FACTORS INFLUENCING THE ENGAGEMENT BETWEEN ENTERPRISE ARCHITECTS AND STAKEHOLDERS IN ENTERPRISE ARCHITECTURE DEVELOPMENT

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FACTORS INFLUENCING THE ENGAGEMENT BETWEEN ENTERPRISE ARCHITECTS AND STAKEHOLDERS IN ENTERPRISE ARCHITECTURE DEVELOPMENT

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Abstract

The development of Enterprise Architecture (EA) is facing several challenges. The highly referenced challenges in literature are related to enterprise architects and stakeholders. The enterprise architects and the stakeholders are the main actors in EA development. However, there are limited studies that cover the relationship of the enterprise architects and the stakeholders. The purpose of this paper is to identify the factors characterizing the engagement of enterprise architects and the stakeholders in EA development. The study used a systematic literature review (SLR) as a method to identify the factors and proposing an initial engagement model. The SLR revealed 12 factors that influence the engagement between the enterprise architect and the stakeholders. These factors are organized using the multiple perspective theory under three perspectives namely; technical, organizational and personal that comprise the initial engagement model. The study is contributing by shedding the light on the key aspects of engagement factors between the enterprise architects and the stakeholders in the development of EA. Furthermore, it is an initial step towards developing the engagement framework by comprehending these key aspects.

Keywords: Enterprise Architecture (EA), Enterprise Architects, Stakeholders, Multiple Perspectives Theory, Systematic Literature Review (SLR)
INTRODUCTION

Improving Business IT Alignment (BITA) is the highest referenced driver for organizations to adopt Enterprise Architecture (EA) (Akhigbe et al. 2014; Drews & Schirmer 2014; Jamróz et al. 2014; Rouhani et al. 2015). In fact, BITA is ranked as a top priority in the agenda of IS management (Birkmeier et al. 2013). Furthermore, the challenges of IT advancements, dynamic business environment, frequent changes and competition are evident in the large organizations (Lantow 2014). The improvement in BITA is expected to be achieved through the analysis and the architecture of the business processes, the information flow resulting from these processes, the required applications to execute the processes and the needed IT infrastructure to run the applications (Alaeddini & Salekfard 2013). These architectures are governed through a set of roles and authority to guide the decision making process that addresses various stakeholders’ needs (Espinosa et al. 2011). Lankhorst defines EA as “A coherent whole of principals, methods, and models that are used in the design and realization of an enterprise's organizational structure, business processes, information systems and infrastructure” (Lankhorst 2009, p. 149).

Based on Gartner predictions, 40% of EA programs would be terminated by 2012 (Gosselt 2012). Furthermore, Gartner reported the top 10 EA pitfalls that hinder the effectiveness of EA initiatives among them: wrong selection of architect leader, insufficient stakeholders awareness, not engage business, restricting architecture scope to IT, lack of communication and governance (Gosselt 2012). Additionally, Rotterdam University conducted a survey in 2008 that shows 66% failure of EA initiatives (Gosselt 2012).

Extensive literature has discussed the existence of challenges facing the development of EA. This includes value demonstration challenges (Nakakawa et al. 2013; Zijl & Belle 2014), stakeholders management challenges (Nakakawa et al. 2013), organizational challenges (Iyamu & Mphahlele 2014) and modeling challenges (Buckl et al. 2011). Additionally, the interaction between enterprise architects and the stakeholders impacts the activities and the acceptance of EA (Buckl et al. 2011; Chuang & van Loggerenberg 2010; Fallmyr & Bygstad, 2014; Farwick et al. 2014). The enterprise architects are responsible of collecting information about EA (Buckl et al. 2010a). They evolve the EA through a set of models and play the role of managing, communicating, leading and modeling (Clark et al. 2014; Gotze 2013). The Open Group define EA stakeholder as “an individual, team, or organization (or classes thereof) with interests in, or concerns relative to, the outcome of the architecture” (Azvedo et al. 2011, p. 29). For the purpose of this study, the stakeholders are defined as individuals who are collaborating with the enterprise architects to build a shared understanding and agreement on EA models.

The enterprise architects are confronted with difficulties while interacting with the stakeholders. The collaboration between the enterprise architects and the stakeholders is one of the common difficulties in EA development because both the architects and stakeholders should have a shared understanding of the organization problem and the required solution to overcome it (Nakakawa et al. 2011). Chuang & van Loggerenberg (2010) and Du Perez et al. (2014) clarified that the enterprise architects tend to use technical modeling terms but the stakeholders are expecting business-oriented discussion. So the differences between the two worldviews lead to inability to collaborate (Du Preez et al. 2014). On the other hand, there are challenges caused by the enterprise architects. The wrong interpretation of stakeholders’ concerns and requirements plays a role in stakeholder dissatisfaction (Farwick et al. 2014). The non-involvement of key stakeholders especially in the initiation phase leads to a lack of buy-in (Nakakawa et al. 2011). Furthermore, the misalignment between EA activities with the stakeholders’ interests can discourage the stakeholders from participating effectively (Buckl et al. 2011).

Overall, there is scarcity of studies that uncover the factors dominating the engagement between the enterprise architects and the EA stakeholders. The acknowledgement of these factors is expected to help addressing the challenges facing the engagement between the two

1
parties. This is aligned with the recommendations from Buckl et al. (2010b) who explained the need for a systematic approach or a model that guides the engagement between the enterprise architects and the stakeholders. Hence, this paper is part of ongoing research that aims to develop an engagement framework that can be utilized by enterprise architects to engage effectively with EA stakeholders. The scope of this paper is to develop a model covering key aspects of factors impacting the engagement between the enterprise architects and the stakeholders during the development of EA. Specifically, this paper attends to answer the question “What model can be used to investigate the key aspects of factors influencing the engagement between enterprise architects and the stakeholders during the EA development?”

The next sections are organized as follow: section 2 reports the related studies, section 3 introduces the utilized study theory, section 4 provides an overview of the study methodology, section 5 discusses the results and section 6 concludes the study with remarks.

2 RELATED STUDIES

Some studies have explained the important role of stakeholders in the effective execution and success of EA (e.g. Du Preez et al. 2014; Nakakawa et al. 2011). However, the enterprise architects are facing challenges to engage with the stakeholders that result in low utilization, less involvement or no acceptance of EA (Buckl et al. 2010b; Fallmyr & Bygstad 2014; Iyamu & Mphahlele 2014). Despite the stakeholders’ role in EA’s effectiveness, there are scarcity of studies that build an in-depth understanding of the relationship between enterprise architects and EA stakeholders during the development of EA and the lack of comprehensive view of the factors shaping this relationship (Bakhshandeh et al. 2013; Du Preez et al. 2014; Nakakawa et al. 2013).

In recent years, van der Raadt et al. (2010), Chuang and van Loggerenberg (2010) and Nakakawa et al. (2013) tried to fulfill some aspects of the relationship between architects and stakeholders. Chuang and van Loggerenberg (2010) conducted a qualitative study to investigate the organizational challenges facing enterprise architects in South Africa by means of interviews with the architects and produced a list of challenges. However, this study neglected the perspective of the stakeholders since the interviews were limited to the architects and it recommended future study to explore the influence of organization social aspects on enterprise architecting. Furthermore, van der Raadt et al. (2010) conducted a qualitative study to explore the importance of individual goals in architecture decisions and their mapping to the organizational goals during EA development using a case study of organization in Netherlands. The study explained that the degree of stakeholders’ satisfaction on EA is related to the achievement of their personal goals. However, the scope of the study did not cover the factors influencing the engagement between the enterprise architects and the stakeholders. Due to the limited studies that address the collaboration challenges between enterprise architects and stakeholders, Nakakawa et al. (2013) performed an exploratory study. The sample consists from 70 enterprise architects who responded to a survey. The survey revealed a set of challenges that hinder the collaboration. Then, they used a design science approach to produce a collaboration model called CEADA that addressed the collaboration challenges obtained from the survey. However, the study had some limitations; unknown demographics of the survey respondents, the data collection were restricted to the views of the enterprise architects and the developed model lacked the ability to support some collaboration tasks in some social contexts.

3 MULTIPLE PERSPECTIVES THEORY

According to Linstone (1989), the traditional view of a problem within a complex system is dominated by the technical perspective that focuses on the technical analysis to find a solution. However, the human and organizational resources that are used to implement the
solution are neglected during the problem analysis. Furthermore, Linstone (1989) explained that the enterprise comprises from a socio-technical system that means technical and social characteristics. Consequently the technical perspective alone is not sufficient to get the real picture (Linstone 1989). Hence, he proposed the multiple perspectives approach in assessing complex problems or systems that involve multiple actors by considering three perspectives Technical, Organizational and Personal (Benjamin & Levinson 1993, p. 31). The technical perspective is covering the technical aspects and the organizational with the personal to cover the social aspects of the system. The technical perspective is to describe the technical characteristics using a technical lens, the organizational perspective is to discuss the organizational elements and personal perspective includes the individual related elements (Alias & Saad 2001; Linstone 1981). The multiple perspectives approach helps the practitioners to bridge the gap between the analysis to action especially after adding the perspectives of organization and personal which were rarely considered in technology assessment (Linstone 1981). All the three perspectives should be considered because each perspective covers different characteristics that do not exist in other perspectives so limiting the perspective to one or two can be problematic (Linstone 1989). Each perspective has unique features and characteristics described in details in Mitroff and Linstone (1993, p. 108).

In context of IS, there are some studies employed multiple perspectives theory. Rahim et al. (2010) utilized it to study the influence of the three contexts (Technical, Organizational and Personal ) on the process of Open Source Software appropriation within the organization. Alias and Saad (2001) used the three perspectives (Technical, Organizational and Personal) to review and classify the knowledge management research areas.

The multiple perspective theory contributes to this study by enhancing the understanding of the different aspects that need to be considered by the researcher while studying the relationship of the enterprise architects and the stakeholders. Since the enterprise architects and the stakeholders interact within a socio-technical system, considering the three perspectives (Technical, Organizational and Personal) will provide a comprehensive view of the characteristics of this interaction.

4 METHODOLOGY

This study used the Systematic Literature Review (SLR) as a method to review, analyze EA literature and finally to develop an initial model in investigating factors influencing the engagement between enterprise architects and stakeholders in EA development processes (Okoli 2015). The structured review of literature provides a basis for a firm foundation about the research topic and demonstrates the novelty of the study contribution (Bandara et al. 2015; Bandara et al. 2011). This study followed the SLR guidelines suggested by Bandara et al. (2011). It consists of four main phases: documents identification (Phase 1), documents preparation (Phase 2), coding (Phase 3) and write-up (Phase 4). The main activities of Phase 1 include the selection of quality articles, searching keyword, the inclusion criteria and references database creation. The tasks of this phase can be mapped to the input step illustrated by Levy and Ellis (2006) guidelines. Bandara et al. (2011) suggested the use of Adobe Acrobat professional to view PDF files and Endnote to build the references database. The main task of Phase 2 is to propose a high level coding themes. Bandara et al. (2011) recommended NVivo software to build up the proposed themes (called nodes in NVivo). Phase 3 is the primary phase where the actual coding of the relevant text takes place. Based on the coded text, there might be a need to create sub-category under each theme. Phase 4 incorporates the analysis of coded text under each node and finally reports the findings.

Therefore, the first step initiated by identifying the articles sources where the institution search engine used. This search engine is connected to various vendor databases (IEEE Xplore, ProQuest, ScienceDirect, Emerald, SpringerLink, ACM Digital Library, etc.). The term “Enterprise Architecture” used as a key searching word similar to SLR studies used in Farwick et al. (2014), Lange et al. (2012) and Stelzer (2010). To ensure high quality articles
and relevant up-to-date knowledge, the study had set the inclusion criteria as illustrated in Table 1.

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• From January 2010 to present (October 2015)</td>
<td>• Keyword in Title or abstract</td>
</tr>
<tr>
<td>• Journal article and conference proceedings only</td>
<td>• Full text articles</td>
</tr>
<tr>
<td>• Peer-reviewed articles</td>
<td>• English Articles</td>
</tr>
</tbody>
</table>

Table 1. Systematic literature review inclusion criteria

In addition, exclusion criteria had been used to identify the primary paper studies from the outcome of applying inclusion criteria as follow:
- Remove duplicate articles
- Exclude articles that do not discuss EA challenges or EA success (critical) factors

Software packages were used to support the SLR process as follow; 1) Preview v8: to view the PDF files, 2) EndnoteX7: to build references database and to support citing/referencing, and 3) Nvivo11: to code and analyze the text. Figure 1 summarized the phases and activities that guided the SLR process of the study.

5 RESULTS AND DISCUSSION

The automatic search using the inclusion criteria revealed 236 articles. Guided by the exclusion criteria, the researchers applied manual full paper skimming for the 236 articles. This is result in 43 articles that are used as main primary studies (some of these studies highlighted EA challenges and success factors superficially as there were not part of study main focus). These studies have been analyzed using NVivo to extract the findings. All the articles extracted were entered and saved within NVivo. Tree-level themes namely ‘Challenges and Factors’ were created within the NVivo project database that was created for this study. The analysis of this study was conducted in two levels. The goal of the first-level analysis was to capture any literature that discussed EA challenges or factors then analyze them to identify challenges or factors related to enterprise architects and stakeholders. In the second-level analysis, these extracted details were analyzed deeper to derive the intended findings using three lenses of multiple perspectives (Technical, Organizational and Personal) and created subcategories (called child nodes) to place relevant coded text under each child node.

The use of explicit inclusion and exclusion criteria (criteria were peer-reviewed) ensured rigor reliability of SLR primary studies. Furthermore, the preparation and actual coding phases were executed by two coders to improve the validity of findings as suggested by Bandara et al. (2011). The overall study findings and the brief description of each factor are presented in Table 2, and section 5.
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Description</th>
<th>Scholar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization culture</td>
<td>The norms and values within the organization that stimulate stakeholders and enterprise architects actions</td>
<td>Aier (2014), Chuang and van Loggerenberg (2010), Iyamu and Mphahlele (2014)</td>
</tr>
<tr>
<td>Organization dynamism</td>
<td>The organizational changes and their influence on the interest of stakeholders and enterprise architects</td>
<td>Buckl et al. (2011), Du Preez et al. (2014), Zijl and Belle (2014)</td>
</tr>
<tr>
<td>Governance</td>
<td>The distribution of decision authority to manage the activities of EA</td>
<td>Chiprianov et al. (2014), Espinosa et al. (2011), Löhe and Legner (2014), Nakakawa and van Bommel (2010), Nakakawa et al. (2013), Iyamu and Mphahlele (2014)</td>
</tr>
<tr>
<td>Organization politics</td>
<td>The predominance of individuals in driving the meaning and the purpose of EA</td>
<td>Chuang and van Loggerenberg (2010), Iyamu and Mphahlele (2014), Zijl and Belle (2014), Nakakawa et al. (2013)</td>
</tr>
<tr>
<td>Awareness</td>
<td>The stakeholders knowledge of EA practices</td>
<td>Aier and Schelp (2010), Ask and Hedström (2011), Jahani et al. (2010), Löhe and Legner (2014), Saarelainen and Hotti (2011)</td>
</tr>
<tr>
<td>Conflict of interest</td>
<td>The conflict between stakeholders interest and goals with EA goals</td>
<td>Chuang and van Loggerenberg (2010), Nakakawa et al. (2013), Nogueira Santos et al. (2014), van der Raadt et al. (2010), Zijl and Belle (2014)</td>
</tr>
<tr>
<td>Participation</td>
<td>The involvement of key stakeholders in EA activities</td>
<td>Jahani et al. (2010), Nakakawa and van Bommel (2010)</td>
</tr>
<tr>
<td>Stakeholders identification</td>
<td>The identification of the qualified stakeholders who are knowledgeable of business processes and demands</td>
<td>Buckl et al. (2011), Löhe and Legner (2014), Nakakawa et al. (2013)</td>
</tr>
<tr>
<td>Architectural knowledge</td>
<td>The architectural knowledge, experience and skills of the enterprise architects</td>
<td>Aier and Schelp (2010), Iyamu and Mphahlele (2014), Jahani et al. (2010), Löhe and Legner (2014), Zijl and Belle (2014)</td>
</tr>
<tr>
<td>Modeling depth</td>
<td>The optimal level of architecture details and description required by the stakeholders</td>
<td>Buckl et al. (2011), Chuang and van Loggerenberg (2010), Glissmann and Sanz (2011), Löhe and Legner (2014), Nakakawa et al. (2013)</td>
</tr>
<tr>
<td>Tasks nature</td>
<td>Type of EA tasks, their duration and effort required to complete them</td>
<td>Holm et al. (2014), Aier and Schelp (2010)</td>
</tr>
</tbody>
</table>

**Table 2. Factors influencing the engagement between enterprise architects and the stakeholders**

The enterprise architects and the stakeholders are interacting within a socio-technical system, which is represented by a set of architectures (Barateiro et al. 2012; Postina et al. 2010). Hence, utilizing the understanding of multiple perspective theory, the factors listed in Table 2 are reviewed using three lenses technical, organizational and personal to identify the key aspects of factors influencing enterprise architects and stakeholders engagement under each
perspective. Results obtained from SLR (see Table 2) are summarized under each relevant perspective as shown in Table 3 and explained in details as part of section 5.1.

<table>
<thead>
<tr>
<th>Technical</th>
<th>Organizational</th>
<th>Personal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural knowledge</td>
<td>Culture</td>
<td>Awareness</td>
</tr>
<tr>
<td>Modeling depth</td>
<td>Organization dynamism</td>
<td>Communication</td>
</tr>
<tr>
<td>Tasks nature</td>
<td>Governance</td>
<td>Conflict of interest</td>
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<tr>
<td></td>
<td>Organization politics</td>
<td>Participation</td>
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<td></td>
<td></td>
<td>Stakeholders identification</td>
</tr>
</tbody>
</table>

*Table 3. Engagement Factors categorization under each perspective*

### 5.1 Proposed Model

This study proposes initial engagement model which consists of three perspectives; 1) Technical, 2) Organizational, and 3) Personal as shown in Figure 2. It clarifies the different perspectives that need to be considered while investigating the different factors involved in the relationship of the enterprise architects and the stakeholders as initial step towards developing an engagement framework.

**Figure 2. Initial engagement model between enterprise architects and stakeholders**

**Technical Perspective**

As explained by Linstone (1989), the technical perspective includes the technical characteristics of the system. In the context of EA, it represents all technical aspects related to the architecture and the modeling activities executed by the enterprise architects and the stakeholders. Mapping this understanding with SLR findings in Table 2, the aspects considered under the technical perspectives are architectural knowledge, modeling depth and tasks duration. The architectural knowledge describes the level of the enterprise architect skills, experience, competency in executing EA activities and the availability of expertise within the organization (Aier & Schelp 2010; Iyamu & Mphahlele 2014; Jahani et al. 2010). The modeling depth and breadth is related to the level of model complexity or abstraction and the distribution of data sources required by the enterprise architect to build the architectures (Buckl et al. 2011; Chuang & van Loggerenberg 2010; Nakakawa et al. 2013). The tasks nature describes the length and amount of modeling effort to complete the task because the duration and the complexity of tasks might impact stakeholders’ involvement (Aier & Schelp 2010; Holm et al. 2014).

**Organizational Perspective**

The organizational perspective covers the aspects related to the organization, which are organization culture, organization dynamism, governance and organization politics. The
organization culture comprises the beliefs, the values and the norms spread among the stakeholders that influence their actions and interaction (Aier 2014; Chuang & van Loggerenberg 2010; Iyamu & Mphahlele 2014). The organization dynamism refers the continuous changes of the organization due to internal or external factors like introduction of new technology, business improvement and introduction of new regulation that lead to an impact on the interest of stakeholders and enterprise architects (Buckl et al. 2011; Du Preez et al. 2014). The governance includes the stakeholders’ decision-making criteria, the structure of the decision-making and the decision-making process required to manage the EA (Chiprianov et al. 2014; Espinosa et al. 2011; Löhe & Legner 2014). The organization politics are related to the power and authority of individuals in influencing architectural products (Chuang & van Loggerenberg 2010; Iyamu & Mphahlele 2014; Nakakawa et al. 2013). Also, it includes resisting the development of EA from the business managers to preserve their right of technology decision-making (Zijl & Belle 2014).

**Personal perspective**

The personal or individual perspective includes all individual related aspects. In this study context, these aspects are awareness of stakeholders, communication, conflict of interest, participation and the stakeholders’ identification. The awareness of stakeholders mostly refers to the training, knowledge and the understanding of EA practices, concepts and activities (Aier & Schelp 2010; Ask & Hedström 2011; Saarelainen & Hotti 2011). The communication aspect here covers the communication within the enterprise architects’ team, the communication of enterprise architects with the stakeholders and the communication among the stakeholders themselves to ensure the coordination and the understanding between different parties (Azevedo et al. 2015; Chuang & van Loggerenberg 2010). The conflict of interest describes the stakeholders’ personal beliefs preference against the organizational interests (Nakakawa et al. 2013; Zijl & Belle 2014). The participation incorporates the involvement of the senior management to support the success of EA project (Jahani et al. 2010; Nakakawa & van Bommel 2010). Stakeholders’ identification is the ability to identify the key stakeholders who will collaborate with enterprise architects and provide the as-is processes, requirements, concerns and the future outlook (Löhe & Legner 2014; Nakakawa et al. 2013).

6 CONCLUSION AND FUTURE WORK

The goal of this paper was to create a comprehensive understanding of the factors influencing the engagement between the enterprise architects and the stakeholders during the development of EA. The collaboration between the architects and the stakeholders is the cornerstone for developing effective architectures. Using SLR, the study revealed 12 factors that need to be considered by enterprise architects while engaging with the stakeholders. These factors categorized into three perspectives (Technical, Organizational and Personal) to constitute the initial engagement model.

This is in progress research and the initial model will be evolved using a qualitative multiple case study approach in which EA project is the unit of analysis. The qualitative study supports the understanding of a particular context in which the participants influence the actions and it is extended to behavior and the interactions of participants (Maxwell 2008). The research will examine the applicability of the obtained factors in the selected case studies and investigate the possibility of other factors. It will compare the cases to find out similarities and differences of the engagement activities and also employing a theoretical comparison (using literature findings and Actor-Network-Theory) to analyze the collected data. Finally, the developed engagement framework will be validated using a focus group of EA practitioners.

The paper is contributing to the body of knowledge by addressing the key aspects of factors that delineate the engagement between enterprise architects and the stakeholders. As discussed, the initial findings of this paper will be exploited to develop the engagement framework.
References


