ENTERPRISE ARCHITECTURE SERVICE PROVISION: PATHWAYS TO VALUE

Research in Progress

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Abstract

Enterprise architecture (EA) provides a blueprint of an organisation's current and desirable future IT infrastructure, systems, data, processes and capabilities, together with a roadmap for achieving the desirable future state. Despite significant interest and investment in EA, organisations still have difficulty articulating the business benefits of EA. In this research in progress paper we conceptualise EA as a service provision function within organisations, rather than an artefact. Using the Resource-Based Theory (RBT), we propose a research model that explains how EA service provision capabilities enhance three types of organisational capability: planning capability, project delivery capability and operating platform capability, to create value. We define the model based on an extensive analysis of the literature and on nineteen interviews with EA experts. The model forms the basis for future empirical work including focus groups, case studies and a survey.

Keywords: Enterprise architecture, Service provision, Capabilities, Business value.

1 Introduction

Enterprise Architecture (EA) defines the current and desirable future states of an organisation's data, process and information technology (IT) systems and provides a roadmap for achieving this target from the current state (Ross et al. 2006; Tamm et al. 2011; Zachman 1987). Enterprise Architecture Services (EAS) enact business strategy by guiding the building of the IT systems, databases and digitized processes that support or automate an organisation's core business processes (Ross et al. 2006). Organisations world-wide are on track to spend $3.7 trillion in 2014 on IT, increasing at an annual rate of 2.1% into the future (Gartner 2014). EAS play an important role in ensuring that such IT investments deliver value in alignment with business strategy (Gartner 2011).

There is strong anecdotal evidence that EA provides value to organisations. For example, the EA team of a leading Australian bank delivered cost savings in excess of $200 million (1.4% of the company's operating expenditure) through IT asset rationalisation and reuse (Burns et al. 2009). In a large-scale Australian IT-enabled business transformation program, the EA team helped the organization to avoid

more than $20 million in costs in the first year of the program alone (about 2% of the total cost of the five-year program) through the identification of synergies and reuse opportunities (Tamm 2012).

Despite these and other examples of the organisational importance and impact of EA (Burns et al. 2009; Tamm 2012), the benefits and value of EA generally remains a poorly understood and under-researched topic. According to Gartner (2011, p.7), "enterprise architects have struggled with the challenge and problem of articulating the business value of EA for years". Despite anecdotal examples of success, organisations find it difficult to justify their EA investments (Obitz and Babu K 2009). A clear understanding of the business outcomes and measures of benefits for EAS is required and, when provided, "will resonate with business leaders" (Gartner 2011, p. 7).

Although there has been much work on EA content and representation for many years (see for example Bernard 2012; Ross et al. 2006; Zachman 1987), research on EA benefits has only recently started to emerge, providing tentative evidence for the positive impact of EA on project outcomes (Foorthuis et al. 2012) and exploring the factors (Lange et al. 2012; Tamm 2012) and mechanisms (Tamm 2012) that explain how EA delivers organisational benefits.

In this paper, we build on the work of Tamm (2012) and propose a model that explains how organisations achieve benefits with EA. We extend the concept of EA to EA service provision, by conceptualising EA as a service provision function that leads to organisational value. This is important as EA is often perceived as an artifact while it also has process and service dimensions (Lange et al. 2012). The service provision perspective reflects the EA teams' broader role not only as the producer of EA documentation but also as the provider of internal advisory services related to the formulation and implementation of IT-enabled business strategies (Tamm 2012).

The paper is organised as follows. We first discuss the background of the study, including enterprise architecture (EA), the value that EA can provide to organisations and Resource-Based Theory RBT. Next, we discuss the research approach used in the study. We then propose the EA service provision model that explains how and why organisations achieve benefits with EA, grounded in RBT (Barney 1991). We provide definitions for concepts and propositions in the model, based on relevant literature and nineteen expert interviews. Finally we conclude the paper and present directions for future research.

2 Background

In this section we review three relevant areas of the literature and highlight a knowledge gap. First, we discuss EA and conceptualise EA as a service provision function. Then we discuss the value that EA can provide to organisations. Finally, we discuss RBT as a useful high-level theory for understanding how EA creates organisational value.

2.1 Enterprise Architecture as Service Provision

Enterprise Architecture (EA) has been traditionally conceptualised as a collection of artefacts that represent an organisation's business systems and IT systems, together with a planning process for documenting these systems (Ross et al. 2006). EA includes details about an organisations processes, capabilities, data, application systems and IT infrastructure using a variety of standardised representation techniques (Kaisler et al. 2005). Enterprise architects typically define the current and future states of an organisation's business systems and IT systems, and provide a roadmap for achieving the transformation between them (Tamm et al. 2011). EA enables the alignment of an organisation's business strategy with its IT strategy and has become important in IS planning in large organisations globally (Ross et al. 2006; Tamm et al. 2011; Zachman 1987).

Many methodologies and standards have evolved that reflect this traditional perspective such as the Open Group Architecture Framework (TOGAF) and The Zachman Framework. However, the EA as a collection of artefacts by itself will not bring value to organisations. How it is used to deliver services

to improve the overall organisations' performance is what matters. Therefore, the concept of EA service provision has been recently highlighted in the EA literature (Lange et al. 2012a; Tamm 2012). EA service provision can be defined as the extent to which organisational strategic decision-makers are provided with relevant, timely and high-quality information and advice about an organisation's current and planned business systems and IT systems (Tamm 2012). Recently, the importance of delivering an advisory service to organisations based on the EA has been acknowledged (Lange et al. 2012a; Niemi and Pekkola 2009; Tamm 2012). Since the concept of EA service provision is relatively new and unexplored, understanding what services can be expected from the EA and how these services deliver valuable outcomes for organisations would be a contribution to the literature.

2.2 Enterprise Architecture and Organisational Value

Although there is strong anecdotal evidence that EA provides value to organisations, enterprise architects continue to have difficulty in articulating the value of EA and justifying investment in EA within organisations (Obitz and Babu K 2009). Examples of value achieved from EA include reduced costs through less duplication of effort (Chan et al. 2006; Kearns and Lederer 2003), increased revenues through better use of customer information (Davenport et al. 2010) and improved quality and reliability of product and service delivery through process optimisation (Davenport and Short 1990). However, there is currently limited systematic and theoretical explanation of how EA brings value to organisations, although there are a number of emerging projects (e.g., Boucharas et al. 2010a,b; Foorthuis et al. 2010; Lange et al. 2012a,b; Tamm et al. 2011). We address this gap in current knowledge by asking the research question:

> *How does enterprise architecture service provision bring value to organisations?*

We argue that conceptualising EA as a service provision function is crucial to understanding how EA can bring value to organisations and embed the concept of EA service provision in RBT, which is widely used by IS researchers to understand and explain how IT leads to organisational value (Wade and Hulland 2004).

2.3 Resource-Based Theory

In RBT, organisations are conceptualised as bundles of resources (Barney 1991; Wade and Hulland 2004). Organisational success and performance is contingent on a subset of these resources, that are valuable, rare, inimitable and have the support of the organisation (VRIO) (Barney 1997). These *resources* may be tangible or intangible, and comprise *assets* and *capabilities*. *Assets* include IT hardware and software, data and people, while *capabilities* include organisational processes and routines that utilise assets in order to perform a task. While many assets are readily available and some are commodities, superior organisational performance can be largely attributed to the unique and valuable capabilities that enable organisations to perform activities more effectively and efficiently than their competitors (Amit and Schoemaker 1993).

A capability is *valuable* when it enables an organisation to devise and implement strategies that will improve its efficiency and effectiveness (Barney 1991) by exploiting opportunities or neutralising threats. Organisations need to have valuable capabilities simply to survive (Barney 1997). *Rare* capabilities are scarce and not possessed by an organisation's competitors. *Inimitable* capabilities are expensive to imitate and provide organisations with significant cost advantage to organisations trying to develop or duplicate the capability. Capabilities that are valuable, rare and inimitable can provide competitive advantage to an organisation (Barney 1997). *Organisational* support, including funding and strong management support, is necessary for capabilities that are valuable, rare and inimitable to provide *sustained* competitive advantage (Barney 1997).

3 Research Approach

The research question is being investigated by developing and then refining an EA service provision model. The initial phase involved extending the model and work of Tamm (2012) using an extensive analysis of current literature and through the application of an RBT lens. Relevant papers were identified from key information systems journals and conferences using the term 'enterprise architecture'. We also searched relevant practitioner conferences and white papers as the concept is constantly being refined through practitioner use and reflection. The initial set of papers numbered over 100 and the list was refined by determining if value or benefits (and synonyms) were mentioned in the papers. We then conducted twenty face-to-face interviews with EA experts. Using expert interviews enables the work to be grounded in current practice and interviewees were selected based on their experience and the industry sectors in which they worked. Table 1 below provides a summary of the profile of the interviewees.

Semi-structured interviews were used to balance the need to gather data related to concepts in the research model, together with the ability to follow up with interviewees on relevant matters (Myers and Neuman 2007). An interview protocol was developed based on the concepts and propositions in the model, together with several more open questions about EA and organisational value in general. The average duration of an interview was one hour. Where permission was granted, interviews were recorded and transcribed. Otherwise the researchers present took detailed notes. Thematic content analysis was used to analyse the interview data (Braun and Clarke 2006). Outcomes of interview data analysis were used to refine and enhance the concepts and propositions in the EA services provision model (see Figure 1 below).

No.	Industry	Org. size, Expertise, Team	No.	Industry	Org. size, Expertise, Team
1	Retail	> 25000, 35 years, 4 in EA	11	Retail	> 100000, 25 years, 4 EA
2	Diversified	> 3500, 20 years, 6 in EA	12	Retail	> 12000, 20 years, no team
3	Finance	> 6500, 35 years, 2 in EA	13	Health	> 15000, 10 years, 1 EA
4	Telecoms.	> 3000, 35 years, 4 in EA	14	Mining	> 128000, 15 years, 5 in EA
5	Finance	> 4000, 30 years, 26 in EA	15	Government	> 3000, 30 years, 6 in EA
6	Government	> 64000, 30 years, 8 in EA	16	Finance	> 300, 30 years, 6 in EA
7	Retail	> 198000, 25 years, 9 in EA	17	Utility	> 2500, 25 years, 5 in EA
8	Manufacturing	>16000, 35 years, 1 in EA	18	Telecoms	> 40000, 15 years, 12 in EA
9	Finance	> 42000, 30 years, 20 in EA	19	Finance	> 47000, 15 years, 13 in EA
10	Government	> 34000, 30 years, 20 in EA	20	IT Hardware & Software	>30,000, 12 years, 6 in EA

Table 1.   Interviewee Information.

4 An Enterprise Architecture Service Provision Model

In the research model (see Figure 1 below), we use the 'process view' of RBT and argue that EA service provision resources are associated with business value indirectly via EA-enabled organisational capabilities (Pang et al. 2014). This perspective is important for managers as they can utilize EA services provision resources to develop other organisational capabilities that, in turn, create business value. EA service provision is conceptualised as an organisational resource, comprising EA assets and EA capabilities. EA assets and EA capabilities each contribute to the development of better EA enabled organisational capabilities. Furthermore, when EA assets and capabilities interact with each other synergistically, higher-level EA service provision capabilities emerge (Asadi Someh and Shanks 2013; Nevo and Wade 2010). The EA service provision resources influence three types of EA-enabled or-

ganisational capabilities: planning, operating platform and project delivery capabilities. The planning and operating platform capabilities influence organisational-level business value, and the project delivery capabilities influence project-level business value. We now provide detailed definitions of the concepts and propositions in the model.
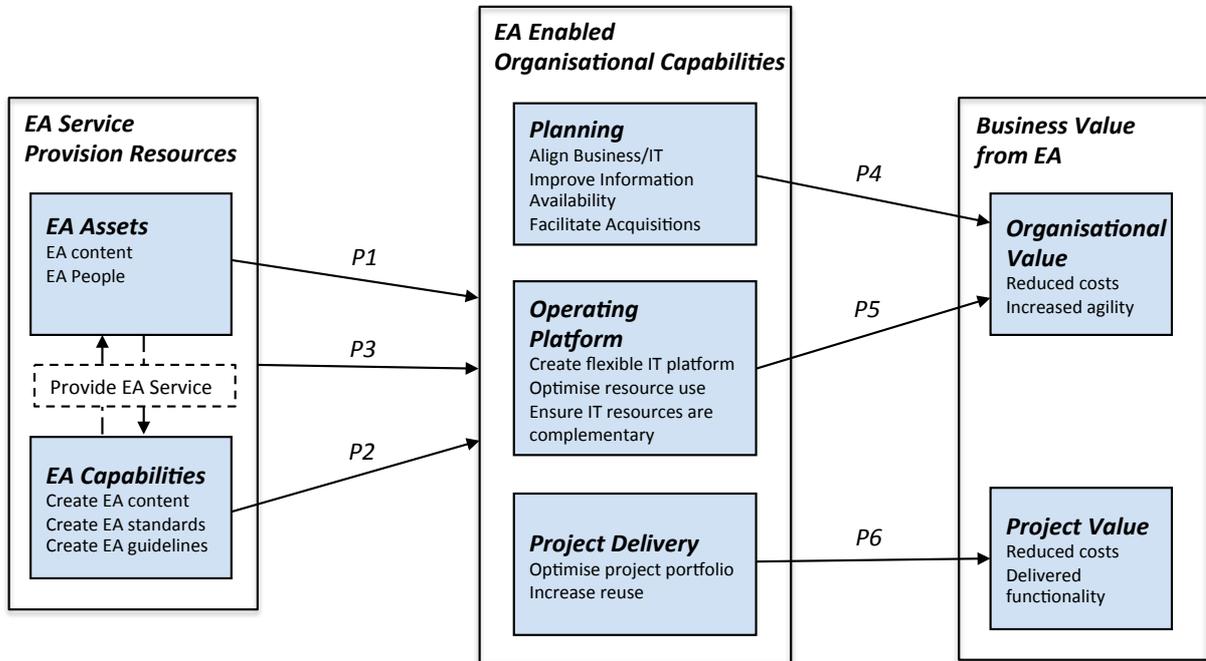

Figure 1.   Enterprise Architecture Service Provision Model

4.1 EA Service Provision Resources

EA service provision resources comprise EA assets and EA capabilities. EA assets include both EA content and EA people. *EA content* comprises principles, standards, and representations of business processes, capabilities, data, IT applications and IT infrastructure, for both the current state of the organisation and the desired future state of the organisation, together with a roadmap for the transformation between them. The EA current representations should be complete, accurate and up to date and the desired future state representation should align with the organisational business strategy (Lange et al. 2012). The EA experts emphasised the importance of high quality content, with a particular emphasis on the importance of business capability models, rather than technical models.

> "The key is we've come up with a capability model. So far every business unit that we've taken through it have loved it". (Expert 2)

> "We do an investment overlay on the capability model and they can see where the money is going, where the money is getting spent. And then, when you put the heat map on it, you can see whether it's being spent on the right areas". (Expert 2)

EA people include the members of the EA team, together with their skills and knowledge, including EA representation skills, IT knowledge, business knowledge and excellent communication skills (Frampton and Ho 2009). The EA experts emphasised the communication skills of the EAs.

> "The most important characteristic of an enterprise architect … is the ability to be able to connect with people and develop trust". (Expert 14)

EA capabilities include the ability to create and maintain EA content, standards and guidelines. The processes and routines to create EA content include communicating with business and IT stakeholders,

then abstracting and representing the content. Because business context and strategic directions change and evolve, creating EA content is an ongoing process. Similarly, the processes and routines to create EA standards and guidelines involve extensive communication with stakeholders and the inclusion of external industry standards and guidelines.

> "We broke that down then into roadmaps that were underpinned with business cases, costs, benefits etc". (Expert 19)

> "An architect really needs to be someone who's right there at every leadership meeting, and is actively participating at the highest levels. … And just because someone's got a software engineering background does not mean that they have the skill set to be able to participate at that level… That architect [has] to skill up on their EQ and communication skills to be able to effectively work as an architect". (Expert 13)

Higher-level *EA service provision* capabilities emerge from the synergistic interaction of EA assets and capabilities (Asadi Someh and Shanks 2013). When high quality EA content, people, processes and routines interact and mutually reinforce each other, the ability to provide service within the organisations emerges. Synergy is enabled when EA assets and capabilities fit well, work seamlessly together and have the strong support of management in order to achieve strategic goals. Synergy is also realised when the EA assets and capabilities complement and reinforce each other (Asadi Someh and Shanks 2013). Synergy between the EA team and other organisational capabilities is important in achieving value from EA.

> "What people are starting to realise here is that there is a synergy between Enterprise Architecture and ICT planning for those two groups to get together, because Enterprise Architecture can provide the structure, more structure around ICT planning than a bunch of people who do ICT planning without any reference to architecture". (Expert 13)

> "It's very much a trusted advisory service to the CIO". (Expert 14)

4.2   EA Enabled Organisational Capabilities

EA enabled organisational capabilities comprise planning, operating platform and project delivery capabilities. EA enabled *planning* capabilities include the ability to align IT and business, to improve information availability for strategic decision-making and to facilitate acquisitions (Johnson et al. 2007). EA enables *business-IT alignment* through the process of creating the EA content when enterprise architects and business people meet and iteratively develop the EA content, leading to mutual understanding. EA provides *information* about an organisation's capability, IT systems and processes that can help managers to make better, more evidence-based decisions about investments in organisational transformation (Bernard 2012). EA helps *facilitate acquisitions* of other businesses, which is a key growth strategy for many organisations. EA may be used in the selection of potential acquisitions, the integration of the acquired organisation, and the evaluation of the success of the acquisition (Yetton et al. 2013).

> "Around three thousand users … get news and dashboards updates [about EA content] … and then we report to the IT management group". (Expert 7)

> "We have models that acquisitions use and we have analysis that they use". (Expert 7)

> "People are realising that you can't have effective ICT planning without having architects intrinsically involved in the entire process". (Expert 13).

Operating platform capabilities include the ability to create a flexible IT platform, to optimise resource use and to ensure IT resources are complementary (Tamm et al. 2011). EA enables the organisation to *create a flexible IT platform* by disaggregating complex monolithic systems and providing information about dependencies between components (Ross et al. 2006). EA enables the organisation to *optimise resource use* by analysing existing systems to identify overlaps and resource gaps, leading to a more standardised and integrated operating platform (Ross et al. 2006). EA enables the organisa-

tion to *ensure that IT resources are complementary* by identifying opportunities for synergy between IT resources (Tamm 2012).

> "[We] get increased value by repeatability around standardisation and quality". (Expert 3)

Project delivery capabilities include the ability to *optimise the project portfolio* and to *increase reuse*. EA enables the organisation to optimise the project portfolio by providing information about interdependencies between projects that leads to improved prioritisation of projects and avoidance of duplication (Lange et al. 2012). EA enables the organisation to increase reuse by establishing a high quality solution architecture practice, and clear standards and guidelines (Lange et al. 2012).

> "… the planning and decision-making behind the foundation pieces … to be sure that we can reuse everything we've done" (Expert 13)

> "So basically, it balanced the IT budget but also took over these people's mindset of doing silo projects". (Expert 3)

We argue that EA assets and EA capabilities will each separately contribute to better EA enabled organisational capabilities. Furthermore, their synergistic interaction will lead to emergent EA service provision capabilities that will contribute to better EA enabled organisational capabilities. Based on the discussion above we define three propositions.

> P1   Organisations with higher levels of EA Assets will also have better EA Enabled Organisational Capabilities.
>
> P2   Organisations with higher levels of EA Capabilities will also have better EA Enabled Organisational Capabilities.
>
> P3   Organisations with higher levels of EA Service Provision will also have better EA Enabled Organisational Capabilities.

4.3   Business Value from EA

Business value from EA comprises organisational value and project value. *Organisational value* includes reduced costs and increased agility. Improved resource utilisation will lead to greater economies of scale and reduced IT licensing, maintenance and support costs (Ross et al. 2006). Improved flexibility of the operating platform will lead to increased agility, and the ability to respond to environmental forces more effectively and efficiently (Tamm 2012).

> "The current tangible was that we've reduced the cost of doing our IT strategy by about 1.5 million dollars". (Expert 7)

We argue that better EA enabled planning capabilities and better EA enabled operating platform capabilities will lead to increased organisational-level value, and therefore define two propositions relating to organisational value.

> P4   Organisations with higher levels of EA Enabled Planning Capabilities will also have higher Organisational Value.
>
> P5   Organisations with higher levels of EA Operating Platform Capabilities will also have higher Organisational Value.

Project value includes reduced costs and delivered functionality. Specifically, improved project prioritisation and avoidance of duplication will lead to more efficient project execution and cost savings (Lange et al. 2012). Further, increased reuse and the use of solution architecture examples, together with clear standards and guidelines, will lead to improved delivered functionality (Foorthuis et al. 2010).

> *"So once you start getting that* [the roadmap]*, you actually allocate the resources into the right area where you will get the* benefit *of it"*. (Expert 3)

> "*We took all this* [top 5 priorities of business capability] *through in the project and mapped those capabilities and guess what, 280 projects have fallen out of their priority. … save a few million dollars".* (Expert 17)

We argue that better EA enabled project delivery capabilities will lead to increased project-level value, and therefore define one proposition relating to project value.

> P6 Organisations with higher levels of EA Project Delivery Capabilities will also have higher Project Value.

5 Conclusion and Further Research

This paper has conceptualised EA as a service provision function and proposed a model that explains how EA service provision resources are associated with business value indirectly via EA-enabled organisational capabilities. We have identified three pathways to value from EA: better planning capability, better project delivery capability and better operating platform capability. Specifically, the paper has contributed to the literature on enterprise architecture by providing detailed definitions of concepts and propositions in the model, grounded in RBT and expert practitioner interviews. Managers can use the model to better understand how to create an EA service provision function and the pathways by which EA service provision can create value at both the organisational level and at the project level. This is a research in progress paper, and future research plans include focus groups to further refine the model, case studies to better understand the concepts and the mechanisms underlying the propositions in the model, and a survey to develop detailed measures for concepts and test the model.

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