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Journal of Strategic Information Systems 8 (1999) 157–187

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*Strategic  
Information  
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# Strategic context and patterns of IT infrastructure capability<sup>☆</sup>

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Accepted 23 September 1999

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## Abstract

The importance of a firm's information technology (IT) infrastructure capability is increasingly recognised as critical to firm competitiveness. Infrastructure is particularly important for firms in industries going through dynamic change, for firms reengineering their business processes and for those with multiple business units or extensive international or geographically dispersed operations. However, the notion of IT infrastructure is still evolving and there has been little empirically based research on the patterns of IT infrastructure capability across firms.

We develop the concept of IT infrastructure capability through identification of IT infrastructure services and measurement of reach and range in large, multi-business unit firms. Using empirical case research, we examine the patterns of IT infrastructure capability in 26 firms with diverse strategic contexts, including different industry bases, level of marketplace volatility, extent of business unit synergies and the nature of firm strategy formation processes. Data collection was based on a combination of quantitative and qualitative methods with multiple participants.

More extensive IT infrastructure capability is defined as a combination of more IT infrastructure services and more reach and range. More extensive IT infrastructure capability was found in firms where: (i) products changed quickly; (ii) attempts were made to identify and capture synergies across business units; (iii) there was greater integration of information and IT needs as part of planning processes; and (iv) there was greater emphasis on tracking the implementation of long term strategy. These findings have implications for both business and technology managers particularly in regard to how firms link strategy and IT infrastructure formation processes. © 1999 Elsevier Science B.V. All rights reserved.

**Keywords:** Information systems planning issues; Information systems investment; Information systems infrastructure; Information infrastructure; Business strategy

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<sup>☆</sup> An earlier version of this paper was presented at the 17th International Conference on Information Systems in December 1996 in Cleveland Ohio, where it won the Best Paper Award.

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## **1. The importance of information technology infrastructure**

Although there is no single universally accepted definition of business strategy (Mintzberg and Quinn, 1991) a number of scholars emphasise the importance of choice. Porter (1996) argues that competitive strategy is about being different requiring the choice of a different set of activities and capabilities to deliver a unique mix of values. Markides (1999) identifies three dimensions where firms must make these choices: who to target as customers, what products to offer and how to undertake the related activities efficiently. Core competencies are at the centre of these strategic choices (Hamel and Prahalad, 1989; Kay, 1993) to create and sustain advantages and implement effectively. Information technology (IT) infrastructure capability is a firm resource (Barney, 1991) and potential core competence that is difficult to imitate requiring a fusion of human and technical assets.

IT infrastructure is increasingly seen as a fundamental differentiator in the competitive performance of firms (McKenney, 1995). New competitive strategies (Boynton et al., 1993) and progression through higher levels of organisational transformation (Davidson and Movizzo, 1996) each require major IT infrastructure investments. IT infrastructure capabilities underpin the emergence of new organisational forms (Davidow and Malone, 1992), such as global virtual corporations (Miller et al., 1993), facilitate electronic commerce via the development of virtual value chains (Rayport and Sviokla, 1995) and are part of a firm's strategic choices (Porter, 1996; Markides, 1999). IT infrastructure capability is critical to globally competing firms (Clemons et al., 1989; Neo, 1991) to provide connectivity and integration.

IT infrastructure can be a significant barrier or enabler in the practical options available to planning and changing business processes (Grover et al., 1993; Wastell et al., 1994). The support of enabling technologies and platforms is an important contributor to successful business process change (Caron et al., 1994; Furey and Diorio, 1994). Cross functional process changes require a shift in the role of the IT function from being guardians of information systems to providing infrastructure support, particularly in the form of data management expertise (Dixon et al., 1994; Earl and Kuan, 1994) and connectivity across areas and computer platforms.

While the significance of IT infrastructure is now being recognised (Davenport and Linder, 1994), this is often as a by-product or retrospective analysis of the success of strategic initiatives or process change implementations. Knowledge of the value of IT infrastructure remains largely "in the realms of conjecture and anecdote" (Duncan 1995, p. 39).

In this paper, we develop the concept of IT infrastructure capability through identification of IT infrastructure services and measurement of reach and range (Keen, 1991; Keen and Cummins, 1994) in large multi-business unit firms. We examine the patterns of IT infrastructure capability in 26 firms with diverse strategic contexts, such as different industries, different strategic intents and different levels of synergies between business units. We compare the number and nature of services and the level of reach and range to understand patterns of IT infrastructure capability and discuss the implications for both business and IT management.

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