Implementation of Discrete and Integrated IT: The Role of Organisational Structure and Culture

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ABSTRACT

Integrated organisational IT systems, such as enterprise resource planning (ERP), supply chain management (SCM) and digital manufacturing (DM), have promised and delivered substantial performance benefits to many adopting firms. However, implementations of such systems have tended to be problematic. ERP projects, in particular, are prone to cost and time overruns, not delivering anticipated benefits and often being abandoned before completion. While research has developed around IT implementation, this has focused mainly on standalone (or discrete), as opposed to integrated, IT systems. Within this literature, organisational (i.e., structural and cultural) characteristics have been found to influence implementation success. The key aims of this research are (a) to investigate the role of organisational characteristics in determining IT implementation success; (b) to determine whether their influence differs for integrated IT and discrete IT projects; and (c) to develop specific guidelines for managers of integrated IT implementations. An in-depth comparative case study of two IT projects was conducted within a major aerospace manufacturing company.

Keywords: Case Study, Integration Management, IT Implementation, IT Systems, Organisational Change

INTRODUCTION

ERP systems are part of a stream of IT which began with MRP and has evolved over the past 30 years (Table I). These integrated IT systems have promised substantial benefits, and many adopters have reported significant organisational improvements. However, implementations have tended to be problematic. ERP projects, in particular, have been prone to cost and time overruns, not delivering anticipated benefits, and have often been abandoned before completion (Somers & Nelson, 2001). Implementation success rates as low as 10 percent have been suggested (Ptak & Schragenheim, 1999). This is troubling, given the prevalence of ERP: it has disseminated much more widely than MRP or MRPII, with 38.5 percent of large UK businesses having implemented ERP by 2007 (ONS, 2008).

Research has attributed ERP implementation failures to high consultancy costs and dif-
ficulties in aligning ERP systems with existing business processes (Nah et al., 2001), among other factors. However, this insight has brought little improvement in failure rates (Zhang et al., 2005). Alongside research on ERP has been a broader literature on IT implementation. Dating from the 1960s, this research has focused on single, standalone (or ‘discrete’) IT systems such as word processing software (Davis et al., 1989) and expert systems (Leonard-Barton & Deschamps, 1988). A consistent finding throughout has been the importance of organisational (i.e., structural and cultural) characteristics for implementation success.

Central to this paper is the distinction between integrated IT and discrete IT. Integrated IT is any software which itself consists of a number of integrated modules serving multiple functions, or which directly integrates with existing functional systems (e.g., ERP, SCM). Discrete IT is defined here as any software which serves a single function and which, at the time of implementation, requires no integration with other functional systems (e.g., transport and logistics systems, CAD) (Table 2). This latter class of IT has become less common, as vendors increasingly offer integrated ‘suites’ of software in order to secure long term customer lock-in (Varian et al., 2004). Based on this distinction, and on inadequate explanation of the much higher failure rates of integrated IT projects, in this paper we examine the effect of organisational characteristics on the implementation of discrete and integrated IT. Our argument is that failure to recognise and manage the potential differences between discrete and integrated IT projects is a major source of failure. A comparative case study of one discrete and one integrated IT project was conducted within a major aerospace manufacturing company. The output—an optimum configuration of structure and culture for integrated IT implementation—is intended to support decision-making for current and future implementers of integrated IT.

The paper is part of a wider research agenda to compare all organisational influences on discrete and integrated IT implementation (i.e., influences beyond organisational structure and culture). Given this broad focus, the adoption of ideas and findings from diverse research streams (e.g., organisational culture, diffusion theory) was necessary. However, these are applied here only in the context of IT implementation, and the positioning and intended contribution of the paper is in the IT implementation literature (see Davis et al., 1989; Leonard-Barton & Deschamps, 1988).

Table 1. Major developments in integrated IT systems with dates and definitions

<table>
<thead>
<tr>
<th>IT System</th>
<th>Date</th>
<th>Description</th>
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<tr>
<td>MRP – Material Requirements Planning</td>
<td>1970s</td>
<td>Optimises production by coordinating production planning with both inventory and customer demand levels</td>
</tr>
<tr>
<td>MRPII – Manufacturing Resource Planning</td>
<td>1980s</td>
<td>As MRP, but integrates all functions involved in manufacturing, including finance, marketing, personnel, etc.</td>
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<tr>
<td>SCM – Supply Chain Management</td>
<td>1980s</td>
<td>Integrates upstream with suppliers so that all processes in supply chain are linked, from raw materials to end product</td>
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<tr>
<td>CRM – Customer Relationship Management</td>
<td>1990s</td>
<td>Standardises and integrates customer data across organisation for consistent, profitable customer relationships</td>
</tr>
<tr>
<td>ERP – Enterprise Resource Planning</td>
<td>1990s</td>
<td>Fully integrates all functions and activities across organisation under a common system/interface</td>
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</table>

CONCEPTUAL BACKGROUND

Reviews of the IT and ERP implementation literature (and of broader literatures around the adoption of new technology (NTA) and innovations) were carried out. All structural and cultural influences on adoption and implementation were drawn from each, creating a taxonomy of organisational influences on implementation,
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