Chapter 7.12
Challenges for Deploying Web Services–Based E–Business Systems in SMEs

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ABSTRACT
E-business initiative in many companies had started in the 1990s. These companies have recently begun to explore the use of Web Services (WS) technologies within their e-business context, since they provide an attractive, language-neutral, environment-neutral programming model that accelerates application development and integration inside and outside the enterprise. Despite these advantages, companies are slow to deploy WS because it requires a considerable shift in their application development process. While a few studies have reported on some of the reasons for this wait-and-see approach, a thorough and systematic investigation of the challenges from the stakeholders’ — providers, consumers, and standards organizations — perspective is needed. This study addresses that and provides a framework for studying the factors that impact the deployment and use of WS. The framework is used to analyze small and medium-sized enterprises (SMEs), as they play a vital role in generating employment opportunity and turnover within many major economies globally.

INTRODUCTION
The e-business initiative in many companies had started in the 1990s. The first generation e-business application, with a business-to-consumer (B2C) focus, had simple Web sites with databases and forms for buying and selling online products. Subsequently, the second generation e-business application, with a business-to-business (B2B) focus, had Web sites that were fully integrated with backend systems — consisting of the major
A Web service is thus a self-contained and self-described modular element of an application that can be published, located, and invoked across the Web. Based on existing and emerging standards such as HTTP, XML (Extensible Markup Language), SOAP (Simple Object Access Protocol), WSDL (Web Services Description Language), and UDDI (Universal Description, Discovery and Integration Service), WS provide significant opportunities for technical and business innovation (Arsanjani, Hailpern, Martin, & Tarr, 2003; Maruyama, 2002). Since the WS technologies provide a language-neutral, environment-neutral programming model that accelerates application development and integration inside and outside the enterprise, they encourage an approach to application development that is evolutionary, building on investments previously made within an IT organization, and developing new capabilities incrementally (Khalaf, 2002; Rust & Kannan, 2003).

Because of this potential to enable a new paradigm for enterprise application development and deployment, companies have recently begun to explore the use of WS technologies within their e-business context (Hagel, 2002). The integration of WS into e-business provides several business benefits that include lowering costs, improving application sharing, increasing flexibility, streamlining business processes, and opportunity to create innovative business models among others. However, there are a few obstacles that need to be overcome before widespread adoption of WS into e-business is realized (Tilley, Gerdes, Hamilton, Huang, Miller, Smith, & Wong, 2004). They include security, availability, reliability, and performance of WS-based e-business systems.

WS-based e-business systems are currently in the early phase of adoption, primarily within large organizations that have well-established IT infrastructures and technically savvy staff (Chen, Chen, & Shao, 2003). Most of these organizations are experimenting with WS for application integration and developing innovative