Chapter 17
A Theoretical Investigation and Extension of a Model of Information Technology Architecture Maturity

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ABSTRACT
Organizations that lack a coherent strategy for managing and evolving their IT platform and resources end up with fragmentation within the organization. Because the need for data sharing and systems integration is not always limited to the internal organization, the boundaries between the organization and its customers, vendors, suppliers, and partners are often blurred. It appears to be evident that organizations must have a clear idea of where they stand in regards to their own Information Technology Architecture (ITA) before preparing to adopt a new, shared ITA. This paper applies the reach and range concept and theory associated with strategic information systems planning to conceptually position ITA as a concept that provides convergence of a variety of frameworks related to IT and business alignment.

INTRODUCTION
IT resources must be managed in an orderly, effective manner to successfully implement the IT strategy\(^1\) (Bradley & Byrd, 2007; Earl, 1989). This management can be facilitated by the development and utilization of an organizational architecture, specifically an Information Technology Architecture\(^2\) (ITA). ITA is a plan or model that guides the identification and utilization of the technical and human IT resources at the disposal of an organization (Curle, 1993; Hildebrand, 2000) that enable the organization to successfully accomplish its business objectives. Most IT functions see the development of an ITA “as an urgent priority if the organization’s needs are to be met efficiently and effectively most of the time” (Earl, 1989, p. 37). An ITA should provide organizations with

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the knowledge to utilize dynamic capabilities that would enable them to quickly adapt to changes in technology, their respective organization, their inter-organizational relationships and alliances, and their respective industry (Allen & Boynton, 1991). By exploiting the usefulness of an ITA, the occurrence of organization’s independent, mission critical systems and applications caught in a quagmire of inflexibility and “rigid business processes” (Hagel & Brown, 2001), which makes it difficult for an organization to adapt quickly to changes in the marketplace and strategic restructurings, can be minimized, if not avoided. The process of developing a more mature ITA is dynamic in nature, requiring continuous change (Henderson & Venkatraman, 1995). Such a task requires organizations to develop an even more sophisticated planning process that facilitates organizational learning and architectural competency as they evolve their ITA.

The purpose of this paper is to theoretically examine and conceptually extend Ross’ (2003) four-stage model of ITA competency and maturity. The four stages consist of the business silo stage, standardized technology stage, optimized core stage, and business modularity stage. Our examination and extension of her model highlights its intra-organizational scope of an ITA, and extends her model to include inter-organizational collaboration and communication, thus looking outside the organization. Presenting the ITA in such a manner contributes to answering Segars and Grover’s (1998) call for research to provide valuable insight into the evolutionary path of strategic information systems planning (SISP), in terms of the type of systems developed and implemented within particular evolutionary stages, and motivations for moving between stages. This evolutionary perspective of the ITA sets it apart from previous studies by expanding the scope of the ITA to include resources and relationships external to the organization. It is also our motive to present the proposed added benefits that come as a result of the development and implementation of an ITA grounded in the latter stages of ITA competency. This is accomplished by investigating ITA through Keen’s (1991) concept of reach and range and Segars and Grover’s (1998) strategic information systems planning (SISP) model. We use the concept of reach and range and each construct of the SISP model as theoretical lenses to view conceptually the intricacies of the latter stages of enterprise IT competency.

LITERATURE REVIEW

Prior research related to organizational architectures focused on subject areas closely related to ITA (i.e. IT infrastructure, information architecture, and information systems architecture) but very little on the subject itself. For instance, a review of the academic literature indicates that a considerable amount of research exists in the subject areas of IT infrastructure (Broadbent, 1999; Byrd, Lewis, & Bradley, 2006; Byrd & Turner, 2000; Duncan, 1995), information architecture (IA) (Allen & Boynton, 1991; Evernden & Evernden, 2003; Farnum, 2002; Niederman, Brancheau, & Wetherbe, 1991; Periasamy & Feeny, 1997; Pervan, 1998), and information systems architecture (ISA) (Brown et al., 2000; Gifford, 1992; Hackathorn & Karimi, 1988; Sowa & Zachman, 1992), whereas only Curle (1993), Gibson (1994), and more recently Ross (2003), Ross, Weill, & Robertson (2006), and Bradley & Byrd (2007) focus primarily on ITA.

The focus of Curle’s (1993) research of ITA was limited to the development of an ITA. Gibson’s (1994) research of ITA centered around the empirical testing and validation of four generic architectural types. The generic architectural types discussed by Gibson (1994) were not treated as linear growth stages, rather he suggested that a single architectural type is most appropriate for a given situation. The information provided by Curle (1993) and Gibson (1994), though vital, does not appear to provide insight as to the value