Chapter 11
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.

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

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

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 difficulties 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.