A Framework for Assessing Enterprise-Wide SOA Implementation Readiness

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ABSTRACT

Many vendors have acclaimed Service Oriented Architecture (SOA) as a better way to design and build enterprise-wide information systems (EWIS). While these claims may be true in the private sector, there is scant evidence in the literature for the same success in the public sector. The adoption of Enterprise-wide SOA (ESOA) as the dominant development paradigm within an organization often requires significant organizational changes, which are difficult to achieve in the public sector, with its strict hierarchies and departmental independence. Although many government departments are beginning to adopt this new paradigm, the literature does not provide a suitable ESOA implementation readiness framework for use in the public sector. This research proposes a framework based on Critical Success Factors (CSFs) and a CSF scorecard to evaluate an organisation’s ESOA implementation readiness. The framework and scorecard were tested in a test case in the Malaysian government, and the results validate the accuracy and usefulness of both the CSF Framework and the CSF Scorecard.

Keywords: Critical Success Factor (CSF), Enterprise-wide Information Systems (EWIS), Enterprise-wide SOA Implementation, Public Sector, Service Oriented Architecture (SOA)

INTRODUCTION

In recent years, the literature has claimed that Service Oriented Architecture (SOA) is a better way to design and build enterprise-wide information systems (EWIS) (Krafzig, Banke, & Slama, 2005; Rosen, Lublinsky, Smith, & Balcer, 2008). SOA is a development paradigm which decomposes business functionality into a set of interoperable services that can be re-used in multiple EWIS across an organisation. Thus, a major goal of SOA is to maximise the reuse of existing services (Schepers, Iacob, & Van Eck, 2008; Müller et al., 2009) thus reducing both costs and development time for new application, and supporting business agility. Instances of services are also used to improve interoperability platforms between E-Government services.
B2B intermediaries in supply change (Pflugler, 2012) and virtual collaboration between organisations in cloud computing (Dollmann et al., 2011). Although potential benefits of SOA are frequently cited, the transformation of SOA into real benefits is difficult (Becker, Buxmann, & Widjaja, 2009). There is some debate on whether SOA should be adopted bottom-up, starting with few systems and expanding from there, or top-down, by effective control of SOA governance, with SOA becoming the dominant paradigm across the whole enterprise (Hau, Ebert, Hochstein, & Brenner, 2008; Marks, 2008; Rosen et al., 2008). Regardless of which approach is chosen, an organisation must adopt SOA across the whole enterprise i.e. Enterprise-wide SOA (ESOA) (Marks, 2008; Veger, 2008). In this study, ESOA is defined as both an architectural and development paradigm for building and implementing systems of systems, which are integrated on multiple levels (unit, component, system of systems) to support core business process and administrative areas of the entire enterprise (Sathish, Pan, & Raman, 2003; Ali, Petersen, & Mäntylä, 2012). ESOA adoption in this manner will produce a large-scale EWIS (Rosen et al., 2008) from loosely-coupled, interoperable components (services), to improve flexibility and reuse (Oh, Leong, Teo, & Ravichandran, 2007) of services.

However, organisational implementation of ESOA is still poorly understood (Luthria & Rabhi, 2008; Geric & Vrcek, 2009; Lee, Shim, & Kim, 2010). ESOA is much harder to implement than SOA because it assumes a willingness by units within the enterprise to share with other units those services that were developed for their own needs (Arsanjani, Zhang, Ellis, Allam, & Channabasavaiah, 2007). ESOA implementation also requires managers to agree on collective funding to support common service infrastructure (Becker et al., 2009). A Gartner study confirms that less than 25% of enterprises have the organisational maturity or technical skills to deliver ESOA, and blames inadequate SOA governance for many ESOA project failures (Müller et al., 2009).

To use ESOA effectively, enterprises need to identify and select appropriate services for sharing or reuse for the entire enterprise. Orchestration of multiple services to support a value chain across a federation of enterprises often requires collaboration and integration of cross-boundary platforms and multiple stakeholders (Brown & Carpenter, 2004). Some researchers recommend changing organisational structure in order to leverage the service concept. For example, Bieberstein, Bose, Walker, and Lynch (2005) argue for a flexible, agile enterprise structure based on core, team-based services to improve collaboration across business units. However, it would be difficult to implement such changes in the public sector where organisational structures are usually static and rigidly hierarchical (McAdam & Donaghy, 1997).

To succeed in ESOA, an organisation must adopt the best practices of SOA governance. Some researchers (Bloomberg, 2005; Afshar, 2007; Open Group, 2009) argue that SOA governance is the application of SOA to high-level IT governance. However, most SOA governance frameworks are either too focussed on governance activities or governance of service lifecycle issues (Marks, 2008; Hojaji & Shirazi, 2010). Others claim that over-emphasis on SOA governance may increase bureaucracy in the organisation (Schepers et al., 2008). A SOA maturity approach emphasises incremental SOA implementation until the enterprise is mature or accumulates sufficient SOA technical knowledge to adopt ESOA. For example, the enterprise should begin from the bottom-up with initial attempts to build basic SOA solutions and gradually progress to enterprise service messaging, such as an Enterprise Service Bus (ESB) before adopting enterprise process integration of ESOA (Arsanjani et al., 2007).

Although this approach sounds feasible, it would take a long time and would be unsuitable when an organisation must deliver ESOA quickly. Furthermore, this method only focuses on technological readiness with ESOA (Bloomberg, 2005), which is not enough because most problems associated with ESOA are organisational (Veger, 2008).
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