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Preliminary Study of Malaysian Public Sector (MPS) Transformation Readiness through Enterprise Architecture (EA) Establishment

Research-in-Progress

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Abstract

Enterprise Architecture (EA) is a holistic approach that not only limited to Information Technology (IT) but also align with the business. EA is not just a tool to be used in a financially competitive world; it is a tool that can help to improve the efficiency of organisation and serves as an instrument for exposing the need for transformation. Consequently, interest in EA in the public sector is increasing in receiving attention. However, to success in EA practices in an organisation yet a concern. The primary aim of this research is to explore the readiness factors that influence the successful EA establishment in Malaysian Public Sector (MPS). Using qualitative approach, the exploration has been made through systematic review and semi-structured interview in with EA experts and practitioners. The data from purposeful and emergent sampling strategies have been analysed using Deductive Qualitative Analysis (DQA). The findings highlighted 17 readiness factors that can be categorised into four main s elements which are Enterprise Environment, Process, People and Technology. In the future, these readiness factors will be analysed on its suitability to be set of readiness assessment criteria towards successful EA establishment in MPS.

Keywords: Enterprise Architecture (EA); Readiness; Enterprise Architecture Establishment

Introduction

Enterprise Architecture (EA) is an approach for an organisation to plan strategically to facilitate decision making process through systematic arrangement. It can also act as a blueprint for organisation to achieve current and future business objectives by alignment of strategy with business and technology. EA is concerned with systematic arrangement of different business processes, procedures, standards, rules and regulations, information systems, and technical infrastructure of current information and expected future transformations and goals (Janssen, 2012; Maheshwari, Janssen and van Veenstra, 2011; Van Der Raadt, Bonnet, Schouten and Van Vliet, 2010). Therefore, in a wider perspective, EA is a holistic approach that not only limited to IT but is also align with the business.

According to Saha (2009), EA is not just a tool to be used in a financially competitive world; it is a tool that can help improve the efficiency of organisation. EA also serves as an instrument for exposing the need for transformation (Ross, Weill, & Robertson, 2006; Simon, Fischbach, & Schoder, 2014). Saha (2009) also stated that EA transformation, i.e. a clearly defined step in taking EA from an existing state (often referred to as baseline state) to a desired state (often referred to as target state), in line with the EA strategy, is enabled by the EA strategy, roadmap, and governance.

As new technologies are aroused and implemented, the benefits of EA continue to grow. Among the benefits of EA from various literatures are alignment of IT and business planning execution process (Boucharas et al., 2010; Lange & Mendling, 2011), optimise resources such as technology, people and process (Boucharas et al., 2010; Isomäki & Liimatainen, 2008) and eliminate duplication and redundancy (Isomäki & Liimatainen, 2008). Hence, based on major benefits highlighted, EA has benefited organisation in many areas. This includes technology, business, and financial aspect.

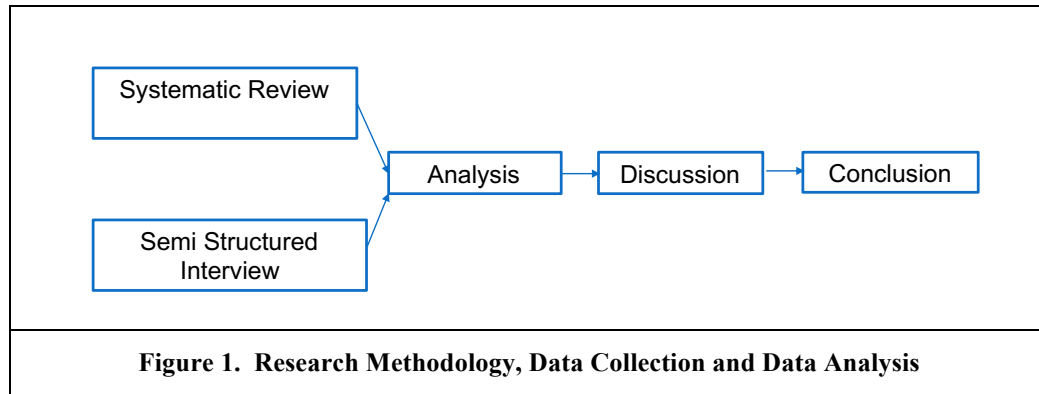
Consequently, interest in EA in the public sector is increasing in receiving attention (Dang & Pekkola, 2016). However, there are several issues regarding the establishment of EA. Lack of organisation readiness for change is one of the failure factor (Donaldson, Blackburn, Blessner, & Olson, 2015). Based on Gartner predictions, 40 percent of EA programs would be terminated by 2012 (Gosselt, 2012). Additionally, Rotterdam University conducted a survey in 2008 that shows 66 percent failure of EA initiatives (Gosselt, 2012). The dimension of readiness are not taken into account, leading to failure of the establishment itself (Desfray & Raymond, 2014). The early experience shows that the process of establishing a public sector EA is a tedious and complicated process (Seppanen, Heikkila, & Liimatainen, 2009). Therefore, in order for EA to act as transformation mechanism in an organisation, dealing with change is a major concern in EA (Yu, Deng, & Sasmal, 2012). In order for an organisation to change, it requires readiness towards transformation.

Based on the literature review findings, publication on EA studies in Malaysia began to emerge from 2007. To the researcher's knowledge, to-date only there is one study related on EA readiness towards organisation's transformation has been conducted in the context of Malaysia (MAMPU, 2014). The study reveals that in general the Malaysian public sector is moving towards Level 2 (Formalised Stage) with regards to the adoption of EA practices (MAMPU, 2014). However, the study was conducted by industries consultant and readiness assessment instrument used are not based on validated research. Moreover, most of the studies in EA transformation readiness conducted in western countries may not be sufficient or applicable to address EA transformation readiness in Malaysian context. Thus, this research intends to provide new findings particularly in the Malaysian context.

Readiness assessment is necessary for two reasons. First, readiness assessment is a key tool for EA risk analysis that extracts the gaps (Dani, 2015). The gap refers to the areas where, despite the efforts, there is no suitable EA readiness assessment prior to EA establishment. Identifying gaps in the readiness for EA can prevent waste of time and resources in places that lack the readiness may cause to the failure (Dani, 2015). Second, readiness assessment indicates the necessary ways to fill these gap, make plans and to successfully implement the EA (Dani, 2015; Gartner, 2010; Winter and Fischer, 2006). Therefore, the research attempts to identify the factors for readiness in the establishment of organization's EA. It is expected that from the factors identified are used to develop EA readiness assessment model to facilitate MPS towards establishment of successful EA practice. Certainly, it is essential for EA practitioners, organisations, and researchers to understand factors towards readiness of EA establishment. As such, this can provide further insights into successful establishment of EA as a mechanism towards effective and efficient service delivery in public sector. The remaining four sections are as follows. Section 2 describes the methodology applied and in Section 3, explains on the findings, which is the factors that influenced the successful EA establishment in MPS. Finally, Section 4 concludes and outlines some possible future works.

Methodology

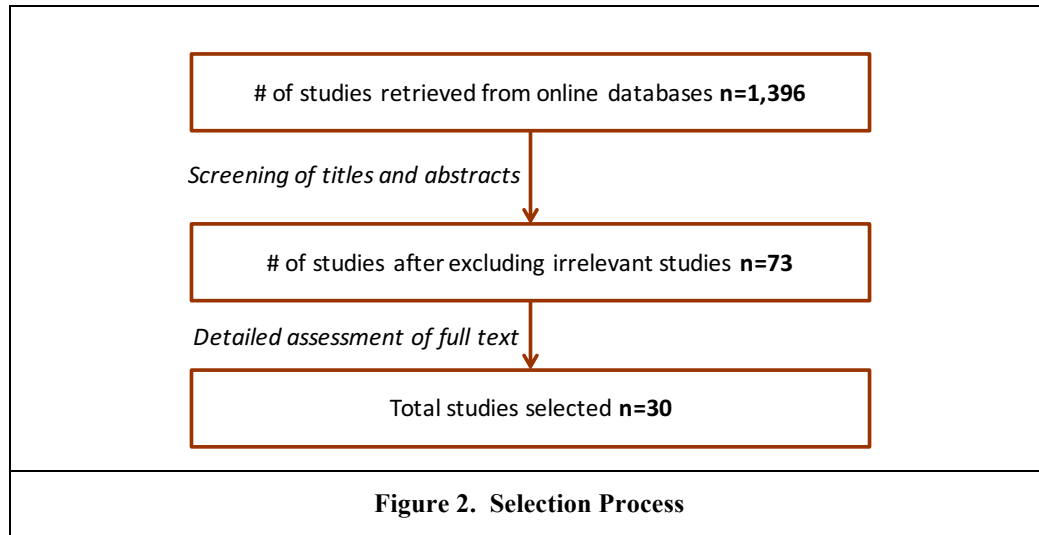
In this study, a systematic review (SR) and semi structured interview was done to gather the preliminary data. This section described methodology involves in SR, interview process and how the data is analysed. Figure 1 shows the process of conducting the study.



Systematic Review (SR)

The SR technique was performed at the beginning stage of this research. The purpose of conducting the SR was to identify possible EA readiness elements and factors that influence successful EA establishment. To begin the SR, the research question outlined is “What are the factors of readiness in the establishment of successful EA practices in organisation?” The criteria for research question formulation is based on guideline by Petticrew, M., & Roberts (2006) where the criteria are population, intervention, comparison, outcomes, and context. The search was performed in the selected online databases. The selection was based on databases that indexed “Enterprise Architecture” or “Information Technology Architecture” studies. The research involved five (5) online databases as data sources which are ACM Digital Library, IEEEExplore Digital Library, SpringerLink, Taylor & Francis and Web of Knowledge. The sources of papers selected are journals, conferences or proceedings, technical reports, thesis reports, books, and magazine articles. The initial search string was (enterprise architecture), (information technology architecture), (establishment), (implementation), (readiness), (model), (assessment), and (factors). The search string is then constructed using Boolean “AND” to link the major terms and Boolean “OR” to incorporate alternative spellings and synonyms. The search string was carried out in the online database to titles, abstracts, and metadata, assuming that these provide a brief summary of the work. The literature search was conducted between September 15, 2015 and Jan 31, 2016. The search only includes articles in English and articles that meet the research questions stated. Articles that are not written in English and do not match the inclusion criteria were excluded.

The initial phase of the search process identified 1,396 studies using the search term defined. Of these, only 73 were potentially relevant based on the screening of titles and abstracts. Each of these studies was filtered according to the inclusion and exclusion criteria before being accepted for the synthesis of evidence. If titles and abstracts were not sufficient to identify the relevance of a paper, full articles were used. Finally, 30 studies were accepted for the synthesis of evidence after a detailed assessment of abstracts and full text and exclusion of duplicates. Figure 2 illustrated the selection process.



Semi-structured Interviews

In this study, semi-structured interviews were done to get the preliminary data. We conducted a series of interviews with five (5) experts from public and private sectors agencies in Malaysia to understand the issues in EA establishment and readiness in the establishment of organisation's EA practices. The initial interview was conducted in an environment that involves the public sector and industry respondents, that are EA Expert and Practitioners in Public Sectors and Private Sectors based on three categories, namely the management of Top Management, Middle Management, and Operation Level. The interview was conducted in one to one basis with time spent of 30 minutes to two (2) hours for each interview. Shorter time taken due to some respondents agreed to the suggestions of the findings and longer time taken by respondents that discussed and suggested new findings. Age also effected duration of interview, which older respondents take longer time compared to younger respondent (Loosveldt & Beullens, 2013). According to Seidman (2012) less than 90 minutes is appropriate for each session. Though it seems too long, it is long enough to make them feel they are being taken seriously. Data was interpreted based on respondent's experience and examples of cases discussed during the interview sessions. The data also was supported by related documents with MPS EA establishment process and the Malaysian Public Sector ICT initiative such as the 1GovEA Blueprint, 1GovEA Enterprise Architecture Capability Maturity and Change Readiness Assessment and Malaysian Public Sector ICT Strategic Plan 2011-2015. Interviews were conducted separately from 24 March to 18 May 2016 as shown in Table 1.

To analyse the gathered preliminary data, the researchers applied the data analysis process by Yin (2010) which consists of familiarisation, transcription, organisation of data, coding the data, building the description and themes, and finally writing the report. In this research, the data coding process is done by using Atlas.ti™ and the Computer Assisted/Aided Qualitative Data Analysis (CAQDAS) software. To build the themes and code, the researchers followed the Framework Analysis Guideline based on Ritchie, Lewis, Nicholls, & Ormston (2013). This framework will allow the categories and themes to be set accordingly from the beginning of the research. During the coding process, any new themes that emerged may be added in the hierarchical tree of themes. Next section will explain the findings gathered from this study.

Table 1: Interview's Information					
Position	Chief ICT Consultant (Strategic)	ICT Expert (Information Management and EA in Malaysia's public sector)	Principal Assistant Director (EA Practitioner & TOGAF 9.1 Certified)	ICT Expert (Information Management and EA in Malaysia's public sector)	Chief Architect of EA Office
Expert Id	Expert 1	Expert 3	Expert 4	Expert 5	Expert 4
Agency	Agency A	Agency A	Agency A	Agency B	Company A
Category	Top Management	Middle Management	Operation	Operation	Top Management
Interviews' Information	24 Mac 2016 (Thursday)	9May 2016 (Monday)	18 May 2016 (Tuesday)	10 May 2016 (Tuesday)	5 May 2016 (Thursday)

Findings and Discussions

This section presents the findings of study. In this study, the analyses of the data began with the identification of key issues and elements. Bazeley (2009) asserted that “the belief that an inductive approach to research requires that researchers come to their data without bringing any theoretical concepts to the research is generally no longer seen as realistic nor broadly supported”. Furthermore if qualitative researcher started the investigation with theories, the researcher would already know what kinds of things can be captured from the data (Bazeley, 2009). This section will discuss on the findings of preliminary study. Results from both SR and interviews are concluded in a unified themes and codes accordingly. The findings can be classified into four themes, namely enterprise environment, people, process, and technology.

Theme 1: Enterprise Environment

Public sector agencies, more often than any other, have cleared and defined structure. In MPS, defined scopes and roles of individuals are not only the standard, but are typically recorded with detailed job descriptions and organisational charts. The structure is in vertical and imposed bureaucracy. However, this structure depends on size of organisation and agency's type. In the words of an EA Expert 1 from Agency A:

“In our agencies, the organisation depends on the size of workers. For public agencies, there are federal agency, state agencies, statutory bodies that have different organisation set-up and structure. To come out with a standard governance structure for EA team is quite a challenge based on this variation of organisation set-up. Therefore, standard governance of EA is a must in an organisation to ensure successful establishment of EA.”

Expert 1 from Agency A also adds that a good governance depends on strategy on mobilisation of resources together with management of change and makes an EA practice as a culture. Expert 1 also suggested that an organisation also needs a clear vision to set a goal and objectives.

Theme 2: Process

An organisation depends on clear business process to operate (Hussein et al., 2016; Van Der Raadt et al., 2010). Process includes the enforcement of policy, clear communication, and documentation. With policy enforced, any decision and guideline that are binding to the organisation can be enacted based on formal processes and prior given authorisation (Aier & Schelp, 2010; Schmidt & Buxmann, 2011; Van Der Raadt et al., 2010; T. Ylimäki, 2006). To date, no law or policy enforces the EA practices in MPS. EA is one of enabling ecosystem towards achieving initiatives in Digital government agenda as stated in MPS strategic 2016-2020 plan (MAMPU, 2016). This means that EA initiatives and

programs are not a compulsory initiatives and agencies depends on their agencies ICT strategic plan to execute their EA practices. Expert 3 on Agency A said:

“Currently we do not have a law or a policy on EA programs but we are working on it. However, we already have standard methodology called 1Government Enterprise Architecture (1GovEA) launched in June 2013 with the aim of strengthening its ICT policy, standards, and practices. 1GovEA is aim to assist the Malaysian Public Sector agencies in aligning and unifying the business and IT strategy to meet the agency vision and mission towards better service delivery. This includes comprehensive business case as a foundation for successful EA establishment.”

Therefore, with 1GovEA, agencies will have standard documentation with complete business case to refer to and be understood. Thus, it will ensure smooth process and as medium of communication among team towards EA establishment.

Theme 3: People

Personnel in the agencies in IT department focused on the IT and technical perspective. They also had experience with IT projects but not with EA. Under the circumstances, the EA programs ignored business services and emphasised IT issues. Agencies need to have EA teams and that have abilities and skills on running EA activities. EA expertise, experiences, background, and views on how EA should work and what its role were crucial. Under the circumstances, the EA programs ignored business services and emphasised IT issues. An EA expert 5 from agency B stated:

“Our personnel had no experience in EA. All of us have a background in IT. Most of them do not understand what EA is, whether it is another strategic initiative related to business or another policy being enforced in an organisation. We do send some of the personnel to EA courses to address this issue and run some awareness program such as technology update to enhance the knowledge on EA.”

Some agencies sent their personnel to courses to gain basic knowledge and obtain certificates, such as TOGAF and Zachman. Other agencies used consultants and outside experts to help their EA teams. Unfortunately, that combination was usually unsuccessful due to the dissimilar views and the lack of general awareness of EA and its expected benefits. This made it difficult to find consensus among the consultants, experts, and personnel on even the simplest details, which caused severe delays and wasted time. An expert 2 from company A stated:

“Some of the agency need to rely on industry consultants to establish EA in their agencies to expedite the process of establishment but they also have to really be involved with us so that we can understand their culture, environment, and business services better and they can learn faster from us. Yes, there are also agencies that established their EA in-house but the process takes longer time due to lack of skills and knowledge on EA.”

Theme 4: Technology

Reliable and user-friendly EA tools influenced the MPS EA establishment process. Therefore, the selection of suitable tools, made with a thorough discussion involving all MPS EA Team. According to expert 4 from agency A:

“Tools are important to help us in managing and updating diagrams, artifacts, and documentation regarding EA. However, MPS need to consider having tools that is easy for us and reliable as well as secured to ensure smooth operation in embracing the EA journey.”

From the interviews and literature, the results from this preliminary study contributes to the identification of 17 factors (code) that affect readiness in the establishment of organisation's EA practices as illustrated in Table 2.

Table 2. Factors that influence readiness in MPS EA establishment					
No.	Themes (Elements)	Codes (Factors)	Sources		
			SR	Authors	Interviews
1.	Enterprise Environment	Governance	√	Hedayati, Shirazi, & Fazlollahtabar(2014); Janssen, 2012)	√
		Culture	√	Aier (2014); Azab & Consultant (2009)	√
		Change Management	√	Aier (2014); Weiner (2009); B. T. Ylimäki (2007)	√
		Resources	√	Aier (2014)	√
		Vision	X	-	√
		Strategy	√	A. Alghamdi, Goodwin, & Rampersad (2011); Azab & Consultant (2009); Jahani, Javadein, & Jafari (2010)	√
2.	Process	Business Case	X	-	√
		Communication	√	Aier & Schelp (2010); Iyamu & Mphahlele (2014); Schmidt & Buxmann (2011); Van Der Raadt et al., 2010; B. T. Ylimäki (2007)	√
		Documentation	√	Buckl, Matthes, & Schweda (2009); Farwick, Breu, Hauder, Roth, & Matthes (2013); Rahimi, Götze, & Møller (2017)	√
		Policy	√	Aier & Schelp (2010); Aziz, Obitz, Modi, & Sarkar (2006); Gilliland, Kotze, & van der Merwe (2015); Lee, Oh, & Nam (2016); Van Der Raadt et al. (2010)	√
3.	People	Competency	√	Aier (2014); Aier & Schelp (2010); Iyamu & Mphahlele (2014); Romero, Galeano, & Molina, (2009); Van Der Raadt et al. (2010); B. T. Ylimäki (2007)	√
		Leadership	√	(Iyamu & Mphahlele (2014); Jahani et al. (2010)	√
		Workforce Capabilities	√	Aier & Schelp (2010); Van Der Raadt et al., 2010; B. T. Ylimäki (2007); Zheng & Jiang (2011)	√

Table 2. Factors that influence readiness in MPS EA establishment

No.	Themes (Elements)	Codes (Factors)	Sources		
			SR	Authors	Interviews
		Commitment	√	Farwick et al. (2013); Nikpay, Selamat, Rouhani, & Nikfard (2013); Schmidt & Buxmann (2011); Seppanen et al. (2009)	√
4.	Technology	Infrastructure	√	Ahuja (2008); Aier & Schelp, (2010); Hedayati et al., (2014); Iyamu & Mphahlele (2014); Lee et al., (2016); Nikpay et al., (2013); Schmidt & Buxmann (2011)	√
		Security	√	Bader, He, Anjomshoaa, & Tjoa, (2012); Liimatainen, Hoffmann, & Jukka (2007); Saha (2012); Zheng & Jiang (2011)	√
		Tools	√	Fischer, Aier, & Winter (2007); Rouhani, Mahrin, Nikpay, Ahmad, & Nikfard (2015)	√

Expert 1 from agency A also mentioned that, for EA to be successfully established, readiness assessment need to be imposed before the establishment. With the readiness assessment, level of the agency’s readiness can be measured before embarking to EA journey. It is important to ensure factors of readiness are addressed towards successful of EA establishment. The view is supported by Expert 2 from company A stated that an understanding of the organisation’s readiness to accept change is a key towards successful enterprise transformation through EA.

The results from this initial study contributes to the identification of 17 readiness factors (code) that have influenced the successful establishment of EA practices in MPS, as shown in Table 2. From the interviews, experts stated that vision and business case are additional important factors that need to be considered other that factors derived from literature.

Conclusion and Future Work

In conclusion, the primary aim of this research is to explore the readiness factors that influence the successful EA establishment in MPS. This study reveals that there are 17 influential factors that can be categorised into four main elements which are Enterprise Environment, Process, People, and Technology. Vision and business case are factors that emerged from the interviews. In future, these readiness factors will be analysed on its suitability to be set of readiness assessment criteria towards successful EA establishment in MPS.

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