



**Chapter V**

# **Theoretical Justification For IT Infrastructure Investments**

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The strategic importance of building highly capable information technology (IT) infrastructure has become a crucial management issue of the 1990s and beyond. However, in spite of the numerous benefits attributed to IT infrastructure, these claims remain unsubstantiated. This problem is due, in part, to inadequate conceptualizations of IT infrastructure and its measurement as well as a lack of theoretical frameworks for explaining its impacts. To address these problems, this paper proposes a theoretical framework to justify the value-creating potential of IT infrastructure investments. First, we provide a conceptual framework that describes the nature of IT infrastructure and its related components. Next, we discuss the role of IT infrastructure as a competitive weapon and identify three areas where it may create strategic value for the firm: responsiveness, innovativeness, and economies of scope. For each area, specific theories are used and research propositions are developed to guide future infrastructure research.

The need for building a responsive information technology (IT) infrastructure has emerged as a critical IT management issue of the 1990s and beyond (Broadbent & Weill, 1997; Broadbent, Weill, O'Brian; Neo, 1996; Keen, 1991; Koch, 1997;

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Niederman, Brancheau, & Wetherbe, 1991; Sambamurthy & Zmud, 1992; Venkatraman, 1991; Weill & Broadbent, 1998).

An information technology infrastructure is vitally important to companies, particularly those in industries going through dynamic change, those re-engineering their business processes, and those with widely dispersed operations (Broadbent & Weill, 1997, p 77).

For many companies, IT infrastructure investments are long-term commitments that account for more than 50% of the IT budget and about 4% of revenues (Broadbent & Weill, 1997). Consequently, many argue that major infrastructure decisions warrant the attention of senior management (Broadbent & Weill; Davenport & Linder, 1994; Duncan, 1995; Koch, 1997; Koeller, 1994; Sambamurthy & Zmud, 1992).

Infrastructure is becoming too important to the company's survival to leave the decisions up to the IS department alone. CIOs can no longer afford to say, "Trust me, I'm managing the infrastructure." The numbers have simply gotten too big. (Koch, 1997, p. 6)

IT infrastructure has become vitally important as managers seek to insure standardization, compatibility, and interoperability among potentially diverse organizational information systems. Furthermore, the seemingly endless variety of hardware, operating systems, and application development tools have placed an added burden on IS managers to maintain a consistent IT architecture to avoid fragmented systems, lack of integration, or, as Lindquist (1992) refers to, "islands of automation." Consequently, the development of corporate IT infrastructure has become an urgent activity for many organizations to insure some degree of cohesiveness among the firm's diverse computers, operating systems, networks, core databases, and mission-critical applications (Niederman et al., 1991). Notwithstanding this, a heightened awareness by senior management of the competitive potential of IT infrastructure has contributed to its importance as a critical IT issue (Barney, 1986; Keen, 1991; Niederman et al.).

While numerous articles cite the value-creating potential of IT infrastructure (Campanelli, 1993; Cox, 1993; Rockart, 1988; Vincent, 1993), much of the evidence for infrastructure benefit lies in the realm of conjecture and anecdote (Duncan, 1995). Consequently, a clear theoretical framework for assessing the value-creating capabilities of IT infrastructure is lacking. To address this issue, we have undertaken to articulate how IT infrastructure creates value and then to provide theoretical arguments for substantiating these claims. Answers to such issues are critical to senior managers who face the daunting task of justifying infrastructure expenditures (CSC Index, 1993; Duncan; Markus & Soh, 1993; Parker & Benson, 1988). First, we provide a conceptual framework that describes the nature of IT infrastructure as a shared corporate resource composed of physical assets, intellectual assets, and IT standards. Next, we discuss the role of IT infrastructure as a competitive weapon and identify three areas where it may create strategic value for the firm. For each area, specific theories are elucidated to provide a theoretical basis for substantiating each of these IT infrastructure capabilities. Subsequent research

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