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# The Impact of IT Personnel Skills on IS Infrastructure and Competitive IS

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## ABSTRACT

*The knowledge and skills of information technology (IT) personnel have become of critical importance as the strategic value of IT in modern organizations has become apparent. In addition to technical skills traditionally expected of IT personnel, organizational, functional, and managerial skills have been increasingly cited as mandatory for these employees. This paper used a well-accepted typology of IT personnel knowledge and skills, and investigated its relationship to desirable technological traits in organizations and to technological variables that have been closely aligned to competitive advantage in organizations. This exploratory examination used the statistical technique of canonical correlation analysis to investigate the relationship between IT personnel knowledge and skills and the flexibility of information systems (IS) infrastructure. Additionally, the same technique was used to test the relationship between the knowledge and skills of these personnel and measures of IT contribution to competitive advantage. In both cases, the relationships were significant and positive. Implications of these findings and a call for further research into the strategic value of IT personnel knowledge and skills are discussed.*

*Keywords: productivity and competitiveness; canonical correlation; IT competitive advantage; construct measurement evaluation*

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## INTRODUCTION

Assessing the requisite knowledge and skills of information technology (IT) personnel has become of strategic importance as the value of IT has increased in modern organizations. In addition to technical skills traditionally expected of IT personnel, organizational, functional, and managerial skills are increasingly cited as mandatory

for these technical employees (Chang and King, 2000; Cougar et al., 1995; Darais et al., 2001; Dhillion and Lee, 2000, Lee et al., 1995; McMurtrey et al., 2002). Indeed, numerous research studies indicate that organizational and behavioral knowledge and skills are crucial to programmers, systems analysts, database administrators, and other IT personnel in the organizations of today (Chang and King, 2000; Cheney et

al., 1989; Darais et al., 2001; Dhillion and Lee, 2000; Lee et al., 1995; Leitheiser, 1992; McMurtrey et al., 2002; Nelson, 1991; Rockart et al., 1996; Ross et al., 1996; Tu et al., 2001; Watson et al., 1990). The IT curriculum, recommended through the collaborative efforts of professional organizations like ACM, AIS, DPMA, and ICIS, establishes organizational and managerial knowledge and skills as integral to the overall training of IT personnel (Couger et al., 1995; Darais et al., 2001; Dhillion and Lee, 2000). In the same way, the trade press promotes similar advice through articles alluding to the increased need of IT personnel to gain organizational, interpersonal, and managerial knowledge and skills (Fallon, 1997; *InfoWorld*, 1998; *Insurance & Technology*, 2003).

Recent research and practitioner literature stresses the value of a broad range of knowledge and skills for IT professionals in meeting the strategic requirements of modern organizations. To add value, IT professionals are called upon to blend technical skills with a deep understanding of the business, along with cultivating their interpersonal skills. However, empirical evidence that actually examines the relationship between IT personnel knowledge and skills with organizational success variables has not been reported in the research literature. This study attempts to fill this void by employing a well-accepted typology of IT personnel knowledge and skills to investigate relationships with desirable technological traits in organizations and technological variables that are closely aligned to competitive advantage.

Based on these relationships, this paper explores the strategic value of developing an IT organization with a broad set of skills; that is, an IT organization with technical, business, and interpersonal skills. Specifically, the study uses the multivari-

ate statistical technique, canonical correlation analysis, to explore the relationship between: (1) IT personnel knowledge and skills and the flexibility of the information infrastructure of organizations, and (2) IT personnel knowledge and skills and IT technology variables associated with enabling competitive advantage. This exploratory analysis should serve as a foundation for further research into the strategic value of IT personnel knowledge and skills. Additionally, the study should provide guidance to practitioners regarding recruiting, training, and promoting IT professionals.

## BACKGROUND

The literature related to IT personnel skills, technological infrastructure, and competitive advantage provides the conceptual basis for this study.

### IT Personnel Knowledge and Skills

Most of the literature examining IT personnel knowledge and skills focuses on the types of knowledge and skills that are required for these workers. The major debate in the literature is whether IT personnel require technical skills or managerial skills or both. The debate started as far back as the 1970s. Typically during the 1970s, researchers found that technical skills were paramount for IT programmers and systems analysts, with managerial and business skills being secondary (Anderson, 1969; Roark, 1976; Strout, 1971; White, 1970). This is understandable because, during this period, IT was not viewed as a strategic or a competitive weapon. The primary task for IT during this period was as a technical support function and little more.

In the 1980s, as IT became viewed more strategically (Porter & Millar, 1985;

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