

# Chapter 16

## Service–Oriented Architecture Adoption: A Normative Decision Model for Timing and Approach

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### ABSTRACT

*Service-oriented architecture (SOA) have been adopted by organizations in a wide variety of industries, however, best practices have still yet to mature. This article, which is part of a larger study on SOA, develops a normative decision model introducing key factors that influence the timing and approach of adopting a SOA. The decision model is based on the results of multiple case studies of organizations that had either employed or were considering implementing a service-oriented architecture project. The results indicate that there are four main areas an information technology (IT) manager needs to assess to determine when and how to move towards a SOA: the maturity of relevant standards, the technology gap, the organizational gap, and the nature of the benefits expected from a SOA. Analyzing these results suggest that differences in the business environment need to be considered in the decision of when and how an IT manager should pursue the move to a service-oriented architecture.*

### INTRODUCTION

Organizations are often searching for best practices to follow as guidance before adopting technologies. Oftentimes, especially with novel or innovative technologies, such practices either do not

exist or are not readily accessible. Without best practices or exemplars of successful adoptions in hand, organizations struggle facing a sometimes steep and daunting learning curve. In some of those instances, these challenges that are faced ultimately lead to failure. A service-oriented architecture (SOA) is one of those recent technology

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approaches that have received a wide amount of attention regarding its advantages, such as its ability to improve the flexibility of an organization's technology architecture and utilizing an approach that is based on open, cross-platform standards. Despite these benefits, there are many organizations worldwide that have been reluctant to adopt (Sholler, 2008). This unwillingness by organizations is in sharp contrast to the many predictions that SOA would be pervasive in industry by now. The objective of this research is to further examine the process organizations follow in pursuit of a SOA adoption to gain a deeper understanding of this surprising reluctance amongst organizations. The primary contribution of this research is that we present a normative decision model, based on the results of multiple case studies, which can guide information technology (IT) managers to determine their approach and timing of moving towards a SOA.

To develop an understanding of the challenges that organizations face pursuing a SOA project, interviews took place with multiple individuals from eight organizations that either employed a project utilizing Web services or were considering developing a SOA based on Web services. Data was collected during a period of time when adoption of SOA was not commonplace and reasonably could be perceived among organizations as either a novel or innovative technology. Based on those interview results, we developed a normative decision model containing key considerations for organizations in the process of moving towards a SOA based on Web service standards. We next present a literature review for this research to provide further background for a SOA followed by a discussion of the research methodology. We then identify four key areas that an IT manager should consider in determining when and how to move to SOA, based on case evidence. The paper concludes with a discussion of its limitations and proposed future work.

## LITERATURE REVIEW

The technology of interest in this research is a service-oriented IT architecture. The researchers chose this particular technology to develop a decision-making framework for because many experts had anticipated SOA to be widespread in industry by today, but this has yet to occur. For example, the widely cited Gartner 2008 hype cycle for emerging technologies (Fenn et al., 2008) expected Web services to be viewed as fairly mature and reaching the "plateau of productivity," with SOA reaching the "slope of enlightenment". Despite these predictions and the wide attention that SOA has received in the trade press, best practices for SOA are not commonplace (Gootzit et al., 2008). It is true that SOA adoption overall is increasing, but it is occurring at a pace much slower than initially anticipated (Sholler, 2008). Part of this hesitance might be attributed to the lack of formal best practices identified in the academic literature for IT managers to follow.

ASOA is best described as a means for building software applications that use available services in a network (Papazoglou, 2008). It is a way to both organize and utilize distributed capabilities under the control of different ownership domains (MacKenzie, Laskey, McCabe, Brown, & Metz, 2006; Tang & Cheng, 2006, 2007). Although a SOA supports various communication protocols, protocols based on open standards are commonly used in modern SOA implementations (Erl, 2006; Papazoglou, 2008). Most large SOAs will provide access to services with a mix of technologies that are not necessarily based on the WS-\*<sup>1</sup> standards. Thus, open standards are not the only way that a SOA may be implemented. Web services based on WS-\* standards, however, are at the core of the integration products of the major vendors, including IBM, SAP, and Oracle. Furthermore, recent industry surveys suggest that WS-\* standards remain the prevalent underlying technology standard for the major SOA platforms (Sholler,

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