very independently. Over a 20-year period they had built niches in separate markets, with some focusing on building the business through external partnerships with like organisations internationally, and others focusing on building strong links with local partners in Australia. The majority of processes and practices were developed and modified over time, within each unit, to support the unique aspects of the business of each one. The various support functions, such as marketing, planning, finance, and human resources were embedded within each unit and became specialised over time to support the specific business needs of each area. Entrepreneurial and risk taking activity was well rewarded, both financially and with promotion opportunities and organisational reward mechanisms reinforced individualistic, internally competitive behaviour.

5.2 Impetus for change

Just prior to the decision to implement an ERP, the external environment changed in several ways. Firstly, the period of unbridled growth slowed considerably as the market-place became much more competitive and clients became more discerning. Secondly, government reporting and compliance requirements became much more demanding and stringent. In addition, a government requirement for measurable, improved performance was a key driver.

There were also internal drivers for change. The organization had grown five-fold over a 20-year period. The loose coupling of organisational systems that had fostered that growth was no longer appropriate because these discrete systems began to compete with one another for a shrinking market. As the market softened and clients became more discerning, the quality of the service provided, and the efficiency with which it was delivered, came under close scrutiny from top management. The non-standard ways in which each of the loosely coupled systems recorded and reported their interactions with clients made it very difficult for top management to respond to the external pressures for change from both the client base and government.

Implementing an ERP was seen as a key mechanism for transforming the organisation: it was viewed as a way of embedding and operationalising organisational change. Separate legacy systems had been designed to automate routine paperwork processing and reporting relating to specific business activities, were no longer adequate tools for providing management with strategic information for decision making in a competitive environment. Top management at COASTAL wanted to explicitly embed the undocumented, tacit organisational knowledge of staff, in well-documented information structures and decision rules with the aim of improving control of corporate information. At COASTAL there were both internal and external
requirements for tighter coupling and control of certain formerly loosely coupled organizational systems. In the discussion which follows, interviewees’ feedback is italised.

5.3 Brief identification of some areas of coupling ‘misfit’

A key competitive advantage for COASTAL, due to it loosely coupled characteristics, was the ability of individuals to seek out new business and adapt legacy systems to meet individual clients’ needs. The ERP provided one way only of interacting with clients. “We didn’t ensure that the new practice and systems could support individual client needs in a competitive environment”.

Prior to ERP implementation staff at COASTAL had roles that were created to meet various business needs and which where a satisfying mix of routine activities and those which required more specialist expertise. Embedding that previously tacit specialist knowledge into ERP supported business rules and tightly coupling and standardizing roles across the organization reduced job satisfaction in many organisational units. “Management wanted the system to make the decisions - individuals who had previously made the decisions couldn’t / wouldn’t let go”. An analysis of the attitude of COASTAL staff to their work revealed that generally they took a broad view of their work activities in relation to the whole organisation unit and its strategic objectives. The place of individual activities and their relationship to the organisation, which was clear prior to implementation, became more obscure as activities were segmented and fragmented and reduced to a series of ‘screens’. This loss of organisational perspective reduced the satisfaction of staff and the competitiveness of COASTAL as individuals, who could no longer meet clients’ needs, felt disempowered.

“People (users) were trained up on discrete parts of the system and weren’t given an overview of the whole system. Even the trainers didn’t have a sense of how the whole system worked.”

A feature of loosely coupled systems is that within the organisation there are several means to the same end or individual units have considerable flexibility in the way they carry out business and the roles which are responsible for achieving those ends. This flexibility, provided by loose coupling, is completely incompatible with a tightly coupled ERP. “A major risk is to go into an implementation without a strong policy and procedural backbone when you are trying to put in a system based on consistent practice. We don’t even have a common language across the organization to describe our activities and work.”

“I just think the place has been run on multiple models of leadership and multiple models of business practice – that it’s a mess”

6. Conclusion and Future Research

This paper has focused on internal organisational factors that may increase the risks of implementing an ERP and the case study has drawn attention to an important influence on implementing an ERP. The fit between an ERP and the existing coupling patterns in an
organisation can impact implementation outcomes. At COASTAL, there was a fundamental misfit between the existing and long-established organisational coupling and that implicit in an ERP. Indeed, an ERP was deliberately selected to try to force changes in the coupling and to introduce tighter coupling between organisational units and activities. However this was a high-risk strategy given that loose coupling at COASTAL had developed over a long period and the entrenched cultural values of independence, flexibility and entrepreneurship had delivered such strategic benefits in the past. Driving business transformation and tighter organisational coupling primarily through the implementation of technology has specific risks in a loosely coupled system. The significant non-technical issues in loosely coupled systems - such as deeply embedded cultural mores, employee resistance to narrowing of roles and authority and loss of strategic advantage due to tighter coupling - also need to be addressed.

The nature and extent of coupling inherent within and between functions and their fit with the coupling imposed by a vanilla ERP implementation is an interesting area for further study. For practitioners, the findings at COASTAL indicate that implementing an ERP without additional attention to organisational coupling was a risky way to drive business transformation. This is an area that needs further research in diverse types of organisations having different forms and strengths of coupling. The single indepth case study employed in this research has provided the authors with an indepth understanding of organisational coupling and its fit with an ERP in a particular organisational setting. Further research with a focus on these themes in both loosely and tightly coupled systems implementing ERPs will provided a mechanism for extending and confirming our findings in other contexts.

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