READINESS ASSESSMENT MODEL IN SUPPORTING ENTERPRISE ARCHITECTURE ESTABLISHMENT FOR MALAYSIAN PUBLIC SECTOR

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READINESS ASSESSMENT MODEL IN SUPPORTING ENTERPRISE ARCHITECTURE ESTABLISHMENT FOR MALAYSIAN PUBLIC SECTOR

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DEDICATION

This thesis is dedicated to my late father, who taught me that the best kind of knowledge to have, is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time.

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ABSTRACT

Enterprise Architecture (EA) is a strategic approach designed to align business strategy with ICT initiatives which has become part of the digital government transformation programme in most countries. The Malaysian Public Sector (MPS) has embraced EA as one of the pillars in their digital transformation initiative. However, findings from Malaysian Administrative Modernisation and Management Planning Unit (MAMPU) in 2016 revealed that EA establishment in MPS is still at its infancy level due to the lack of EA readiness. Similarly, public sectors in other countries such as Indonesia, Vietnam and Oman are also struggling to resolve this issue. Until June 2020, only six (6) agencies in MPS have established EA compared to 25 agencies targeted by MAMPU. Thus, to address this issue, this research proposes an EA Readiness Assessment Model (EARAM) with the aim to assess readiness of MPS, support decision-making process, and plan strategies for EA establishment. This research has four (4) objectives. The first objective is the identification of EA readiness factors followed by the second objective which is the development of EARAM. The third objective is to validate the developed EARAM, while the fourth objective involved evaluation of EARAM. A sequential exploratory mixed method research design was employed to achieve these four (4) objectives. To achieve the first and second objectives, this research used a systematic review (SR) and interview with five (5) EA experts; while the third objective involved three rounds of modified Delphi technique with 13 EA experts. Finally, for the fourth objective, the researcher adopted a multiple case study method whereby three (3) agencies in MPS that are in the EA establishment stage were selected. The EARAM was formulated based on several inputs from SR, interview findings, as well as Information Technology and Information System (IT/IS) Readiness Maturity model. The overall results of three (3) cycles of Delphi technique yielded the conclusion that 45 statements of elements, factors and items in the questionnaires received high consensus of importance in which their Inter Quartile Range (IQR) is between zero (0), and one (1) and median is more than four (4). Results from the Delphi analysis validated four (4) major elements of EARAM, namely 1) Catalyst Enabler, 2) People, 3) Process and 4) Technology along with 14 factors and 45 items. The EA Readiness Assessment Tool (EARAT) is developed by incorporating EARAM validated elements and factors to provide practitioners with an automated tool to assess the EA readiness level of their organisation. The results of EARAT's evaluation from three (3) agencies in MPS indicated a high level of agreement (with a median score of more than 4.00) that EARAT provides useful and quality information, supports decision making, as well as provides ease of use and user satisfaction to support EA establishment in MPS. In conclusion, this research contributed to the development of EARAM to assess readiness in MPS, supports decision-making process, and plan strategies for EA establishment. This research is also in line with EA Body of Knowledge (EABOK) related to the areas of Organisational Scope and Structure of EA, specifically focusing on the sub-areas of Organisational Need and Drivers.

ABSTRAK

Seni Bina Perusahaan (EA) adalah pendekatan strategik yang dirancang untuk menyelaraskan strategi perniagaan dengan inisiatif ICT yang telah menjadi sebahagian daripada program transformasi kerajaan digital di kebanyakan negara. Sektor Awam Malaysia (MPS) telah menerima EA sebagai salah satu teras dalam inisiatif transformasi digital mereka. Walau bagaimanapun, penemuan dari Unit Pemodenan Tadbiran dan Perancangan Pengurusan Malaysia (MAMPU) pada tahun 2016 menunjukkan bahawa penubuhan EA di MPS masih di peringkat awal kerana kurangnya kesediaan EA. Begitu juga sektor awam di negara lain seperti Indonesia, Vietnam dan Oman yang bergelut dalam menyelesaikan isu ini. Sehingga Jun 2020, hanya enam (6) agensi di MPS yang telah membangunkan EA berbanding 25 agensi yang disasarkan oleh MAMPU. Oleh itu, bagi menangani masalah ini, kajian ini mencadangkan Model Penilaian Kesediaan EA (EARAM) yang bertujuan untuk menilai kesediaan MPS, membantu dalam proses membuat keputusan, dan merangka pelan strategi untuk pembangunan EA. Kajian ini mempunyai empat (4) objektif. Objektif pertama adalah untuk mengenal pasti faktor kesediaan EA diikuti dengan objektif kedua iaitu pembangunan EARAM. Objektif ketiga adalah untuk mengesahkan EARAM yang dibangunkan, manakala objektif keempat melibatkan penilaian EARAM. Reka bentuk penyelidikan kaedah eksploratif bercampur secara berturutan digunakan untuk mencapai empat (4) objektif ini. Untuk mencapai objektif pertama dan kedua, kajian ini menggunakan kaedah sorotan bersistematik (SR) dan temu bual dengan lima (5) pakar EA; manakala objektif ketiga melibatkan tiga pusingan teknik Delphi yang diubah suai melibatkan 13 pakar EA. Akhirnya, bagi objektif keempat, penyelidik menggunakan kaedah kajian kes melibatkan tiga (3) agensi di MPS yang berada di peringkat pembangunan EA. EARAM dirumuskan berdasarkan beberapa input dari SR, penemuan temu bual, serta model Kematangan Kesediaan Teknologi Maklumat dan Sistem Maklumat (IT/IS). Hasil keseluruhan dari tiga (3) kitaran teknik Delphi menghasilkan kesimpulan bahawa 45 penyataan elemen, faktor dan item dalam soal selidik mendapat konsensus kepentingan yang tinggi bagi Julat Antara Kuartil (IQR) berada antara sifar (0), dan satu (1) serta median lebih daripada empat (4). Keputusan daripada analisis Delphi mengesahkan empat (4) elemen utama EARAM, iaitu 1) pemangkin pemboleh ubah, 2) manusia, 3) proses dan 4) teknologi bersama dengan 14 faktor dan 45 item. Alat Penilaian Kesediaan EA (EARAT) dibangunkan dengan memasukkan elemen dan faktor EARAM yang telah disahkan untuk menyediakan alat automasi kepada pengamal bagi menilai tahap kesediaan EA organisasi mereka. Keputusan penilaian EARAT dari tiga (3) agensi di MPS menunjukkan tahap persepakatan yang tinggi (dengan skor median lebih dari 4.00) bahawa EARAT memberikan maklumat yang berguna dan berkualiti, menyokong dalam membuat keputusan, serta menyediakan kemudahan penggunaan dan kepuasan pengguna untuk menyokong pembangunan EA di MPS. Sebagai kesimpulan, penyelidikan ini menyumbang kepada pembangunan EARAM untuk menilai kesediaan dalam MPS, membantu dalam proses membuat keputusan, dan merangka pelan strategi bagi pembangunan EA. Kajian ini sejajar dengan badan pengetahuan EA (EABOK) yang berkaitan dengan bidang Organisasi dan Struktur EA, yang memberi tumpuan khusus pada sub-bidang Keperluan Organisasi dan Pemacu.

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LIST OF ABBREVIATIONS

1GovEA	-	1 Government Enterprise Architecture
CVI	-	Content Validity Index
EA	-	Enterprise Architecture
EABOK	-	Enterprise Architecture Body of Knowledge
e-Gov	-	electronic Government
EPU	-	Economic Planning Unit
EARAM	-	Enterprise Architecture Readiness Assessment Model
EARAT	-	Enterprise Architecture Readiness Assessment Tool
ICT	-	Information Communication Technology
ICU	-	Implementation Coordination Unit
ISP	-	IT Strategic Plan
IS	-	Information Systems
IT	-	Information Technology
IQR	-	Inter Quartile Range
MAMPU	-	Malaysian Administrative Modernisation and Management Planning Unit
MPS	-	Malaysian Public Sector
MyGovEA	-	Malaysian Government Enterprise Architecture
SR	-	Systematic Review
TAM	-	Technology Acceptance Model

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CHAPTER 1

INTRODUCTION

1.1 Overview

Enterprise Architecture (EA) is an approach for organisations to plan strategically to facilitate decision-making through the systematic arrangement. EA acts as a blueprint for organisations to achieve current and future business objectives by aligning businesses and their technology strategies. EA is concerned with the systematic arrangement of different business processes, procedures, standards, rules and regulations, information system, current information technical infrastructure, as well as the expected future transformations and objectives (Al-Kharusi, Miskon, & Bahari, 2018; Janssen, 2012; Maheshwari, Janssen, & van Veenstra, 2011; van der Raadt, Bonnet, Schouten, & van Vliet, 2010).

EA is not only a tool that can be used in a financially competitive world, but it is also a tool that is useful in improving the efficiency of organisations (Saha, 2008). As new technologies are discovered and implemented, the benefits of EA continue to grow. Among the benefits of EA are IT alignment and business planning execution process (Boucharas, van Steenbergen, Jansen, & Brinkkemper, 2010; Lange & Mendling, 2011), resources optimisation such as technology, people, and process (Boucharas et al., 2010; Isomäki & Penttinen, 2008), and the elimination of duplication and redundancy (Isomäki & Penttinen, 2008). In this sense, EA can benefit organisations in technology, business, and financial areas.

EA is a complex phenomenon as stated by Mykhashchuk, Buckl, Dierl, and Schweda (2011), Radeke (2010), and Bricknall, Darrell, Nilsson, and Pessi (2006). Nevertheless, EA is relatively new in Malaysia (Ahmad, Drus, & Bakar, 2019a; Bakar, Kama, & Harihodin, 2016a; Dahalin, Abd Razak, Ibrahim, Yusop, & Kasiran, 2010; Kamaruddin & Abdullah, 2007) and the interest in EA is undoubtedly growing

(Langenberg & Wegmann, 2004; Winter, Legner & Fischbach, 2014). Many public and private organisations have already embarked in the establishment of EA. Organisations without EA may have to face the risks of being uncompetitive, ineffective and inefficient which eventually lead to a lack of resilience in facing different challenges in the environment (Nikpay, Ahmad, & Rouhani, 2015).

Business value gains from both profit and non-profit organisations such as public sector organisations as their EA maturity improves. Burns, Neutens, Newman, and Power (2009), posited that the two sectors vary significantly in the way they use the EA and their expectations of the EA values for their organisations. Profit-making organisations typically concentrate on utilising EA to guide their organisation-wide strategies such as cost control, pre-and post-merger integrations, consolidation of infrastructure, and the delivery of new products. EA is also perceived as a competitive advantage tool and useful for non-profit organisations, particularly in the public sector to enhance internal collaboration, interoperability, and the ability to share information between departments and agencies. Concentrating on EA efforts to standardised government services helps organisations to strive and handle their resource portfolios more efficiently, especially for large-scale program execution (Burns et al., 2009).

In the planning stage, readiness is vital to ensure a smooth EA establishment process (Bakar, Kama, & Harihodin, 2015a; Dang & Pekkola, 2016b). The establishment is defined as the activities encompassing in the formation and development of an EA (Bakar et al., 2015a). An EA establishment is a set of process involved in EA development, and the typical stages are planning, analysing, designing, developing, and maintaining (Bakar et al., 2015a). However, the readiness of an organisation to embrace EA has never been taken into account (Ahmad et al., 2019b; Desfray & Raymond, 2014). Readiness for EA is an EA establishment's risk analysis, which aims to increase the organisational success of EA practices (Dani, 2015; van der Raadt & van Vliet, 2008).

The lack of organisational readiness for EA can cause a failure in its implementation (Donaldson, Blackburn, Blessner, & Olson, 2015). Hence, previous studies suggested that the readiness assessment is necessary as it helps to identify gaps

in establishing an EA (Ahmad et al., 2019b; Dani, 2015). Identifying gaps in the readiness for EA enables the time and resources to be managed efficiently and prevent failure during the implementation (Dani, 2015). A readiness assessment can also provide a mechanism on how to close the identified gaps by suggesting appropriate measures (Dani, 2015; Handler, 2010; Winter & Fischer, 2006).

Realising the importance of having an EA readiness assessment, the research attempts to identify the factors that can affect the degree of readiness of an organisation in establishing EA. These factors will later be utilised to develop an EA Readiness Assessment Model that can be used as a standard reference. Indeed, it is essential for EA practitioners, organisations, and researchers to understand what are the factors that contribute to the readiness of an EA establishment. Given the Malaysian public sector (MPS) as a case study, this study provides further insights into a successful establishment of EA as a mechanism towards effective and efficient service delivery.

1.2 Problem Background

Interest in the EA is increasing in the public sector (Dang & Pekkola, 2016a). EA establishment was first studied by Roeleven and Broere (2009) who revealed that over 66 per cent of EA programmes in the Netherlands did not meet the expectations due to the length of time spent during the EA establishment process. As the dimension of readiness was not taken into account, it has led to the failure of the establishment itself (Desfray & Raymond, 2014).

While some EA initiatives have been successful, many EA initiatives ended up as disappointments. The disappointments were unnecessarily outright failures, but without concrete results, the initiatives seemed to continue forever (Schmidt & Buxmann, 2011). Limited understanding and lack of resources in EA initiatives due to readiness of organisation itself were often found to be the root causes of the problem (Dang & Pekkola, 2016b). A holistic approach to IT architecture towards achieving EA has been an accepted strategy, but the results of these initiatives varied (Hylving & Bygstad, 2018).

Previous studies showed that the process of establishing EA in the public sector initially appeared to be tedious and complicated (Al-Kharusi et al., 2016; Dang & Pekkola, 2016b; Seppanen, Heikkila, & Liimatainen, 2009). The organisations need to prepare themselves before embarking on an EA project. The EA programmes have experienced integration and interoperability difficulties within and between government organisations (Hjort-Madsen, 2007). A shared understanding between business and IT which includes EA remains an issue. In many organisations, mutual knowledge between business and IT (including EA) continues to be a problem (Iyamu, & Mphahlele, 2014). Despite the growing interest of EA establishment in the MPS, the establishment of EA practices is still slow and considered low in achieving its target. Although EA was introduced in MPS since 2011 and was formalised in 2014, currently in 2019 only eight agencies in MPS had adopted EA practices although in 2014 a total of 25 agencies were targeted to adopt EA by 2016 (MAMPU, 2017).

Therefore, a major concern that needs to be addressed is the readiness of organisations to adopt EA. The lack of readiness in agencies to adopt EA is one of the critical problems that has led to the slow establishment of EA in the organisations (Al-Kharusi et al., 2016). Organisations need to assess its readiness to participate in EA work and be able to participate in cross-public sector services, taking into account, for instance, data protection, security, and profitability aspects (Heikkila & Penttinen, 2016).

Most of the EA readiness-related studies conducted in the Western countries did not provide sufficient information to address the level of EA readiness in Malaysia. Not many studies have put a focus on the EA Readiness Assessment Model itself (Dang & Pekkola, 2016b; Seppänen, Penttinen, & Pulkkinen, 2018). It was found that a comprehensive assessment model for readiness has not been established despite the extensive discussion on EA readiness factors (Al-Kharusi et al., 2016; Banaeianjahromi, 2018; Ylinen & Pekkola, 2018). Although other scholars have proposed other EA readiness models, none of them can fit into the MPS' EA implementation approach due to the MPS' structure of governance and project management.

Notably, only two studies related to EA readiness in the Malaysian context were undertaken. The studies were conducted in 2014 and 2016 to assess the readiness of public sector agencies to establish EA. The studies revealed that the MPS is moving towards a partial readiness to embark on EA practices (MAMPU, 2014b, 2016b). The lack of readiness in the agencies to embrace EA was one of the critical problems that led to slow EA establishment (Yusoff, 2017). Nevertheless, these studies were merely based on the industries' consultant perspective, and there was no assurance on the rigorousness of the readiness assessment instrument used. Moreover, the readiness assessment studies conducted by industries' consultants were based on their own readiness assessment model which lacking perspective in people, process, technology, and the EA catalyst as suggested by many EA scholars (Bakar et al., 2016b; Dang & Pekkola, 2016b; Ojo, Janowski, & Estevez, 2012).

The assessment model used in 2014 was solely based on nine maturity areas taken from Togaf 9.1 EA maturity study framework (MAMPU, 2014c). The result from this assessment shows that MPS EA was still very much in its infancy stage. Most of the agencies did not possess knowledge in EA, and the assessment conducted used EA terms from a prominent EA framework as a basis to formulate EA questions. However, based on preliminary interview with one of the respondents, the questions from the assessment were difficult to understand although a guidebook was provided. Hence, as the model itself can be disputable, the results might not represent the actual scenario of EA establishment in MPS.

Another study conducted by a team of consultants appointed by MAMPU (MAMPU, 2016b) deployed their own EA Readiness Assessment Model which covered only four main factors involving people (commitment, team capability, business case, and stakeholder) while disregarding many other factors such as catalyst enablers (governance, culture, vision, change management, and resources), processes (communication and policy and rules), and technologies (repository, security, and tools). It is clear that the readiness assessment model being used did not depict all of the factors of EA readiness as mentioned before and discussed by other EA scholars (Bakar et al., 2016b; Dang & Pekkola, 2016b; Jahani, Javadein, & Jafari, 2010; Sobczak, 2013; van der Raadt et al., 2010). Thus, the result is not accurate and

comprehensive enough to provide the overall factors related to EA readiness in MPS. Until June 2020, only six agencies in MPS have established EA compared to 25 agencies targeted by MAMPU.

In dealing with problems of EA readiness in MPS and in addressing the knowledge gap in EA establishment, it is vital to understand the factors that influence the readiness of EA establishment in MPS. Hence, this research aims to develop, validate, and evaluate a new model of EA based on these factors.

1.3 Preliminary Interview with Experts

In addition to the review of documents, interviews were conducted with five experts (Appendix A) involved in the establishment of EA in the MPS. This interview identified the current issues on EA establishment especially in the current EA readiness aspects. The findings of the interviews were discussed and the experts' views on issues on EA establishment in their organisations were analysed (Table 1.1). The excerpts of the interview can be referred in Appendix C.

Table 1.1 Experts' Views on EA Establishment Issues in their Organisations

Issues (Themes)	**Descriptions**	**Experts' input**				
		Expert 1 (Agency A)	**Expert 2 (Company A)**	**Expert 3 (Agency B)**	**Expert 4 (Agency A)**	**Expert 5 (Agency B)**
No mandate from government to implement EA initiatives	Refers to no policy or circular towards EA implementation being enforced to an organisation	√	-	√	-	√
Improper EA governance leads to difficulty in managing EA implementation	Refers to different governance structures set up based on the size of the organisation and create variety in EA governance structure	√	-	√	√	√
The absence of EA tool to	Refers to a tool such as EA repository tool	√	√	-	-	-

Issues (Themes)	Descriptions	Experts' input				
		Expert 1 (Agency A)	Expert 2 (Company A)	Expert 3 (Agency B)	Expert 4 (Agency A)	Expert 5 (Agency B)
maintain EA document	and EA modelling tool					
Lack of EA awareness	Refers to a lack of understanding of EA initiative	-	√	√	-	√
Lack of EA readiness	Refers to a lack of readiness in EA implementation	√	√	√	√	√
Limited knowledge and skills on EA among the team	Refers to the knowledge and skills required for the team to manage EA initiatives	-	√	√	√	-

The interviews identified six current issues on EA establishment that may affect the success of EA. Feedbacks on EA issues that were described by the experts demonstrated similarity to other findings. In this case, there were two most highlighted issues in EA implementation. The most common issue throughout and agreed upon by all five experts was the lack of EA readiness, followed by the improper EA governance that was voiced out by four experts. This study will deal and discuss in detail on the former issue.

1.4 Problem Statement

The EA establishment in many organisations have failed, and a primary reason for this failure is the lack of organisational readiness or EA establishment. The lack of EA readiness in an organisation may force the organisation to face several problems in dealing with changes and proper planning in the process of establishing EA. Thus, the real extent of the EA readiness assessment in the MPS sectors can be further studied and improved. Most of the existing EA Readiness Assessment Models were based on industrial standards and specific EA frameworks that could pose problems for implementation in the public sector agencies. Therefore, this research proposed EA Readiness Assessment Model formulated from EA readiness factors in conducting the EA readiness assessment. This model intends to assess readiness in the MPS, support decision-making process, and plan strategies for EA establishment.

1.5 Research Questions

The research questions that are going to be addressed are outlined as follows:

i. RQ1: What constitute factors of readiness in the EA establishment of an organization?
ii. RQ2: How to use the identified factors in developing EA Readiness Assessment Model for Malaysian Public Sector?
iii. RQ3: How to validate the EA Readiness Assessment Model for Malaysian Public Sector ?
iv. RQ4: How to evaluate EA Readiness Assessment Model in facilitating the Malaysian Public Sector towards the establishment of EA practices?

1.6 Research Objectives

The research objectives were defined to achieve the overall aim of the research which is to develop, validate and evaluate a new readiness assessment model in supporting EA establishment for Malaysian Public Sector. The identified research objectives are:

RO1. To identify the readiness factors that support EA establishment in Malaysian Public Sector

RO2. To develop a new EA Readiness Assessment Model in Malaysian Public Sector

RO3. To validate the developed EA Readiness Assessment Model in Malaysian Public Sector

RO4. To evaluate the developed EA Readiness Assessment Model in Malaysian Public Sector

1.7 Research Scope

The scope of this study confines the research area and sets the frontiers of what should be investigated. The research scope is further elaborated in the following discussions.

1.7.1 Area of Exploration

The area of exploration in this research is the development of readiness assessment model for supporting EA establishment in MPS. Assessment of readiness should be conducted in the planning stage of EA establishment. Thus, this research focus on the planning stage of EA establishment because the key of successful EA establishment is the readiness of the organisation itself to be identified at the earlier stage.

1.7.2 Research Context

The justification for choosing the MPS is because the establishment of EA in MPS still slow in progress because of readiness of MPS to embrace EA due to lack of readiness assessment conducted. This is because there is lack of mechanism to conduct a readiness assessment for EA establishment in MPS, although there has been continues interest in conducting ICT readiness assessment in MPS.

1.7.3 Unit of Analysis

The unit of analysis for validation of EARAM are 13 experts consist of EA experts in public, private, and academic fields in Malaysia using Delphi Technique. The selected experts have the EA knowledge and have been practicing the EA for more than ten years of experience. Evaluation of EARAM was conducted using a case study method. The case studies are uniquely chosen according to their EA experiences and business functionality. Therefore, this provides the general overview of EA readiness assessment for the public sector agencies in term of EA frameworks and business

function. Therefore, four cases from agencies in MPS that include pilot case were selected in this study. The respondents are an EA team from IT and business unit in the agencies. The selected respondents must be a person who understands EA process and business function of the agency.

1.8 Significance of the Research

The main significance of this study is the development of assessment model for EA establishment in MPS. The detail significance of this study are organised into three contexts, which are theoretical, methodological and practical. The details are as follows:

1.8.1 Underpinning Theories of the Research

It is anticipated that the model is in line with EA Body of Knowledge (EABOK) related to the area of Organisational Scope and Structure of EA, specially focusing on the sub-area namely Organisational Need and Drivers (Kendrick & Shelton, 2020).

The first significance of the of the research has broadened the area of readiness research in EA by identifying the readiness factors that were important in EA establishment. Advances to the existing body of knowledge were made possible by performing SR with greater availability of published literature and with detailed searching process. Identifying the readiness factors for EA establishment in MPS will overcome the gap of the lack of existing studies that reported the readiness factors in EA establishment. The second significance of the research is a list of readiness factors identified from interview session with EA practitioners in MPS. From the interview, new factors from the context of MPS were suggested by the practitioners to be added in the existing lists from the SR findings. The third significance of the research is the formulation of EA Readiness Assessment Model (EARAM) for EA establishment. The conceptual EARAM was developed from the identified factors from SR and interview. The model was able to evaluate the readiness level of EA establishment in an

organisation. The EARAM is also able to facilitate the EA practitioners in the decision-making process related to preparing the agencies towards the establishment of EA. Until now, there is no established and fixed EA readiness assessment to be used for MPS. Generally, EARAM enables organisations to understand their current readiness level before implementation and being able to take actions to overcome the weaknesses. This fulfils the gap of several studies that have built the definitive model of EA readiness assessment at the organisation level.

1.8.2 Practicality of the Research

For the practical significance of the research, this model can be used as a readiness assessment tool (EARAT) based on EARAM and evaluate the tool (EARAT) using the case study method. This tool is able to assist the EA practitioners in conducting the EA readiness assessment in their respective agencies. This EARAT tool is useful in overcoming the issues of lack of established EA readiness assessment tool in MPS due to various EA readiness assessment tool being based on industry and consultant method.

1.9 Definition of Terms

This section explains terms that have been used throughout the thesis.

Enterprise Architecture (EA)	:	A complete concept of an organisation structure, business processes, information systems, and technology infrastructure, through a coherent and comprehensive collection of principles, methods, models, diagrams, and other documents that describe the organisation core business (Dang & Pekkola, 2017).
Model	:	A particular type of version of set of ideas that describe the specific solution for something (van Steenbergen et al., 2011), which in this context refers to the model to assess readiness of EA establishment in MPS.

Establishment	:	The activities encompassing the formation and development of EA. EA establishment describes a set of processes involved in the EA development. In general, the common processes involved are plan, analyse, design, develop, and implement (Bakar, Harihodin, & Kama, 2014).
Assessment	:	The action of making a judgement, evaluating or estimating the nature, ability, or quality of someone or something (ISO/IEC, 2004). In this study, the term is used to define the evaluation process of EA readiness in the organisation.
Public Sector Organisation	:	Type of organisation that deals with production, delivery and allocation of goods and services to its citizens. These services offered by the public sector organisations include social, security, administering urban planning and organising national defences. The government and the local government usually control the public sector (Hjort-Madsen, 2007).
Readiness	:	The state of being fully prepared for something (Armenakis, Harris, & Mossholder, 1993).
Agency	:	A business or organization providing a particular service on behalf of another business, person, or group. In public sector, agencies reside under ministry (Bakar & Selamat, 2016)
Company	:	A commercial business. In this context, company is a private or industrial sector that run business (Garousi et al., 2015)
Institution	:	An organization founded for an educational, professional, or social purpose (Adwan & Al-Soufi, 2016)

1.10 The Organisation of the Thesis

This thesis comprises seven chapters. Chapter 1 presents an overview of this research area. It consists of a background of the research statement of the problem, research questions, objectives of the research, and the scope of research. The significance of this research is also discussed. Chapter 2 consists of the literature review. The chapter presents the key concepts of enterprise architecture, EA establishment, and EA Readiness Assessment Model. Several concepts and theories used in the readiness model are also discussed in this chapter. Chapter 3 explains the research methodology used in this research in achieving the research objectives. Moreover, it provides a further discussion on qualitative analysis that used in this research. Chapter 4 describes the foundations and concepts of EA readiness assessment. Chapter 5 describe the empirical work conducted in the research and the evaluation of the proposed EA Readiness Assessment Model. Finally, Chapter 6 provides the overall discussion and conclusion of the research.

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Appendix A

List of Experts Directly Involved with this Study

Method and Participants	Position and Experiences
i. **Preliminary Interviews**	
1. Dr. Zainuddi Mat Taib	Chief ICT Consultant (Strategic), MAMPU JPM
2. Mrs. Anizah Nordin	Principal Assistant Director (EA Practitioner & TOGAF 9.1 Certified), MAMPU JPM
3. Mr. Mohd Zamri Selamat	ICT Expert (Information Management and EA in Malaysia's public sector), MAMPU JPM
4. Dr. William Voon Fook Seng	ICT Expert (Information Management and EA in Malaysia's public sector), KKM
5. Mr. Aaron Tan Dani	Chief Architect of EA Office, ATD Solution Sdn. Bhd.
ii. **Interviews**	
1. Dr. Zainuddi Mat Taib	Chief ICT Consultant (Strategic), MAMPU JPM
2. Mrs. Anizah Nordin	Principal Assistant Director (EA Practitioner & TOGAF 9.1 Certified), MAMPU JPM
3. Mr. Mohd Zamri Selamat	ICT Expert (Information Management and EA in Malaysia's public sector), MAMPU JPM
4. Dr. William Voon Fook Seng	ICT Expert (Information Management and EA in Malaysia's public sector), KKM
5. Mr. Aaron Tan Dani	Chief Architect of EA Office, ATD Solution Sdn. Bhd.
iii. **Content Validity Study**	
1. Dr. Azlina Ab Aziz	Principal Assistant Director, JPJ, MOT EA Practitioner
2. Dr Suraya Ya'acob	Senior Lecturer, UTM KL Involved in the field of information system
3. Puan Norsyidah binti Mat Saad	Senior Assistant Director, MAMPU JPM. Involved in the project regarding the establishment of EA. Attended formal EA training (Togaf 9.1, Archimate 3.0)
4. Dr. Yahaya Ab. Rahim	Senior Lecturer, UTeM, Melaka Involved in the field of information system and project regarding the establishment of EA
5. Mr. Kamal Hijjal bin Kassim	Senior EA Consultant, ATD Solution Sdn. Bhd. Involved in the project regarding the establishment of EA. Certified IT Architect Trainer.
6. Mrs. Afeefa Azmi	Principal Assistant Director, MAMPU JPM EA Practitioner
7. Mrs. Rajeswari	Principal Assistant Director, MAMPU JPM EA Practitioner
iv. **The Panel of Delphi**	
1. Dr. Zainuddi Mat Taib	Chief ICT Consultant (Strategic), MAMPU, JPM
2. Mrs Wan Azlin Wan Ahmad	ICT Expert (Information Management) , MAMPU, JPM

Method and Participants	Position and Experiences
3. Dr. Pallab Saha	PhD in Information System. Certified in EA certification (Togaf 9.1 and Dodaf)., Bangalore
4. Mr. Nick Goldbergs	ICT Expert and Consultant (Information System) Certified in EA certification (Togaf 9.1 and QPR EA), UK
5. Dr. Ariffin Mokhtar	Business Executive and Consultant Anesthesiologist Cardiothoracic Certified in EA certification (Togaf 9.1, COBIT 5 and CITA-A), HUSM
6. Assoc. Prof. Dr. Wardah Zainal Abidin	Involved in the field of information system. She is the coordinator of Information System in Institution A, UTM, KL
7. Mrs. Anizah Nordin	ICT Expert and Senior Lecturer Involved in the project regarding the establishment of EA. Certified in EA certification (Togaf 9.1, CITA-F), MAMPU, JPM
8. Dr. Fazidah	ICT Expert and Consultant (Information Management) Involved in the project regarding the establishment of EA.Certified in EA certification (Togaf 9.1, CITA-F, Certified IT Architect – Business Technology Strategy), MAM{PU, JPM
9. Dr. Mokhtar Mohd. Yusof	Senior Lecturer, ICT Expert and Consultant (Information Management).Involved in the project regarding the establishment of EA, UTeM
10. Mr. Hasan Gany	Chief Enterprise Architect and Consultant (Information System) This company practices EA. Certified in EA certification (Togaf 9.1, CITA-F, Archimate 3.0), ATD Solution
11. Mr. Mohd Zamri Selamat	ICT Expert (Information Management), Involved in the project regarding the establishment of EA, MAMPU, JPM
12. Mrs. Salinah	Business Executive, Involved in the project regarding the establishment of EA. Certified in EA certification (Togaf 9.1, CITA-F, Archimate 3.0), IJN
13. Mrs. Azlinda Mat Jan	Senior Assistant Director, Involved in the project regarding the establishment of EA. Attended formal EA training. (Togaf 9.1, Archimate 3.0), ICU JPM

Appendix B

Interview Protocol

The Factors of Enterprise Architecture (EA) Readiness Assessment Model for Malaysian Public Sector (MPS)

Research Team:

Surya Sumarni Hussein (Researcher/PhD Student) shsurya2@live.utm.my Phone:+60176347393	Associate Professor Dr. Mohd Naz'ri Mahrin Main Supervisor mdnazrim@utm.my Phone:+60321805211	Dr. Nurazean Maarop Co Supervisor nurazean.kl@utm.my Phone:+60322031341
Advanced Informatics School (UTM AIS) Universiti Teknologi Malaysia, Kuala Lumpur Jalan Semarak 54100 KUALA LUMPUR, MALAYSIA		

Overview:
This protocol is designed for main field work for interview session for data collection in this research.

The objective of this protocol is as to identify the readiness factors of EA in Malaysian Public Sector (MPS) by conducting interview.

This protocol consists of the following:

- Interview Question (see Section A.1)
- List of participants to be interviewed (see Section A.2)
- Sample letter to approach target participants (see Section A.3)
- Evidence of Permission to Conduct the Study (see Section A.4)

A.1 Interview Question

This section is the interview Questions as depicted in Table A.

Table A: Interview Question

Question	**Respondent's Answer**
1. Tell me about yourself • To gather information on: a. Interviewee background b. Job scope c. Organisation direction	
2. What is the strategies being plan to ensure implementation of EA practices successful and can be sustain?	
3. Before embarking in EA journey, what are the activities being held? • To gather information on readiness on EA implementation **a.** What's motivates this organisation/stakeholder?	
4. What initiative involved to ensure successful and sustainable EA practices? • To gather information on activities involved in practicing EA (awareness, gov, knowledge, skils,) **a.** What activities involved in current EA practices	
5. What are the important factors that influences readiness of EA practices in an organisation? • Current issues that need to be resolved • Existing positive factors • Risk in EA practices • Key factors that need to incorporate	

Question	Respondent's Answer
6. How to assess readiness towards EA implementation? • Is there any tools/method used to assess (YES/NO)	

A.2 List of Participation to be Interviewed

The interview would entail mainly quantitative evidence from interview session. At the initial preparatory phase, the key contact person was approached through email explaining the objective and the expected outcome from this study. This is to allow them to have an idea of what to expect during the interview. Table B is the list of participants in the interview from Malaysian Public Sector agencies:

Table B: List of participants to be interview at Malaysian Public Sector and Industry

No	Participants	Positions
1.	Dr. Zainuddi Mat Taib	Chief ICT Consultant (Strategic)
2.	Mrs. Anizah Nordin	Principal Assistant Director (EA Practitioner & TOGAF 9.1 Certified)
3.	Mr. Mohd Zamri Selamat	CT Expert (Information Management and EA in Malaysia's public sector)
4.	Dr. William Voon Fook Seng	ICT Expert (Information Management and EA in Malaysia's public sector)
5.	Mr. Aaron Tan Dani	Chief Architect of EA Office

A.3 Sample Email To Approach Target Participants

Bahasa Malaysia Version

Assalamualaikum dan Salam Sejahtera <interviewee's name>,

PERMOHONAN UNTUK MENGADAKAN KAJIAN KES
Adalah dimaklumkan saya Surya Sumarni Hussein, Pegawai Teknologi Maklumat kini sedang melanjutkan pengajian di peringkat Doktor Falsafah (PhD) tajaan JPA di Universiti Teknologi Malaysia (UTM), Kuala Lumpur dalam bidang Enterprise Architecture (EA). Penyelia saya adalah Profesor Madya Dr. Mohd Naz'ri Mahrin dan Dr. Nurazean Maarop.
2. Untuk makluman, topik kajian ini ialah 'EA Readiness Assessment Model for EA Establishment in Malaysia Puclic Sector', bertujuan untuk menyediakan model kesediaan organisasi yang terlibat dalam fasa pra pembangunan EA dan mengenalpasti faktor kesediaan dalam memastikan kejayaan pelaksanaan EA di agensi kerajaan. Oleh yang demikian selaku peneraju pelaksanaan EA, input daripada <agency's name> adalah amat penting dalam kajian ini untuk mendapatkan pandangan tentang model yang telah dibangunkan.. Data yang sama akan dikumpulkan daripada beberapa agensi peneraju EA lain untuk membolehkan analisis bersilang dilaksanakan antara agensi. Dapatan daripada kajian ini berpotensi sebagai pemudahcara dalam proses pelaksanaan EA di agensi-agensi kerajaan yang lain pada masa akan datang. Kajian ini juga mendapat sokongan penuh daripada pasukan 1GovEA MAMPU.
3. Sehubungan itu, untuk mendapatkan maklumat lanjut bagi melengkapkan kajian ini, saya memohon kebenaran untuk menjalankan temubual. Cadangan tarikh kajian kes adalah < proposed date,time and venue

for interview>, tertakluk kepada ketersediaan pihak tuan/puan. Untuk sebarang pertanyaan lanjut, bolehlah berhubung dengan saya di e-mel shsurya2@live.utm.my atau no. telefon 017-6347292.
4. Bersama-sama surat ini disertakan surat pengesahan kajian daripada UTM untuk perhatian tuan/puan jua. Kerjasama dan pertimbangan tuan/puan amatlah dihargai dan didahului dengan ucapan ribuan terima kasih. Sekian.

Surya Sumarni Hussein
Pelajar PhD
Advanced Informatics School (UTM AIS)
Universiti Teknologi Malaysia, Kuala Lumpur
Jalan Semarak
54100 KUALA LUMPUR
☎ *017 6347292*
✉ *shsurya2@live.utm.my*

English Version

<Greetings>,
APPLICATION FOR CONDUCTING CASE STUDY

I am Surya Sumarni Hussein, PhD candidate from Advanced Informatics Schoold (AIS), Universiti Teknologi Malaysia (UTM), Kuala Lumpur. My research field is on Enterprise Architecture (EA) under supervision of Associate Professor Dr. Mohd Naz'ri Mahrin and Dr. Nurazean Maarop.

2. For your information, the subject of this study is 'EA Readiness Assessment Model for EA Establishment in Malaysia Public Sector', aims to develop a readiness model for the establishment of the EA in Malaysian Public Sector and to identify readiness factor towards successful EA establishment in public sector organisation. Therefore, as a leading organisation in EA implementation, the input of <agency's name> is very important to get feedback of model that has being develop. The same data will be collected from several other EA lead public sector organisations for the cross-analysis purposes. The findings of this study have the potential as an input to formulate a readiness assessment model. The study also received support from MAMPU 1GovEA team.
3 Therefore, I would like to interview you and your EA team on <date, day, time, venue>. For further information, I can be reached at e-mail mel shsurya2@live.utm.myor no. telephone 017-6347292. Together I enclosed the evidence of permission from UTM for your reference. Your cooperation and consideration are greatly appreciated.

Regards
Surya Sumarni Hussein
PhD students
Advanced Informatics School (UTM AIS)
Universiti Teknologi Malaysia, Kuala Lumpur
54100 KUALA LUMPUR

A.4 Evidence of Permission to Conduct Main Study

Refer to Appendix B (letter)

Appendix C

Collected Information About Issues of EA Establishment in MPS with Expert

Issue 1: Absence of the mandate from the government to implement EA initiative	
Expert	Excerpt
Expert 5 from agency B	*"Yes, we are interested in implementing EA in our agencies and believing it is a good initiative to be implemented in our organisation. However, it is difficult to get buy-in from the stakeholder because of the mandate. Compared to ICT Strategic Planning (ISP) initiatives, it already becomes compulsory for agencies to have ISP to comply for a star rating criteria. So, it is important to have the mandate to ensure the MPS EA benefits are recognised throughout the governmental sector."*
Issue 2: Improper EA governance leads to difficulty in managing EA implementation	
Expert 1 from agency A	*"In our agencies, the organisation depends on the size of workers. For public agencies, there a federal agency, state agencies and statutory bodies that have different organisation set up and structure. To come out with a standard governance structure for the EA team is quite a challenge based on this variation of the organisation set up. Therefore, standard governance of EA is a must in an organisation to ensure the sustainability of EA implementation."*
Issue 3: Absence of an EA tool to maintain the EA document	
Expert 4 from agency A	*"Tools is important to help us in managing and updating diagrams, artefact, and documentation regarding EA. However, MPS need to consider having tools that are easy to use and reliable as well as secured to ensure smooth operation in embracing EA journey. As EA will become one of the mediums to integrate all the government initiatives, we need a central repository to allow us to store and information. Yes, it will be good if we can have suitable EA tools to support our personnel, the EA team during EA implementation."*
Issue 4: Lack of EA awareness in Agencies	
Expert 5 from agency B	*"We need to create awareness and understanding of EA. Issues usually occur in establishing and maintaining continues awareness of EA to business users. We need to raise awareness on EA among public sector agencies through the various sessions held in this project. Nobody in our team had experience in EA. All of us have a background in IT. We do not understand what EA is, whether a human resource, financial issue, what the policies are, and*

	so on. We are spending a lot of time discussing the topic."
Expert 3 from agency B	*"Some agencies sent their staff 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 different views and the lack of general awareness of EA and its expected benefits. These views made it difficult to find consensus among the consultants, experts, and civil servants on even the simplest details, which caused severe delays and wasted time. When we proposed EA requirements, we strongly depended on the consultants, who don't have any understanding of our culture, environment, and business services."*
Issue 5: Lack of EA Readiness in Agencies	
Expert 3 from agency B Expert 1 from Agency B Expert 2 from company A	*"EA implementation is not just a project; it is a continues to practice. However, most of the agency understand that EA is a one-time project which one's executed; it is already a success. Thus, it is important for the agencies to be ready to implement EA in their organisation in the long run. Assessment that suits our environment is a must because we need to tackle the factors that enable us to move forward and sustain in this journey. Currently, the lack of assessment being made to assess organisation readiness towards EA implementation. It is based on project initiate with an appointed private consultant. Therefore, I like to suggest that we can have our standard readiness assessment tool that suite our environment and can be used periodically."* *"If the agencies know which point of readiness they need to tackle; it is easier for them to focus on what needs to be done first to ensure smooth sailing."* *"EA readiness assessment is required before embarking on this journey".*
Issue 6: Limited knowledge and skills on EA among the team	
Expert 5 from Agency B	*"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 these issues and run some of the awareness programs such as technology update to enhance the knowledge on EA."
Expert 2 from Company A	*"Some of the agency need to rely on industry consultants to establish EA in their agencies to expedite the process of the establishment, but they also have to involved with us so that we can understand of 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 a long time because of lack of skill and knowledge on EA."*

Appendix D

List of Articles used in Systematic Review (SR)

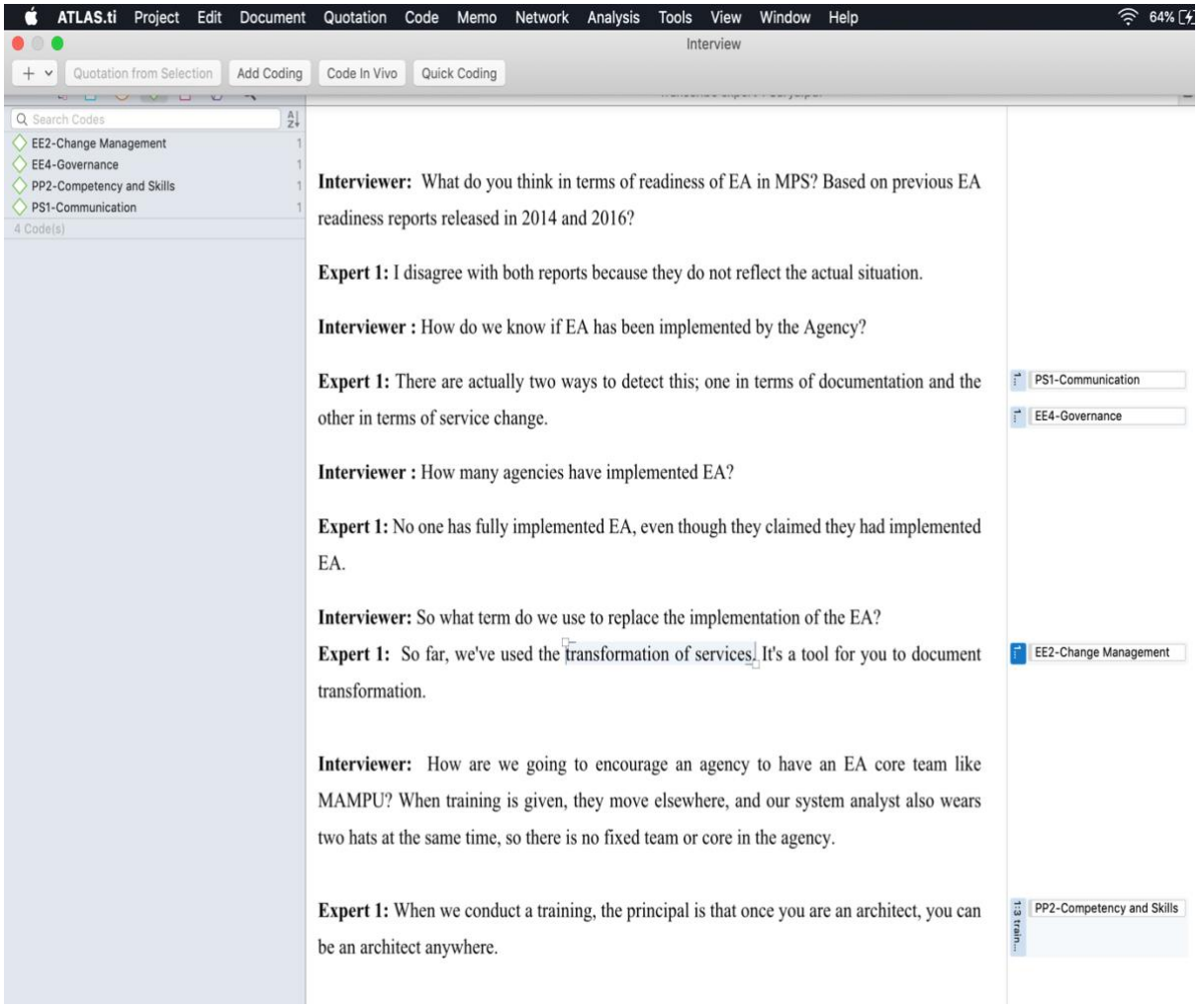
Elements	EA Readiness Factors	(Aagesen et al., 2011)	(Ahuja & Ahuja, 2008)	(Aier, 2014)	(Aier & Schelp, 2010);	(Alshawi & Salleh, 2011)	(Aziz, Obitz, Modi, & Sarkar, 2006)	(Bader et al., 2012)	(Buckl, Matthes, & Schweda, 2009)	(Donaldson et al., 2015)	(Farwick et al., 2013)	(Fischer et al., 2007)	(Foorthuis et al., 2015);	(Gilliland et al., 2015)	(Iyamu & Mphahlele, 2014)	(Jahani et al., 2010)	(Janssen, 2012)	(S. Lee et al., 2016)	(Liimatainen et al., 2007)	(Fatemeh Nikpay et al., 2013)	(Fatemeh Nikpay, Ahmad, & Kia,	(Romero et al., 2009)	(Rouhani et al., 2015)	(Saha, 2012)	(Saleh & Alshawi, 2005)	(Salleh et al., 2011)	(Schmidt & Buxmann, 2011)	(Seppanen, et al., 2009)	(Shah & El Kourdi, 2007)	(Van der Raadt et al., 2010)	(Weiner, 2009)	(Winter & Schelp, 2008)	(B. T. Ylimäki, 2008)	(Zheng & Jiang, 2011)	(Al-Kharusi et al., 2016)
Enterprise Environment	EA Culture	●		●		●	●			●			●	●	●									●	●			●	●	●	●		●		●
	Change Management			●						●									●					●	●							●		●		
	EA Resources			●		●								●	●			●	●				●		●			●				●				
	EA Governance	●		●	●		●		●	●							●			●	●	●	●	●	●	●	●	●	●	●		●			●
People	Workforce Capabilities					●				●			●		●				●							●						●				

Elements	EA Readiness Factors	(Aagesen et al., 2011)	(Ahuja & Ahuja, 2008)	(Aier, 2014)	(Aier & Schelp, 2010);	(Alshawi & Salleh, 2011)	(Aziz, Obitz, Modi, & Sarkar, 2006)	(Bader et al., 2012)	(Buckl, Matthes, & Schweda, 2009)	(Donaldson et al., 2015)	(Farwick et al., 2013)	(Fischer et al., 2007)	(Foorthuis et al., 2015);	(Gilliland et al., 2015)	(Iyamu & Mphahlele, 2014)	(Jahani et al., 2010)	(Janssen, 2012)	(S. Lee et al., 2016)	(Liimatainen et al., 2007)	(Fatemeh Nikpay et al., 2013)	(Fatemeh Nikpay, Ahmad, & Kia,	(Romero et al., 2009)	(Rouhani et al., 2015)	(Saha, 2012)	(Saleh & Alshawi, 2005)	(Salleh et al., 2011)	(Schmidt & Buxmann, 2011)	(Seppanen, et al., 2009)	(Shah & El Kourdi, 2007)	(Van der Raadt et al., 2010)	(Weiner, 2009)	(Winter & Schelp, 2008)	(B. T. Ylimäki, 2008)	(Zheng & Jiang, 2011)	(Al-Kharusi et al., 2016)
	Sponsorship and Leadership					●	●			●				●				●	●							●								●	
	Competency & Skills			●	●	●				●				●	●							●		●	●					●			●	●	
	Commitment														●						●			●	●			●				●	●		
	Stakeholder support										●									●							●	●							
Process	Documentation											●					●						●	●	●				●				●		
	Communication				●																						●			●			●		
	Policy and Rules				●		●							●				●											●						
	Funding						●					●		●	●									●	●			●							

Elements	EA Readiness Factors	(Aagesen et al., 2011)	(Ahuja & Ahuja, 2008)	(Aier, 2014)	(Aier & Schelp, 2010);	(Alshawi & Salleh, 2011)	(Aziz, Obitz, Modi, & Sarkar, 2006)	(Bader et al., 2012)	(Buckl, Matthes, & Schweda, 2009)	(Donaldson et al., 2015)	(Farwick et al., 2013)	(Fischer et al., 2007)	(Foorthuis et al., 2015);	(Gilliland et al., 2015)	(Iyamu & Mphahlele, 2014)	(Jahani et al., 2010)	(Janssen, 2012)	(S. Lee et al., 2016)	(Liimatainen et al., 2007)	(Fatemeh Nikpay et al., 2013)	(Fatemeh Nikpay, Ahmad, & Kia,	(Romero et al., 2009)	(Rouhani et al., 2015)	(Saha, 2012)	(Saleh & Alshawi, 2005)	(Salleh et al., 2011)	(Schmidt & Buxmann, 2011)	(Seppanen, et al., 2009)	(Shah & El Kourdi, 2007)	(Van der Raadt et al., 2010)	(Weiner, 2009)	(Winter & Schelp, 2008)	(B. T. Ylimäki, 2008)	(Zheng & Jiang, 2011)	(Al-Kharusi et al., 2016)
Technology	EA Repository		●												●			●		●										●					
	Security							●											●					●	●										
	EA Tools											●											●								●			●	

Appendix E

Start List and Emerging Code After Data Analysis (Sample)



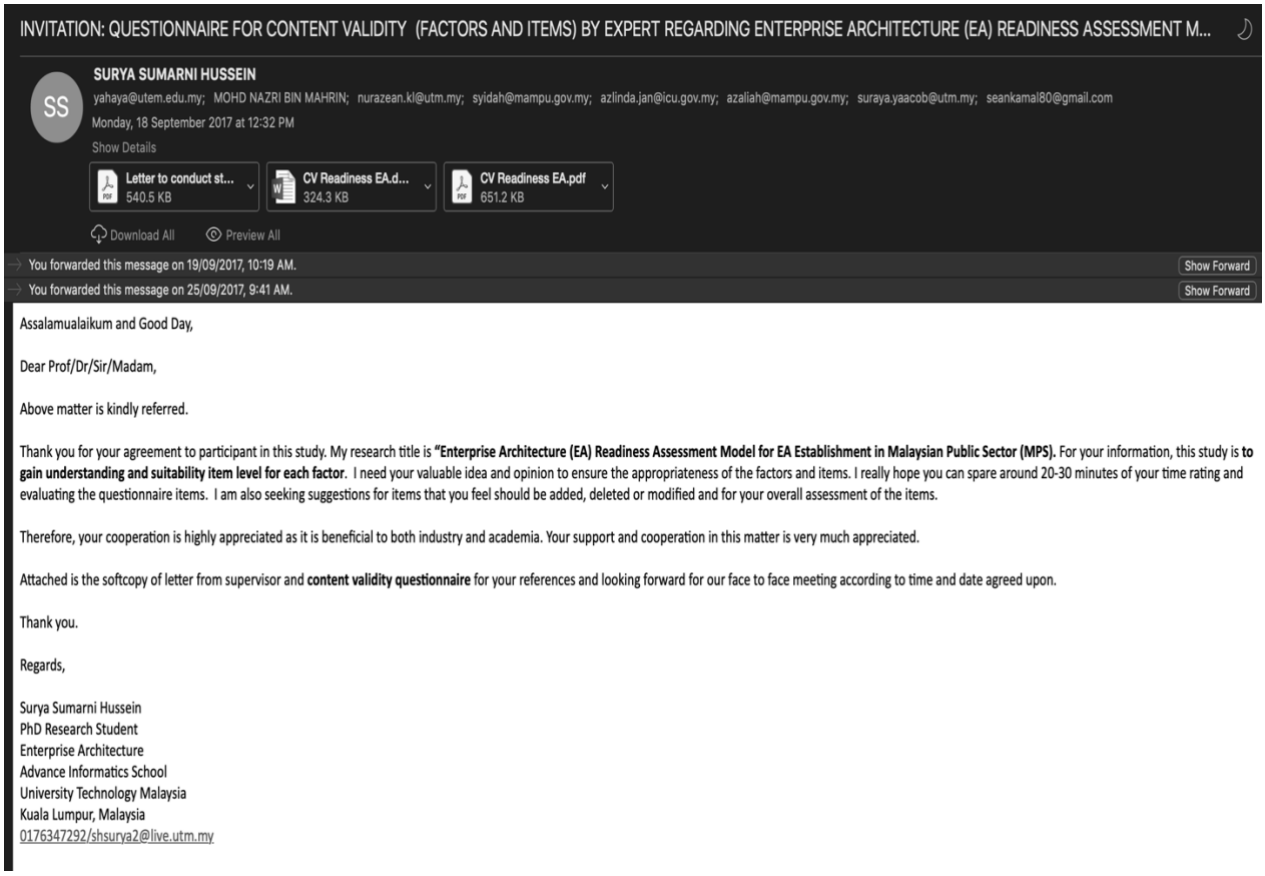
Appendix F

EA development and implementation scenario of the MPS agencies (Sample Cases)

Case	EA Implementation Background					
	EA Process	**Approach**	**Governance Structure**	**EA Tools and Repository**	**Year started**	**Readiness Score in 2016 (MAMPU, 2016b)**
E	TOGAF and consultant EA Framework	The initial phase, rely on the consultant. The following phase, self-develop and implement with less guidance from a consultant	EPU EA Committee Governance structure in place and involves all management levels and departments	TOGAF and Archimate	2011	No record on readiness score
F	Based on Case F Treasury Transformation Program (TTP) and EA Process defined by the consultant	Joint venture with private consultant and MAMPU EA Team	Treasury EA committee (TEAC) with Business Requirement Manager (BRM) and Business Requirement Liaison (BRL) Governance structure in place and involve all management levels and departments	Consultant Tools (Proprietary)	2013	3.37 out of 5.00 Ready
R	MyGovEA from MAMPU	Joint venture implementation and implementation by consultant and MAMPU EA Team	EPU EA Committee Governance structure in place and involves all management levels and departments	MyGovEA repository	2016	2.95 out of 5.00 Ready

Appendix G

Invitation to the Expert to participate in Content Validity (CV) Study



INVITATION: QUESTIONNAIRE FOR CONTENT VALIDITY (FACTORS AND ITEMS) BY EXPERT REGARDING ENTERPRISE ARCHITECTURE (EA) READINESS ASSESSMENT M...

SS

SURYA SUMARNI HUSSEIN

yahaya@utem.edu.my; MOHD NAZRI BIN MAHRIN; nurazean.kl@utm.my; syidah@mampu.gov.my; azlinda.jan@icu.gov.my; azaliah@mampu.gov.my; suraya.yaacob@utm.my; seankamal80@gmail.com

Monday, 18 September 2017 at 12:32 PM

Show Details

Letter to conduct st... 540.5 KB | CV Readiness EA.d... 324.3 KB | CV Readiness EA.pdf 651.2 KB

Download All | Preview All

You forwarded this message on 19/09/2017, 10:19 AM. Show Forward

You forwarded this message on 25/09/2017, 9:41 AM. Show Forward

Assalamualaikum and Good Day,

Dear Prof/Dr/Sir/Madam,

Above matter is kindly referred.

Thank you for your agreement to participant in this study. My research title is **"Enterprise Architecture (EA) Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS).** For your information, this study is **to gain understanding and suitability item level for each factor**. I need your valuable idea and opinion to ensure the appropriateness of the factors and items. I really hope you can spare around 20-30 minutes of your time rating and evaluating the questionnaire items. I am also seeking suggestions for items that you feel should be added, deleted or modified and for your overall assessment of the items.

Therefore, your cooperation is highly appreciated as it is beneficial to both industry and academia. Your support and cooperation in this matter is very much appreciated.

Attached is the softcopy of letter from supervisor and **content validity questionnaire** for your references and looking forward for our face to face meeting according to time and date agreed upon.

Thank you.

Regards,

Surya Sumarni Hussein
PhD Research Student
Enterprise Architecture
Advance Informatics School
University Technology Malaysia
Kuala Lumpur, Malaysia
0176347292/shsurya2@live.utm.my

Appendix H

Letter of Approval to Conduct CV Study

UTM UNIVERSITI TEKNOLOGI MALAYSIA | Advanced Informatics School (AIS)

Advanced Informatics School
Level 5, Menara Razak
Universiti Teknologi Malaysia
Jalan Semarak
54100 Kuala Lumpur, Malaysia

Tel: +(6)03-21805192 Fax: +(6)03-21805370 http://www.ais.utm.my Email: enquiry_ais@ic.utm.my

OUR REF.:

UTM.K38/13.11/1/4 JLD 20 (2)

Date: 13 September 2017

To Whom It May Concern:

Dear Sir/Madam,

APPLICATION FOR CONTENT VALIDATION BY EXPERTS

Above matter is kindly referred.

2. I would like to inform that **Madam Surya Sumarni binti Hussein (PAN153003)** is a registered post graduate student of Advanced Informatics School, Universiti Teknologi Malaysia and currently under my supervision in conducting the research regarding **Enterprise Architecture (EA) Readiness Assessment Model for EA Establishment in Malaysian Public Sector.**

3. With reference to the above matter, we would like to request for your kind service to review the content items of the research instrument from the perspective of the Public Sector.

Thank you.

Yours sincerely,

DR. MOHD NAZ'RI MAHRIN
Supervisor
Advanced Informatics School (AIS)
UTM Kuala Lumpur
0321805211
mdnazrim@utm.my

Appendix I

Content Validity Questionnaire

UTM UNIVERSITI TEKNOLOGI MALAYSIA | Advanced Informatics School (UTM AIS)

EXPERT REVIEW: CONTENT VALIDITY FORM

Research Title:

ENTERPRISE ARCHITECTURE (EA) READINESS ASSESSMENT MODEL FOR EA ESTABLISHMENT IN MALAYSIAN PUBLIC SECTOR (MPS)

Dear Dr/Sir/Madam,

Thank you for your interest in this study. I am a Doctor of Philosophy (PhD) student in Universiti Teknologi Malaysia (UTM), Kuala Lumpur Campus. My research title is "Enterprise Architecture (EA) Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS). The aim of this questionnaire is to gain an understanding and suitability item level for each factor. A Content Validity Questionnaire (CVQ) with specific instructions is enclosed for your review.

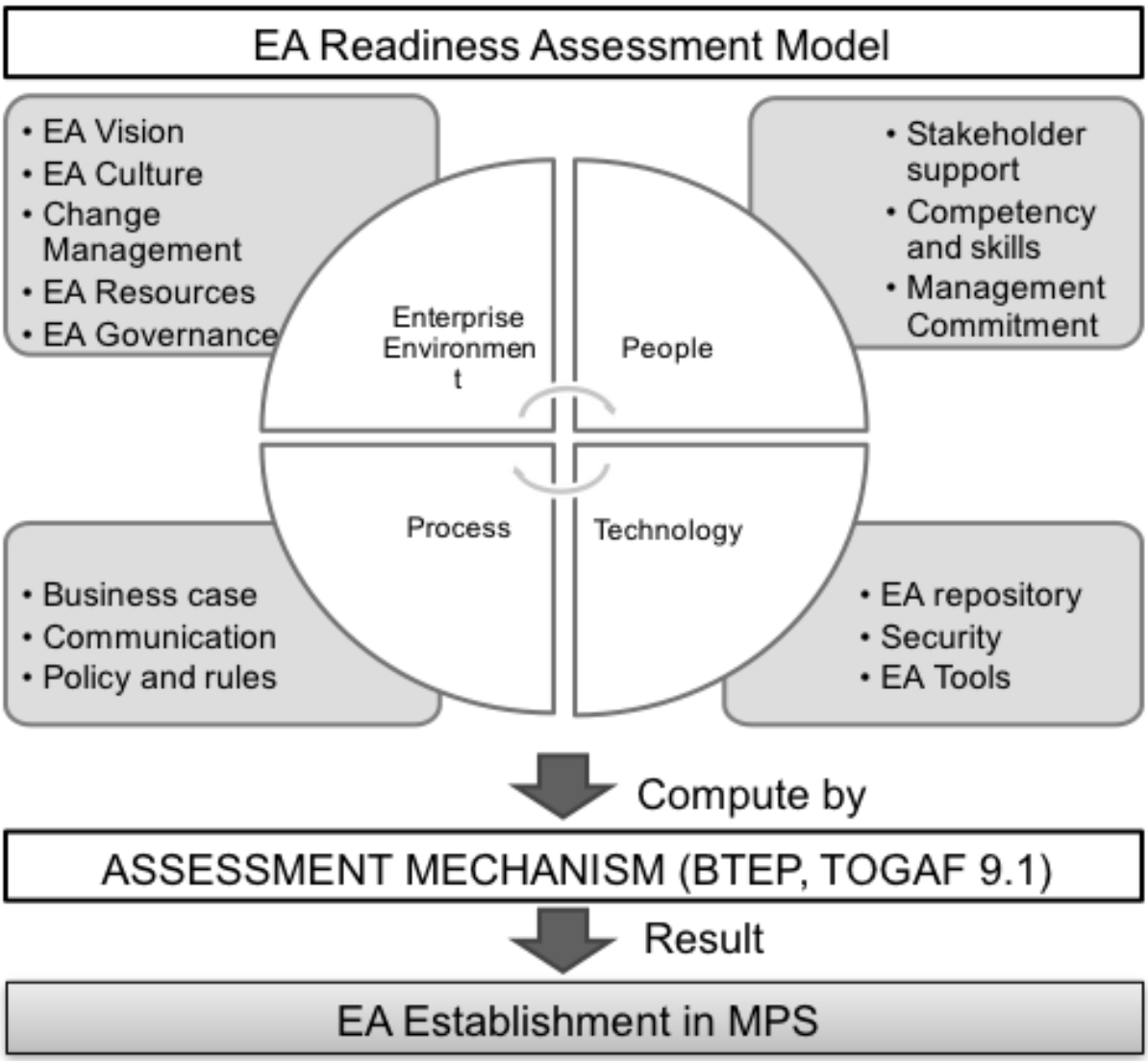
I need your valuable idea and opinion to ensure the appropriateness of the factors and items. I really hope you can spare around 20-30 minutes of your time rating and evaluating the **questionnaire items.** I am also seeking suggestions for items that you feel should be added, deleted or modified and for your overall assessment of the items. Therefore, your cooperation is highly appreciated as it is beneficial to both industry and academia. Your support and cooperation in this matter is very much appreciated. Thank you.

For further info, you may contact:

Student	**Surya Sumarni binti Hussein (PAN153003)** PhD Candidate Advanced Informatics School (AIS), UTMKL E-mail: **shsurya@live.utm.my** / cuyasuryahussein@gmail.com Telephone: 017-6347292	
Supervisors	**Dr. Mohd Naz'ri Mahrin** Senior Lecturer, AIS, UTMKL E-mail: mdnazrim@utm.my	**Dr. Nurazean Maarop** Senior Lecturer, AIS, UTMKL E-mail: **nurazean.kl@utm.my**

The Proposed EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS)

The concept of EA readiness has been studied based on different dimensions by different scholars and organisations, and they used different theories to support their arguments. Based on the literature, it can be concluded that there are a few major perspectives when discussing EA readiness, relevant theories and famous writings related to this area. The proposed EA Readiness Assessment Model is based on IT/IS Readiness Maturity Model developed by Salleh, Alshawi, Mohamed Sabli, Zolkafli, & Judi (2011). It is a generic model that evaluates four (4) elements; IT infrastructure (Technology), people, work environment (Enterprise Environment) and process. The assessment mechanism will adapt Business Transformation Enablement Program (BTEP) method from TOGAF 9.1. This assessment is based upon the determination and analysis/rating of a series of readiness factors. The outcome is a deeper understanding of the challenges and opportunities that could be presented in the course of the endeavour. Many of the challenges translate directly into risks that should be addressed, monitored, and, if possible, mitigated. The factors proposed are derived based Salleh et al.(2011) model, systematic review (SR) study and interview with the experts. Below is the proposed EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector for your references.



The CVQ structure is as below and the question for Delphi Study later will use Scale and Category for Section A and Five Points Likert Scale (1-Strongly Disagree to 5-Strongly Agree) for Section B until E.

Section	Description/Element/Factor	Item	No. of Item
A	Respondent's Profile	RP1: Role RP2: Experience RP3: Knowledge level on EA RP4: Training in EA RP5: EA Certification RP6: Years of involvement in application system, enterprise-wide system an EA project	6
B	**Enterprise Environment (EE)**		**20**
B1	EA Vision (EE1)	EE1-1: Align with business EE1-2: Clear Objective EE1-3: Defined vision include business and IT EE1-4: Predict and prove processes EE1-5: Clear drivers EE1-6: Clear scope and approach	6
B2	EA Culture (EE2)	EE2-1: Awareness program EE2-2: Encourage participation EE2-3: EA Culture as delivery oriented EE2-4: Empowered and shared EA with staff and stakeholder	4
B3	Change Management (EE3)	EE3-1: Strategy alignment EE3-2: Management of the vertical and horizontal relationship EE3-3: Management processes are in places EE3-4: Reward and recognition	4
B4	EA Resources (EE4)	EE4-1: Workforce capability EE4-2: Enterprise ability EE4-3: Sufficient financial resource	3
B5	EA Governance (EE5)	EE5-1: Formal governance structure EE5-2: Identification of stakeholder with interest EE5-3: Roles and responsibilities	3
C	**People (PP)**		**10**
C1	Stakeholder support (PP1)	PP1-1: Leadership and management provision PP1-2: Stakeholder continuous support PP1-3: Mutual understanding among stakeholder	3
C2	Competency & Skills (PP2)	PP2 -1: Sufficient competence and skillful PP2-2: Presence necessary skills PP2-3: Model for competency skills	3
C3	Management Commitment (PP3)	PP3-1: Support from top management PP3-2: Top management and stakeholder continuous engagement PP3-3: Active involvement from top management and other stakeholder groups PP3-4: Sufficient knowledge among stakeholder	4
D	**Process (PS)**		**7**
D1	Business Case (PS1)	PS1-1: Concrete benefits of Business Case document PS1-2: Clear business case	2
D2	Communication (PS2)	PS2-1: A common, well-defined vocabulary of terms and concepts PS2-2: Communications plan and strategy PS2-3: Documentation for references	3
D3	Policy and Rules (PS3)	PS3-1: Standard business policies and rules PS3-2: Standard principles and guidelines exist	2
E	**Technology (TC)**		**6**
E1	EA Repository (TC1)	TC1-1: Centralised EA repository TC1-2: Easy Retrieval	2
E2	Security (TC2)	TC2-1: Reliable security system	1
E3	EA Tools (TC3)	TC3-1: EA tools are suitable with selected methodology and framework TC3-2: Adequate EA tool support	2
		TOTAL OF ITEMS	**49**
	Feedback		
	Verification on Content Validation by Expert		

SAMPLE

Below is a **sample** on how you can complete this **CVQ** by **ticking (√) at the number from 1 to 4 under Relevancy column** as an indication of the level of your argument with the statement. For the **comment section** you may **add, delete of modify** the factors and items **if any.**

The scale of Relevancy	**1**	**2**	**3**	**4**
	Not Relevant	**Somewhat Relevant**	**Quite Relevant**	**Highly Relevant**

SECTION B	**ELEMENT: ENTERPRISE ENVIRONMENT (EE)**
This section intends to look into multiple factors under **enterprise environment element** that involves the **EA vision, EA culture, EA change management, governance** towards readiness of EA establishment in the MPS.	

Sub-Section B1		**FACTOR: EA VISION (EE1)**				
Description		The ability to **clearly define and communicate what we are trying to achieve**. EA is **driven by business approach to achieve vision**. Provides the basis/foundation for the entire EA.				
Source		**Interview:** Vision factor derive from an interview session				
		Literature review: Items derived from LR Jahani et al., 2010; Alghamdi et al., 2011a; Azab, 2009				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE1-1	**Alignment of EA** practices with **business vision**				√
	EE1-2	**Objectives are clearly defined**, in both strategic and specific terms.				√
	EE1-3	**Vision and needs are defined** from the **business side with IT input**.				√
	EE1-4	There is a **predict and prove processes for moving from vision to statement of requirements.**				√
	EE1-5	There is a **clear driver** to implement the initiatives				√
	EE1-6	There is a **clear scope and approach** of the transformation initiative throughout the organization.				√
2.	Overall, the presence of **EA Vision** can influence readiness of EA establishment in MPS					√
Comments/Suggestions: (Add/Delete/Modify) Delete predict and prove process.						

INSTRUCTION: Please tick (√) at the number from 1 to 4 as an indication of the level of your agreement with the statement. The scale of **Relevancy** is:			
1	**2**	**3**	**4**
Not Relevant	**Somewhat Relevant**	**Quite Relevant**	**Highly Relevant**

SECTION A	**RESPONDENT'S PROFILE**				
This section is to **gain general information** about the **respondent's demographic background**.					
No	**Items/Questions**	**Relevancy**			
		1	**2**	**3**	**4**
RP1	Role in any Enterprise System of Enterprise Architecture project • Chief Information Officer • IT Director • IT Manager • IT Executive • Business Executive • IT Consultant/Expert • IT Solution Provider/Vendor • Business Consultant/Expert • Others, please specify				
RP2	Working Experience • Less than 5 years • 5 to 10 years • 11 to 15 years • 16 to 20 years • More than 20 years				
RP3	Knowledge level on enterprise architecture • Expert • Advanced • Competent • Casually acquainted • Unfamiliar				
RP4	Attended any formal training in enterprise architecture • Yes, please specify • No				
RP5	Attended and received any enterprise architecture certification. • Yes, please specify • No				
RP6	Worked in inter-organisational application system, enterprise-wide system or Enterprise Architecture. • Never • Less than 3 years • 3 to 6 years • 7 to 10 years • More than 10 years				
	Comments/suggestions:(Add/Delete/Modify))				

SECTION B	**ELEMENT: ENTERPRISE ENVIRONMENT (EE)**
This section intends to look into multiple factors under **enterprise environment element** that involves the **EA vision, EA culture, EA change management, governance** towards readiness of EA establishment in the MPS.	

Sub-Section B1	**FACTOR: EA VISION (EE1)**
Description	The ability to **clearly define and communicate what we are trying to achieve**. EA is **driven by business approach to achieve vision**. Provides the basis/foundation for the entire EA.
Source	**Interview:** Vision factor derive from an interview session

		Literature review: Items derived from LR Jahani et al., 2010; Alghamdi et al., 2011a; Azab, 2009				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE1-1	**Alignment of EA** practices with **business vision**				
	EE1-2	**Objectives are clearly defined**, in both strategic and specific terms.				
	EE1-3	**Vision and needs are defined** from the **business side with IT input**.				
	EE1-4	There is a **predict and prove processes for moving from vision to statement of requirements.**				
	EE1-5	There is a **clear driver** to implement the initiatives				
	EE1-6	There is a **clear scope and approach** of the transformation initiative throughout the organization.				
2.	Overall, the presence of **EA Vision** can influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section B2		**FACTOR: EA CULTURE (EE2)**				
Description		**Involvement and practices of EA** by the employee in the organization. It also refers to **activities to embrace EA** in the environment of organization**.**				
Source		**Interview**				
		Literature review Aier, 2014; Donaldson et al., 2015; Foorthuis et al., 2015; B. T. Ylimäki, 2008; Shah & El Kourdi, 2007; Seppanen et al., 2009				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE2-1	Program to **promote awareness** among employees to embrace EA				
	EE2-2	**Encourage participation** of employees towards corporate objectives rather than local objectives				
	EE2-3	Enforcement of **EA culture as a delivery-oriented**				
	EE2-4	**Empowerment and sharing among employees and stakeholder** in the organization learning culture				

2.	Overall, the presence of **EA Culture** can influence readiness of EA establishment in MPS.				
Comments/Suggestions: (Add/Delete/Modify)					

Sub-Section B3		**FACTOR: EA CHANGE MANAGEMENT (EE3)**				
Description		Refers to **change commitment** and **change efficacy**. **Specific plan and governance structure is created to facilitate change in the organization.**				
Source		**Interview**				
		Literature Review Weiner, 2009; Aier, 2014; B. T. Ylimäki, 2008				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE3-1	**Alignment of strategy between IT and business** is able to facilitate change management				
	EE3-2	Ability of the **top management to manage vertical and horizontal relationship to accommodate change** in EA establishment				
	EE3-3	**Service management processes are in place** (e.g.: operations, maintenance, and support for existing systems behaviors, and training for the new way of working.)				
	EE3-4	**Establishment of reward and recognition system** to recognize teams and individuals (i.e.: Employees who use good change management practices, planning and prevention of crisis behaviours and who reinforce behaviours appropriate to the new way of doing business)				
2.	Overall, the presence of **EA Change Management** can influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section B4	**FACTOR: EA RESOURCES (EE4)**
Description	**Sufficient resource to establish EA practices**. Resource include human resources, financial resources and asset resources in enterprise. It also refers to business and IT capacity. These factors deal with all the resources (assets) available to be allocated in order to support organisational business processes.

Source		Interview				
		Literature review Aier, 2014; Aier & Schelp, 2010; Short & Burke, 2010;				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE4-1	**Employees capable to perform all the tasks required** by the project, in areas outside of IT, including the ability to make decisions within the tight time constraints typical to project environments				
	EE4-2	**Organisation ensure service management processes are in place** (i.e.: providing operations, maintenance, and support for existing systems behaviors, and training for the new way of working for the employees)				
	EE4-3	**Sufficient financial resource is allocated** (central funding for EA establishment is allocated)				
2.	Overall, the presence of **EA Resources** can influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section B5	FACTOR: EA GOVERNANCE (EE5)					
Description	Refers to **structure, procedures and routines, and communications involving business and IT**. The ability to **engage the involvement and support** of all parties with an interest in or responsibility to the project with the objective of ensuring that the corporate interests are served and the objectives achieved**.**					
Source	**Interview**					
	Literature Review (Aagesen et al., 2011)**;** (Janssen, 2012)**;** (Seppanen et al., 2009)**;** (Schmidt & Buxmann, 2011)**;** (Van der Raadt et al., 2010)**;** (Winter & Schelp, 2008)(S. Lee et al., 2016)					
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE5-1	Establishment of **formal EA governance structure**				
	EE5-2	**Clear identification** of stakeholders				
	EE5-3	**Roles and responsibility of stakeholder and EA team** clearly defined				

2.	Overall, the presence of **EA Governance** can influence readiness of EA establishment in MPS				
Comments/Suggestions: (Add/Delete/Modify)					

SECTION C	**ELEMENT: PEOPLE (PP)**
This section intends to look into multiple factors under people element that involves the stakeholder support, competency and skills, and commitment towards readiness of EA establishment in the MPS.	

Sub-Section C1	**FACTOR: STAKEHOLDER SUPPORT (PP1)**
Description	Stakeholder is the **highest hierarchy in organization who continuously support EA practices**. Stakeholder also act as an **executive sponsor** that accepts accountability for the project.
Source	**Interview**
	Literature review (Fatemeh Nikpay et al., 2013); (Schmidt & Buxmann, 2011); (Seppanen et al., 2009); (Farwick, Breu, Hauder, Roth, & Matthes, 2013); (Iyamu & Mphahlele, 2014)(Iyamu & Mphahlele, 2014)

Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PP1-1	**Leadership and management provision among sponsor and stakeholder** (i.e.: keep the project focused, and communicate and support the needs of the project to senior management.)				
	PP1-2	**Stakeholder continuous support** (i.e.: engagement in aligning project needs and execute the EA programs)				
	PP1-3	**Mutual understanding** exists among all **EA stakeholder**				
2.	Overall, the presence **Stakeholder Support** is an important factor which influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section C2		FACTOR: COMPETENCY AND SKILLS (PP2)				
Description		The **ability to perform all the EA tasks required by the project, including the skills, tools, processes, and management capability**. The extent to which the architecture team is organized and established and to which required skills are available or acquired.				
Source		**Interview**				
		Literature review Aier, 2014; Aier & Schelp, 2010; Iyamu & Mphahlele, 2014; Van der Raadt et al., 2010; B. T. Ylimäki, 2008; Romero et al., 2009				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PP2-1	Sufficient **competence and skillful EA architect** in place				
	PP2-2	Adequate **staffs with the necessary skills to execute the project**				
	PP2-3	Presence of **EA competency model** (i.e.: include awareness program, retention program, and training and certification provided throughout the organization)				
2.	Overall, the presence **Competency and Skills** is an important factor which influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section C3		FACTOR: MANAGEMENT COMMITMENT (PP3)				
Description		The extent to which both the **top-management and the employees of the organization are committed to and involved** in the EA effort.				
Source		**Interview**				
		Literature review (Fatemeh Nikpay et al., 2013)**;** (Schmidt & Buxmann, 2011)**;** (Seppanen et al., 2009)**;** (Farwick et al., 2013)(T. Ylimäki, 2006)				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PP3-1	S**upport from top management** to set up funding, follow through, identify effort and benefits of EA establishment.				

	PP3-2	**Top management and stakeholder's** continuous engagement in EA project				
	PP3-3	**Active involvement from top management and other stakeholder groups** in early establishment of EA initiatives and throughout the journey.				
	PP3-4	**Sufficient knowledge among stakeholders in fostering EA.** (i.e.: Everyone are having a clear view on how implementation will occur, how it will be monitored and how realignment actions will be made)				
2.	Overall, the presence **Management commitment** is an important factor which influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

SECTION D	**ELEMENT: PROCESS (PS)**
This section intends to look into multiple factors under process element that involves business case, communication and policy and rules towards readiness of EA establishment in the MPS.	

Sub-Section D1	**FACTOR: BUSINESS CASE (PS1)**					
Description	A business case consists of **focus for the project, benefits that must be achieved and thereby creating an imperative to succeed.** EA is driven by business requirement derived from business case.					
Source	**Interview:** Business case factor derive from an interview session					
	Literature review: Items derived from LR (Foorthuis et al., 2015); (Saha, 2012); (Seppanen et al., 2009);(Schmidt & Buxmann, 2011); (Van der Raadt et al., 2010)					
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PS1-1	There is a Business Case document that **identifies concrete benefits (revenues or savings) that the organization is committed to deliver.**				
	PS1-2	There is a Business Case that clearly stated **points to goals that the organization is committed to achieved.**				
2.	Overall, the presence **Business Case** is an important factor which influence readiness of EA establishment in MPS.					

Comments/Suggestions: (Add/Delete/Modify)

Sub-Section D2		**FACTOR: COMMUNICATION (PS2)**				
Description		Formalised processes through which **interactions and information sharing** between the Top management (CIO, ITO) and the EA team or employee took place in the organisation.				
Source		**Interview**				
		Literature review (Fatemeh Nikpay et al., 2013)**;** (Schmidt & Buxmann, 2011)**;** (Seppanen et al., 2009)**;** (Farwick et al., 2013)				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PS2-1	**Common, well-defined vocabulary of terms and concepts** of **EA language** exists.				
	PS2-2	Clear **roadmap on EA implementation exist** to be understand by EA practitioner.				
	PS2-3	**Documentation as a reference** consist of current and future state of an EA, EA roadmap, and EA principles is available.				
2.	Overall, the presence **Communication** is an important factor which influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section D3	**FACTOR: POLICY AND RULES (PS3)**	
Description	Define **guidelines for decision making on architecture development**, **implementation and management**, to ensure transparency and objectivity. They **govern** the relationship between EA and its stakeholders within and outside IT.	
Source	**Interview**	
	Literature review Aier & Schelp, 2010; S. Lee et al., 2016; Gilliland et al., 2015; Van der Raadt et al., 2010; Aziz et al., 2006	
Items		**Relevancy**

			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PS3-1	There is a standard **business policies and rules** (i.e.: which assist the monitoring and controlling of continuous improvements in EA practices)				
	PS3-2	There is a standard **principles and guidelines** (i.e.: for architecture arbitration improve acceptance of results and reduce time required for decision making.)				
2.	Overall, the presence **Policy and Rules** is an important factor which influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

SECTION E	**ELEMENT: TECHNOLOGY (TC)**
This section intends to look into multiple factors under technology element that involves EA repository, security, and practical EA Technology towards readiness of EA establishment in the MPS.	

Sub-Section E1	**FACTOR: EA REPOSITORY (TC1)**
Description	An **infrastructure that consist of a storage architecture, which manage and moves information to the most cost-effective data repository based on the value of each piece of information at that exact point in time.** This infrastructure should be accessible to EA team and secured**.**
Source	**Interview**
	Literature review (Ahuja & Ahuja, 2008)**;**(Iyamu & Mphahlele, 2014)**;** (S. Lee et al., 2016; Fatemeh Nikpay et al., 2013; B. T. Ylimäki, 2008)

Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	TC1-1	**Centralized EA repository** to store EA information exist.				
	TC1-2	**Easy access and retrieval** of the information via the repository for the EA team.				
2.	Overall, the present **EA Repository** is an important factor which influence readiness of EA establishment in MPS.					

Comments/Suggestions: (Add/Delete/Modify)

Sub-Section E2		**FACTOR: SECURITY (TC2)**				
Description		Refers to **security of the communication of systems, flow of information,** as well as the **exchange of data** and business processes				
Source		**Interview**				
		(Bader et al., 2012)**;** (Liimatainen et al., 2007)**;**(Saha, 2012)				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	TC2-1	**Reliable security systems are in place** to ensure EA artifacts secured.				
2.	Overall, the presence **security** is an important factor which influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section E3		**FACTOR: EA TOOLS (TC3)**				
Description		Refers to **EA Management supporting tools** for its practices and procedure such as modelling and developing tools.				
Source		**Interview**				
		Literature review (Fischer et al., 2007) (Rouhani et al., 2015)				
Items			**Relevancy**			
			1	**2**	**3**	**4**
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	TC3-1	**EA tools** that **suite with selected methodology and framework.**				
	TC3-2	**Adequate support** for EA tool for **management and maintenance.**				
2.	Overall, the presence **EA tools** is an important factor which influence readiness of EA establishment in MPS.					
Comments/Suggestions: (Add/Delete/Modify)						

--END OF QUESTIONS-

FEEDBACK:	
Expected time taken to complete the questionnaire (Example: 15 minutes)	
Please provide comments (if any)	

VERIFICATION ON CONTENT VALIDATION BY EXPERT:

To whom it may concern,

VERIFICATION ON CONTENT VALIDATION BY EXPERT

The above matter is kindly referred.

2. This is to confirm my participation in the evaluation of the item's relevancy to the research instrument in the study of EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector by Surya Sumarni binti Hussein (Matric No.: PAN153003) from Advanced Informatics School, Universiti Teknologi Malaysia.

Thank you.

Signature :

Name :

Designation :

Date :

Appendix J

Content Validity Answer from Expert (Sample)

UTM
UNIVERSITI TEKNOLOGI MALAYSIA
Advanced Informatics School (UTM AIS)

EXPERT REVIEW: CONTENT VALIDITY FORM

Research Title:
ENTERPRISE ARCHITECTURE (EA) READINESS ASSESSMENT MODEL FOR EA ESTABLISHMENT IN MALAYSIAN PUBLIC SECTOR (MPS)

Dear Dr/Sir/Madam,

Thank you for your interest in this study. I am a Doctor of Philosophy (PhD) student in Universiti Teknologi Malaysia (UTM), Kuala Lumpur Campus. My research title is "Enterprise Architecture (EA) Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS). The aim of this questionnaire is to gain an understanding and suitability item level for each factor. A Content Validity Questionnaire (CVQ) with specific instructions is enclosed for your review.

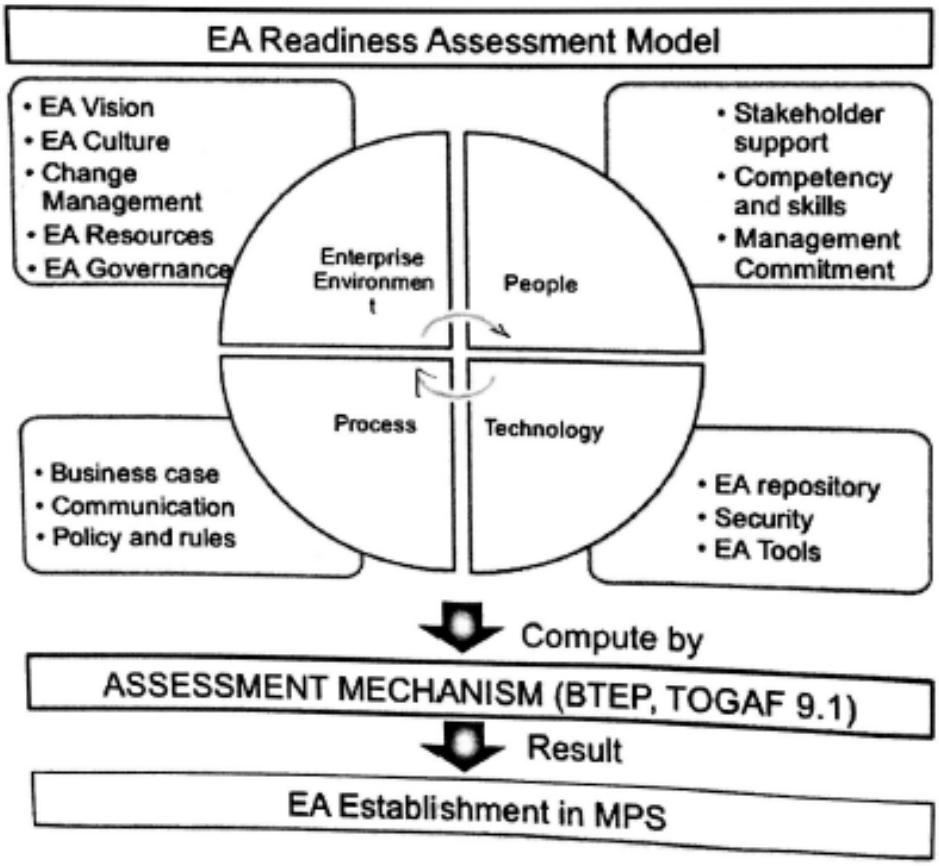
I need your valuable idea and opinion to ensure the appropriateness of the factors and items. I really hope you can spare around 20-30 minutes of your time rating and evaluating the **questionnaire items.** I am also seeking suggestions for items that you feel should be added, deleted or modified and for your overall assessment of the items. Therefore, your cooperation is highly appreciated as it is beneficial to both industry and academia. Your support and cooperation in this matter is very much appreciated. Thank you.

For further info, you may contact:

Student	**Surya Sumarni binti Hussein (PAN153003)** PhD Candidate Advanced Informatics School (AIS), UTMKL E-mail: **shsurya@live.utm.my** / cuyasuryahussein@gmail.com Telephone: 017-6347292	
Supervisors	**Dr. Mohd Naz'ri Mahrin** Senior Lecturer, AIS, UTMKL E-mail: mdnazrim@utm.my	**Dr. Nurazean Maarop** Senior Lecturer, AIS, UTMKL E-mail: **nurazean.kl@utm.my**

The Proposed EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS)

The concept of EA readiness has been studied based on different dimensions by different scholars and organisations, and they used different theories to support their arguments. Based on the literature, it can be concluded that there are a few major perspectives when discussing EA readiness, relevant theories and famous writings related to this area. The proposed EA Readiness Assessment Model is based on IT/IS Readiness Maturity Model developed by Salleh, Alshawi, Mohamed Sabli, Zolkafli, & Judi (2011). It is a generic model that evaluates four (4) elements; IT infrastructure (Technology), people, work environment (Enterprise Environment) and process. The assessment mechanism will adapt Business Transformation Enablement Program (BTEP) method from TOGAF 9.1. This assessment is based upon the determination and analysis/rating of a series of readiness factors. The outcome is a deeper understanding of the challenges and opportunities that could be presented in the course of the endeavour. Many of the challenges translate directly into risks that should be addressed, monitored, and, if possible, mitigated. The factors proposed are derived based Salleh et al.(2011) model, systematic review (SR) study and interview with the experts. Below is the proposed EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector for your references.



The CVQ structure is as below and the question for Delphi Study later will use Scale and Category for Section A and Five Points Likert Scale (1-Strongly Disagree to 5-Strongly Agree) for Section B until E.

Section	Description/Element/Factor	Item	No. of Item
A	Respondent's Profile	RP1: Role RP2: Experience RP3: Knowledge level on EA RP4: Training in EA RP5: EA Certification RP6: Years of involvement in application system, enterprise-wide system an EA project	6
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E	**Technology (TC)**		**6**
E1	EA Repository (TC1)	TC1-1: Centralised EA repository TC1-2: Easy Retrieval	3
E2	Security (TC2)	TC2-1: Reliable security system	1
E3	EA Tools (TC3)	TC3-1: EA tools is suitable with selected methodology and framework TC3-2: Adequate EA tool support	2
		TOTAL OF ITEMS	**49**
	Feedback		
	Verification on Content Validation by Expert		

SAMPLE

Below is a **sample** on how you can complete this **CVQ** by **ticking (√) at the number from 1 to 4 under Relevancy column** as an indication of the level of your argument with the statement. For the **comment section** you may **add, delete of modify** the factors and items **if any.**

The scale of Relevancy	1	2	3	4
	Not Relevant	**Somewhat Relevant**	**Quite Relevant**	**Highly Relevant**

SECTION B	**ELEMENT: ENTERPRISE ENVIRONMENT (EE)**
This section intends to look into multiple factors under **enterprise environment element** that involves the **EA vision, EA culture, EA change management, governance** towards readiness of EA establishment in the MPS.	

Sub-Section B1		**FACTOR: EA VISION (EE1)**				
Description		The ability to **clearly define and communicate what we are trying to achieve. EA is driven by business approach to achieve vision.** Provides the basis/foundation for the entire EA.				
Source		**Interview:** Vision factor derive from an interview session				
		Literature review: Items derived from LR (Jahani, Javadein, & Jafari, 2010)(Alghamdi, Goodwin, & Rampersad, 2011)(Azab & Consultant, 2009)				
Items			**Relevancy**			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE1-1	**Alignment of EA** practices with **business vision**				√
	EE1-2	**Objectives are clearly defined,** in both strategic and specific terms.				√
	EE1-3	**Vision and needs are defined** from the **business side with IT input.**				√
	EE1-4	There is a **predict and prove processes for moving from vision to statement of requirements.**		-		√
	EE1-5	There is a **clear driver** to implement the initiatives				√
	EE1-6	There is a **clear scope and approach** of the transformation initiative throughout the organization.				√
2.	Overall, the presence of **EA Vision** can influence readiness of EA establishment in MPS					√
Comments/Suggestions: (Add/Delete/Modify) Delete predict and prove process.						

INSTRUCTION: Please tick (√) at the number from 1 to 4 as an indication of the level of your agreement with the statement. The scale of **Relevancy** is:

1	2	3	4
Not Relevant	**Somewhat Relevant**	**Quite Relevant**	**Highly Relevant**

SECTION A **RESPONDENT'S PROFILE**

This section is to **gain general information** about the **respondent's demographic background.**

No	Items/Questions	Relevancy 1	2	3	4
RP1	Role in any Enterprise System of Enterprise Architecture project • Chief Information Officer • IT Director • IT Manager • IT Executive • Business Executive • IT Consultant/Expert • IT Solution Provider/Vendor • Business Consultant/Expert • Others, please specify				✓
RP2	Working Experience • Less than 5 years • 5 to 10 years • 11 to 15 years • 16 to 20 years • More than 20 years			✓	
RP3	Knowledge level on enterprise architecture • Expert • Advanced • Competent • Casually acquainted • Unfamiliar				✓
RP4	Attended any formal training in enterprise architecture • Yes, please specify • No				✓
RP5	Attended and received any enterprise architecture certification. • Yes, please specify • No				✓
RP6	Worked in inter-organisational application system, enterprise-wide system or Enterprise Architecture. • Never • Less than 3 years • 3 to 6 years • 7 to 10 years • More than 10 years			✓	
	Comments/suggestions:(Add/Delete/Modify) RP1 - Others - should be specify. RP2 - Group of range may be not too many.				

Sub-Section B3		FACTOR: EA CHANGE MANAGEMENT (EE3)				
Description		Refers to **change commitment** and **change efficacy**. **Specific plan and governance structure is created to facilitate change in the organization.**				
Source		**Interview**				
		Literature Review (Weiner, 2009) (Aier, 2014); (B. T. Ylimäki, 2007)				
Items			**Relevancy**			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE3-1	**Alignment of strategy between IT and business** is able to facilitate change management				✓
	EE3-2	Ability of the **top management to manage vertical and horizontal relationship to accommodate change** in EA establishment				✓
	EE3-3	**Service management processes are in place** (e.g.: operations, maintenance, and support for existing systems behaviors, and training for the new way of working.)				✓
	EE3-4	**Establishment of reward and recognition system** to recognize teams and individuals (i.e.: Employees who use good change management practices, planning and prevention of crisis behaviours and who reinforce behaviours appropriate to the new way of doing business)				✓
2.	Overall, the presence of **EA Change Management** can influence readiness of EA establishment in MPS.					✓
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section B4		FACTOR: EA RESOURCES (EE4)				
Description		**Sufficient resource to establish EA practices.** Resource include human resources, financial resources and asset resources in enterprise. It also refers to business and IT capacity. These factors deal with all the resources (assets) available to be allocated in order to support organisational business processes.				
Source		**Interview**				
		Literature review (Aier, 2014) Aier, 2014; Aier and Schelp, 2010; Short and Burke, 2010;				
Items			**Relevancy**			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE4-1	**Employees capable to perform all the tasks required** by the project, in areas outside of IT, including the ability to make decisions within the tight time constraints typical to project environments			✓	
	EE4-2	**Organisation ensure service management processes are in place** (i.e.: providing operations, maintenance, and support for existing systems behaviors, and training for the new way of working for the employees)				✓
	EE4-3	**Sufficient financial resource is allocated** (central funding for EA establishment is allocated)			✓	
2.	Overall, the presence of **EA Resources** can influence readiness of EA establishment in MPS.					✓
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section B5	FACTOR: EA GOVERNANCE (EE5)
Description	Refers to **structure, procedures and routines, and communications involving business and IT**. The ability to **engage the involvement and support** of all parties with an interest in or responsibility to the project with the objective of ensuring that the corporate interests are served and the objectives achieved.
Source	**Interview** **Literature Review** (Aagesen et al., 2011); (Janssen, 2012); (Seppanen et al., 2009); (Schmidt & Buxmann, 2011); (Van Der Raadt, Bonnet, Schouten, & Van Vliet, 2010); (Winter & Schelp, 2008)(Lee, Oh, & Nam, 2016)

Items			Relevancy			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	EE5-1	Establishment of **formal EA governance structure**			✓	
	EE5-2	**Clear identification** of stakeholders				✓
	EE5-3	**Roles and responsibility of stakeholder and EA team** clearly defined				✓
2.	Overall, the presence of **EA Governance** can influence readiness of EA establishment in MPS					✓

Comments/Suggestions: (Add/Delete/Modify)
Quite difficult to establish of formal EA governance structure because each public sector, they have their own structure.

SECTION C	ELEMENT: PEOPLE (PP)
This section intends to look into multiple factors under people element that involves the stakeholder support, competency and skills, and commitment towards readiness of EA establishment in the MPS.	

Sub-Section C1	FACTOR: STAKEHOLDER SUPPORT (PP1)
Description	Stakeholder is the **highest hierarchy in organization who continuously support EA practices**. Stakeholder also act as an **executive sponsor** that accepts accountability for the project.
Source	**Interview** **Literature review** (Fatemeh Nikpay et al., 2013); (Schmidt & Buxmann, 2011); (Seppanen et al., 2009); (Farwick, Breu, Hauder, Roth, & Matthes, 2013); (Iyamu & Mphahlele, 2014)(Iyamu & Mphahlele, 2014)

Items			Relevancy			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PP1-1	**Leadership and management provision among sponsor and stakeholder** (i.e.: keep the project focused, and communicate and support the needs of the project to senior management.)				✓
	PP1-2	**Stakeholder continuous support** (i.e.: engagement in aligning project needs and execute the EA programs)				✓
	PP1-3	**Mutual understanding** exists among all **EA stakeholder**			✓	
2.	Overall, the presence **Stakeholder Support** is an important factor which influence readiness of EA establishment in MPS.					✓

Comments/Suggestions: (Add/Delete/Modify)

Sub-Section C2	FACTOR: COMPETENCY AND SKILLS (PP2)
Description	**The ability to perform all the EA tasks required by the project, including the skills, tools, processes, and management capability**. The extent to which the architecture team is organized and established and to which required skills are available or acquired.
Source	**Interview**
	Literature review (Aier, 2014); (Aier & Schelp, 2010); (Iyamu & Mphahlele, 2014); (Van Der Raadt et al., 2010); (B. T. Ylimäki, 2007) (Romero, Galeano, & Molina, 2009)

	Items		Relevancy			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PP2-1	Sufficient **competence and skillful EA architect** in place			✓	
	PP2-2	Adequate **staffs with the necessary skills to execute the project**				✓
	PP2-3	Presence of **EA competency model** (i.e.: include awareness program, retention program, and training and certification provided throughout the organization)				✓
2.	Overall, the presence **Competency and Skills** is an important factor which influence readiness of EA establishment in MPS.					✓

Comments/Suggestions: (Add/Delete/Modify)
How to measure that sufficient competence and skillful EA for each of our staffs. What the technique be used to measure it.

Sub-Section C3	FACTOR: MANAGEMENT COMMITMENT (PP3)
Description	The extent to which both the **top-management and the employees of the organization are committed to and involved** in the EA effort.
Source	**Interview**
	Literature review (Nikpay, Selamat, Rouhani, & Nikfard, 2013); (Schmidt & Buxmann, 2011); (Seppanen et al., 2009); (Farwick, Breu, Hauder, Roth, & Matthes, 2013)(T. Ylimäki, 2006)

	Items		Relevancy			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PP3-1	**Support from top management** to set up funding, follow through, identify effort and benefits of EA establishment.				✓
	PP3-2	**Top management and stakeholder's** continuous engagement in EA project				✓
	PP3-3	**Active involvement from top management and other stakeholder groups** in early establishment of EA initiatives and throughout the journey.				✓
	PP3-4	**Sufficient knowledge among stakeholders in fostering EA.** (i.e.: Everyone are having a clear view on how implementation will occur, how it will be monitored and how realignment actions will be made)			✓	
2.	Overall, the presence **Management commitment** is an important factor which influence readiness of EA establishment in MPS.					✓

Comments/Suggestions: (Add/Delete/Modify)

SECTION D	ELEMENT : PROCESS (PS)
This section intends to look into multiple factors under process element that involves business case, communication and policy and rules towards readiness of EA establishment in the MPS.	

Sub-Section D1		FACTOR: BUSINESS CASE (PS1)					
Description		A business case consist of **focus for the project, benefits that must be achieved and thereby creating an imperative to succeed.** EA is driven by business requirement derived from business case.					
Source		**Interview:** Business case factor derive from an interview session					
		Literature review: Items derived from LR (Foorthuis et al., 2015); (Saha, 2012); (Seppanen et al., 2009);(Schmidt & Buxmann, 2011); (Van Der Raadt et al., 2010)					
Items			**Relevancy**				
			1	2	3	4	
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:						
	PS1-1	There is a Business Case document that **identifies concrete benefits (revenues or savings) that the organization is committed to deliver.**				✓	
	PS1-2	There is a Business Case that clearly stated **points to goals that the organization is committed to achieved.**				✓	
2.	Overall, the presence **Business Case** is an important factor which influence readiness of EA establishment in MPS.					✓	
Comments/Suggestions: (Add/Delete/Modify)							

Sub-Section D2		FACTOR: COMMUNICATION (PS2)					
Description		Formalised processes through which **interactions and information sharing** between the Top management (CIO, ITO) and the EA team or employee took place in the organisation.					
Source		**Interview**					
		Literature review (Nikpay et al., 2013); (Schmidt & Buxmann,. 2011); (Seppanen et al., 2009); (Farwick et al., 2013)					
Items			**Relevancy**				
			1	2	3	4	
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:						
	PS2-1	**Common, well-defined vocabulary of terms and concepts** of **EA language** exists.				✓	
	PS2-2	Clear **roadmap on EA implementation exist** to be understand by EA practitioner.				✓	
	PS2-3	**Documentation as a reference** consist of current and future state of an EA, EA roadmap, and EA principles is available.				✓	
2.	Overall, the presence **Communication** is an important factor which influence readiness of EA establishment in MPS.					✓	
Comments/Suggestions: (Add/Delete/Modify)							

Sub-Section D3	FACTOR: POLICY AND RULES (PS3)					
Description	Define **guidelines for decision making on architecture development, implementation and management**, to ensure transparency and objectivity. They **govern** the relationship between EA and its stakeholders within and outside IT.					
Source	**Interview**					
	Literature review (Aier & Schelp, 2010); (Lee et al., 2016); (Gilliland, Kotze, & van der Merwe, 2015);(Van Der Raadt et al., 2010); (Aziz, Obitz, Modi, & Sarkar, 2006)					
Items		**Relevancy**				
		1	2	3	4	
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	PS3-1 There is a standard **business policies and rules** (i.e.: which assist the monitoring and controlling of continuous improvements in EA practices)				✓	
	PS3-2 There is a standard **principles and guidelines** (i.e.: for architecture arbitration improve acceptance of results and reduce time required for decision making.)			✓		
2.	Overall, the presence **Policy and Rules** is an important factor which influence readiness of EA establishment in MPS.				✓	
Comments/Suggestions: (Add/Delete/Modify)						

SECTION E	ELEMENT: TECHNOLOGY (TC)
This section intends to look into multiple factors under technology element that involves EA repository, security, and practical EA Technology towards readiness of EA establishment in the MPS.	

Sub-Section E1	FACTOR: EA REPOSITORY (TC1)					
Description	An **infrastructure that consist of a storage architecture, which manage and moves information to the most cost-effective data repository based on the value of each piece of information at that exact point in time.** This infrastructure should be accessible to EA team and secured.					
Source	**Interview**					
	Literature review (Ahuja, 2008);(Iyamu & Mphahlele, 2014); (**Lee** et al., 2016; Nikpay et al., 2013; B. T. Ylimäki, 2007)					
Items		**Relevancy**				
		1	2	3	4	
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	TC1-1 **Centralized EA repository** to store EA information exist.				✓	
	TC1-2 **Easy access and retrieval** of the information via the repository for the EA team.			✓		
2.	Overall, the present **EA Repository** is an important factor which influence readiness of EA establishment in MPS.			✓		
Comments/Suggestions: (Add/Delete/Modify)						

Not necessary because the organization can design back to implement EA repository with the current Repository implemented.

Sub-Section E2	FACTOR: SECURITY (TC2)					
Description	Refers to **security of the communication of systems, flow of information,** as well as the **exchange of data** and business processes					
Source	**Interview**					
	(Bader, He, Anjomshoaa, & Tjoa, 2012); (Liimatainen, Hoffmann, & Jukka, 2007);(Saha, 2012)					
Items			**Relevancy**			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	TC2-1	**Reliable security systems are in place** to ensure EA artifacts secured.				✓
2.	Overall, the presence **security** is an important factor which influence readiness of EA establishment in MPS.					✓
Comments/Suggestions: (Add/Delete/Modify)						

Sub-Section E3	FACTOR: EA TOOLS (TC3)					
Description	Refers to **EA Management supporting tools** for its practices and procedure such as modelling and developing tools.					
Source	**Interview**					
	Literature review (Fischer, Aier, & Winter, 2007) (Rouhani, Mahrin, Nikpay, Ahmad, & Nikfard, 2015)					
Items			**Relevancy**			
			1	2	3	4
1.	To what degree you would agree that the items below are important towards readiness of EA establishment in the MPS:					
	TC3-1	**EA tools** that **suite with selected methodology and framework.**			✓	
	TC3-2	**Adequate support** for EA tool for **management and maintenance.**				✓
2.	Overall, the presence **EA tools** is an important factor which influence readiness of EA establishment in MPS.					✓
Comments/Suggestions: (Add/Delete/Modify) Some of the tools can be modify to suite it.						

--END OF QUESTIONS--

FEEDBACK:	
Expected time taken to complete the questionnaire (Example: 15 minutes)	45 minutes.
Please provide comments (if any)	Some of the questions should be narrow and it can provide how to implement the idea with more better.

VERIFICATION ON CONTENT VALIDATION BY EXPERT:

To whom it may concern,

VERIFICATION ON CONTENT VALIDATION BY EXPERT

The above matter is kindly referred.

2. This is to confirm my participation in the evaluation of the item's relevancy to the research instrument in the study of EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector by Surya Sumarni binti Hussein (Matric No.: PAN153003) from Advanced Informatics School, Universiti Teknologi Malaysia.

Thank you.

Signature :

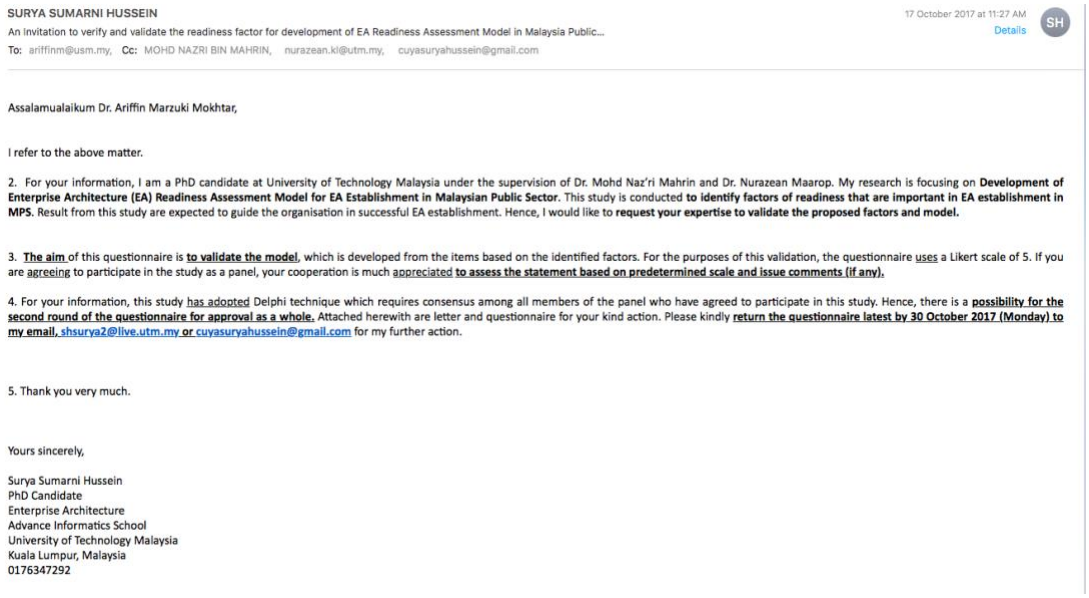
Name : Dr. Hafiza Abas Rahim

Designation : Senior Lecturer

Date : 29 Sept. 2017.

Appendix K

Invitation to the Expert to participate in Delphi Study



SURYA SUMARNI HUSSEIN

An invitation to verify and validate the readiness factor for development of EA Readiness Assessment Model in Malaysia Public...

To: ariffinm@usm.my, Cc: MOHD NAZRI BIN MAHRIN, nurazean.kl@utm.my, cuyasuryahussein@gmail.com

17 October 2017 at 11:27 AM

Details

SH

Assalamualaikum Dr. Ariffin Marzuki Mokhtar,

I refer to the above matter.

2. For your information, I am a PhD candidate at University of Technology Malaysia under the supervision of Dr. Mohd Naz'ri Mahrin and Dr. Nurazean Maarop. My research is focusing on **Development of Enterprise Architecture (EA) Readiness Assessment Model for EA Establishment in Malaysian Public Sector.** This study is conducted **to identify factors of readiness that are important in EA establishment in MPS.** Result from this study are expected to guide the organisation in successful EA establishment. Hence, I would like to **request your expertise to validate the proposed factors and model.**

3. **The aim** of this questionnaire is **to validate the model**, which is developed from the items based on the identified factors. For the purposes of this validation, the questionnaire uses a Likert scale of 5. If you are agreeing to participate in the study as a panel, your cooperation is much appreciated **to assess the statement based on predetermined scale and issue comments (if any).**

4. For your information, this study has adopted Delphi technique which requires consensus among all members of the panel who have agreed to participate in this study. Hence, there is a **possibility for the second round of the questionnaire for approval as a whole.** Attached herewith are letter and questionnaire for your kind action. Please kindly **return the questionnaire latest by 30 October 2017 (Monday) to my email, shsurya2@live.utm.my or cuyasuryahussein@gmail.com** for my further action.

5. Thank you very much.

Yours sincerely,

Surya Sumarni Hussein
PhD Candidate
Enterprise Architecture
Advance Informatics School
University of Technology Malaysia
Kuala Lumpur, Malaysia
0176347292

Appendix L

Letter of Approval to Conduct Study (Delphi Study)

UTM Advanced Informatics School (AIS)

Advanced Informatics School
Level 5, Menara Razak
Universiti Teknologi Malaysia
Jalan Semarak
54100 Kuala Lumpur, Malaysia

Tel: +(6)03-21805192 Fax: +(6)03-21805370 http://www.ais.utm.my Email: enquiry_ais@ic.utm.my

OUR REF.: UTM.K.38/13.11/1/4 Jld.20 (53)

9 October 2017

To Whom It May Concern

Dear Sir/Madam,

PERMISSION TO CONDUCT RESEARCH AND SURVEY

STUDENT NAME	:	**SURYA SUMARNI BINTI HUSSEIN**
MATRIC NO.	:	**PAN153003**
RESEARCH TITLE	:	**ENTERPRISE ARCHITECTURE (EA) READINESS ASSESSMENT MODEL FOR EA ESTABLISHMENT IN MALAYSIAN PUBLIC SECTOR**

With reference to the above matter.

2. I am pleased to inform you that **Madam Surya Sumarni binti Hussein** is a registered post graduate student of Advanced Informatics School, Universiti Teknologi Malaysia Kuala Lumpur.

3. For your information, she needs your permission to do research and collect data from you for research purposes. This research is important and required among students enrolled in Doctor of Philosophy (Research) program at UTM AIS.

4. Should you have any enquiries please do not hesitate to call the undersigned or directly contact our office at 03-21805217.

Your cooperation is very much appreciated. Thank you.

Yours sincerely,

DR. MOHD NAZ'RI MAHRIN
Supervisor
Advanced Informatics School (AIS)
UTM Kuala Lumpur
☎ 03 - 21805211
✉ mdnazrim@utm.my

www.utm.my innovative • entrepreneurial • global

Appendix M

Delphi Round 1 Questionnaire

DELPHI QUESTIONNAIRE: ROUND 1

Dear Prof/Dr/Sir/Madam,

Re: An Invitation to validate the readiness factor for development of EA Readiness Assessment Model in Malaysia Public Sector (MPS)- The Delphi Round One.

My Name is Surya Sumarni Hussein. I am undertaking a PhD research program at the Advanced Informatics School (AIS), University of Technology Malaysia (UTM), Kuala Lumpur Campus. The title of my research is **"Enterprise Architecture (EA) Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS)".** I am currently fulfilling my third objective of research that is to validate the identified factors of readiness for development of EA Readiness Assessment Model in MPS. I seek for your participation in validating the readiness factors in the respective research.

A group of **ten (10) experts** within Malaysia and abroad was selected to validate the proposed factors and items of EA readiness. You are invited to participate in this study based on your expertise and experience in this field. Your insight and opinions pertaining to the issues being explored shall provide a valuable contribution to the best practice and body of knowledge of this research. We decided to adopt Delphi techniques to achieve this objective.

The Delphi technique is described as a qualitative method which involves a survey of expert opinion and is designed to feed information back to its respondents. Delphi does not only involve a one-off posting of questions. Rather, the survey is circulated, to the same set of respondents/experts, **at least twice.** A group of panel experts which has been chosen will be asked to give feedback to achieve some consensus pertaining to the topic discussed.

The statement in this Round One were developed based on Systematic Review (SR) and Interview. It is presented such way to ease you and the other experts to understand feedback of others and states your opinion using scale. Therefore, it will require you to rate the factors and items and input provided by all ten experts to get consensus on what constitute to the development of EA Readiness Assessment Model in MPS.

This questionnaire is divided into three sections, namely (1) Respondent profile (2) Factors influence Readiness of EA Establishment in MPS and (3) The Proposed EA Readiness Assessment Model for EA Establishment in MPS. Please read and review the questionnaire and rate each statement from **1 to 5 by marking 'X'** at the appropriate number. A rating of **1 (one) means that you think the statement is extremely irrelevant** when considering the factors of readiness in EA establishment. A rating of **5 (five) shows the statement is extremely relevant.** You may also leave **a comments/suggestion (if any)** in space given.

Please keep a completed copy of the summaries for your record so that you may refer to it later. If you would like to suggest new factors or items that are not addressed in the first round, you may write a short note that describes your new ideas. It is highly appreciated you could send your response **via email** by latest **30 October 2017** or in two weeks' time.

Thank you very much for your cooperation and I really appreciate it. For further info, you may contact:

Student	**Surya Sumarni binti Hussein (PAN153003)** PhD Candidate Advanced Informatics School (AIS), UTMKL E-mail: shsurya2@live.utm.my / cuyasuryahussein@gmail.com Telephone: 017-6347292	
Supervisors	**Dr. Mohd Naz'ri Mahrin** Senior Lecturer, AIS, UTMKL E-mail: mdnazrim@utm.my	**Dr. Nurazean Maarop** Senior Lecturer, AIS, UTMKL E-mail: **nurazean.kl@utm.my**

SECTION 1: Respondent Profile

Please mark (X) for your answer.

<table>
<tr><th>No</th><th>Items/Questions</th></tr>
<tr><td>RP1</td><td>Role in any Enterprise System of Enterprise Architecture (EA) project:
<table>
<tr><td></td><td>Business Consultant/Expert</td><td></td><td>IT Executive</td></tr>
<tr><td></td><td>Business Executive</td><td></td><td>IT Consultant/Expert</td></tr>
<tr><td></td><td>Chief Information Officer</td><td></td><td>IT Solution Provider/Vendor</td></tr>
<tr><td></td><td>IT Director</td><td></td><td>Others:</td></tr>
<tr><td></td><td>IT Manager</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>RP2</td><td>Working Experience in ICT initiatives including EA:
<table>
<tr><td></td><td>Less than 5 years</td><td></td><td>16 to 20 years</td></tr>
<tr><td></td><td>5 to 10 years</td><td></td><td>More than 20 years</td></tr>
<tr><td></td><td>11 to 15 years</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>RP3</td><td>Knowledge level on EA:
<table>
<tr><td></td><td>Expert</td><td></td><td>Casually acquainted</td></tr>
<tr><td></td><td>Advanced</td><td></td><td>Unfamiliar</td></tr>
<tr><td></td><td>Competent</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>RP4</td><td>Attended any formal training in EA:
<table>
<tr><td></td><td>Yes (If Yes, please specify):</td></tr>
<tr><td></td><td>No</td></tr>
</table></td></tr>
<tr><td>RP5</td><td>Attended and received any EA certification:
<table>
<tr><td></td><td>Yes (If Yes, please specify):</td></tr>
<tr><td></td><td>No</td></tr>
</table></td></tr>
<tr><td>RP6</td><td>Collaborate in inter-organisational application system, enterprise-wide system or Enterprise Architecture:
<table>
<tr><td></td><td>Never</td><td></td><td>7 to 10 years</td></tr>
<tr><td></td><td>Less than 3 years</td><td></td><td>More than 10 years</td></tr>
<tr><td></td><td>3 to 6 years</td><td></td><td></td></tr>
</table></td></tr>
</table>

SECTION2: Factors that Influence Readiness of EA Establishment in Malaysian Public Sector (MPS)

INSTRUCTION: Please mark **(X)** at the number from **1 to 5** as an indication of the level of your agreement with the statement. The scale of **Relevancy** is:				
1	**2**	**3**	**4**	**5**
Extremely irrelevant	**Irrelevant**	**Uncertain**	**Relevant**	**Extremely Relevant**

SECTION B	**ELEMENT: ENTERPRISE ENVIRONMENT (EE)**
This section intends to look into multiple factors under **enterprise environment element** that involves the **EA vision, EA culture, EA change management, governance** towards readiness of EA establishment in the MPS.	

Sub-Section B1		**FACTOR: EA VISION (EE1)**						
Description		The ability to **clearly define and communicate what to be achieve**. EA is **driven by business approach to achieve vision**. Provides the basis/foundation for the entire EA.						
Source		**Interview:** Vision factor derive from an interview session						
		Literature review: Items derived from LR Jahani et al., 2010; Alghamdi et al., 2011a; Azab, 2009						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	Towards readiness of EA establishment in the MPS, **EA Vision** is necessary to:							
	EE1-1	**Align EA** practices with **business vision**						
	EE1-2	Define **clear objectives,** in both strategic and specific terms.						
	EE1-3	**Define needs** from the **business perspective** with **IT strategic alignment**						
	EE1-4	**Predict and prove processes** for moving from **vision to statement of requirements.** i.e. strategy to tactics						
	EE1-5	Possess a **clear driver** to implement the initiatives						
	EE1-6	Have a **clear scope and approach** of the transformation initiative throughout the organization.						
2.	**Overall,** the presence of **EA Vision** is important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section B2		FACTOR: EA CULTURE (EE2)						
Description		**Involvement and practices of EA** by the employee in the organization. It also refers to **activities to embrace EA** in the environment of organization**.**						
Source		**Interview**						
		Literature review Aier, 2014; Donaldson et al., 2015; Foorthuis et al., 2015; B. T. Ylimäki, 2008; Shah & El Kourdi, 2007; Seppanen et al., 2009						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**
1.	To foster **EA Culture** towards readiness of EA establishment in the MPS, organisation need to ensure that:							
	EE2-1	There is a **program to promote awareness** among employees to embrace EA						
	EE2-2	**Encourage participation** of employees towards organization objectives rather than local objectives						
	EE2-3	Enforcement of **EA culture as a delivery-oriented**						
	EE2-4	**Empowerment and sharing among employees and stakeholder** in the organization learning culture						
2.	**Overall**, the presence of **EA Culture** is important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section B3		FACTOR: EA CHANGE MANAGEMENT (EE3)						
Description		Refers to **change commitment** and **change efficacy**. **Specific plan and governance structure is created to facilitate change in the organization.**						
Source		**Interview**						
		Literature Review Weiner, 2009; Aier, 2014; B. T. Ylimäki, 2008						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	In EA establishment, the **commitment of organisation towards change management** is important towards readiness of EA by:							
	EE3-1	**Alignment of strategy between IT and business** to facilitate change management						
	EE3-2	Ability of the **top management to manage vertical and horizontal relationship to accommodate change** in EA establishment						
	EE3-3	**Service management processes are in place** (e.g.: operations, maintenance, and support for existing systems behaviors, and training for the new way of working.)						
	EE3-4	**Establishment of reward and recognition system** to recognize teams and individuals (i.e.: Employees who use good change management practices, planning and prevention of crisis behaviours and who reinforce behaviours appropriate to the new way of doing business)						
2.	Overall, the presence of **EA Change Management** is important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section B4		FACTOR: EA RESOURCES (EE4)						
Description		**Sufficient resource to establish EA practices**. Resource **include human resources, financial resources and asset resources in enterprise.** It also refers to business and IT capacity. These factors deal with all the resources (assets) available to be allocated to support organisational business processes.						
Source		**Interview**						
		Literature review Aier, 2014; Aier & Schelp, 2010; Short & Burke, 2010;						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	To ensure readiness of organisation in EA establishment and to support EA initiatives, sufficient **EA resources** are important includes:							
	EE4-1	**Employees capable to perform all the tasks required** by the project, in areas outside of IT, including the ability to make decisions within the tight time constraints typical to project environments						
	EE4-2	**Organisation ensure service management processes are in place** (i.e.: providing operations, maintenance, and support for existing systems behaviors, and training for the new way of working for the employees)						
	EE4-3	**Sufficient financial resource is allocated** (central funding for EA establishment is allocated)						
2.	Overall, the presence of **EA Resources** is important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section B5	FACTOR: EA GOVERNANCE (EE5)
Description	Refers to **structure, procedures and routines, and communications involving business and IT**. The ability to **engage the involvement and support** of all parties with an interest in or responsibility to the project with the objective of ensuring that the corporate interests are served and the objectives achieved**.**
Source	**Interview**
	Literature Review (Aagesen et al., 2011)**;** (Janssen, 2012)**;** (Seppanen et al., 2009)**;** (Schmidt & Buxmann, 2011)**;** (Van der Raadt et al., 2010)**;** (Winter & Schelp, 2008)(S. Lee et al., 2016)

Items			Relevancy				
			1	**2**	**3**	**4**	**5**
1.	To ensure organizational in ready to establish EA, there is a need for:						
	EE5-1	Establishment of **formal EA governance structure**					
	EE5-2	**Clear identification** of stakeholders with interest or potential entity					
	EE5-3	**Roles and responsibility of stakeholder and EA team** clearly defined					
2.	Overall, the presence of **EA Governance** is important factor towards readiness of EA establishment in MPS.						

Comments/Suggestions (if any):

SECTION C	ELEMENT: PEOPLE (PP)
This section intends to look into multiple factors under people element that involves the stakeholder support, competency and skills, and commitment towards readiness of EA establishment in the MPS.	

Sub-Section C1	FACTOR: STAKEHOLDER SUPPORT (PP1)
Description	Stakeholder is the **highest hierarchy in organization who continuously support EA practices**. Stakeholder also act as an **executive sponsor** that accepts accountability for the project.
Source	**Interview**
	Literature review (Fatemeh Nikpay et al., 2013); (Schmidt & Buxmann, 2011); (Seppanen et al., 2009); (Farwick, Breu, Hauder, Roth, & Matthes, 2013); (Iyamu & Mphahlele, 2014)(Iyamu & Mphahlele, 2014)

	Items		Relevancy				
			1	**2**	**3**	**4**	**5**
1.	In EA establishment, **stakeholder support** is important towards readiness of EA by:						
	PP1-1	**Leadership and management provision among sponsor and stakeholder** (i.e.: keep the project focused, and communicate and support the needs of the project to senior management.)					
	PP1-2	**Stakeholder continuous support** (i.e.: engagement in aligning project needs and execute the EA programs)					
	PP1-3	**Mutual understanding** exists among all **EA stakeholder**					
2.	Overall, the presence **Stakeholder Support** is important factor towards readiness of EA establishment in MPS.						
Comments/Suggestions (if any):							

Sub-Section C2		FACTOR: COMPETENCY AND SKILLS (PP2)						
Description		The **ability to perform all the EA tasks required by the project, including the skills, tools, processes, and management capability**. The extent to which the architecture team is organized and established, and to which required skills are available or acquired.						
Source		**Interview**						
		Literature review Aier, 2014; Aier & Schelp, 2010; Iyamu & Mphahlele, 2014; Van der Raadt et al., 2010; B. T. Ylimäki, 2008; Romero et al., 2009						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	In EA establishment, **competency and skills** is important towards readiness of EA by:							
	PP2-1	**Having a competence and skillful EA architect** in place						
	PP2-2	Assign **staffs with the necessary skills to execute the EA program**						
	PP2-3	Formulation of **EA competency model** (i.e.: include awareness program, retention program, and training and certification provided throughout the organization)						
2.	Overall, the presence **Competency and Skills** is important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section C3		FACTOR: MANAGEMENT COMMITMENT (PP3)						
Description		The extent to which both the **top-management and the employees of the organization are committed to and involved** in the EA effort.						
Source		**Interview**						
		Literature review (Fatemeh Nikpay et al., 2013)**;** (Schmidt & Buxmann, 2011)**;** (Seppanen et al., 2009)**;** (Farwick et al., 2013)(T. Ylimäki, 2006)						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	To ensure readiness of EA establishment in the MPS, the organisation should:							
	PP3-1	Obtain s**upport from top management** to set up funding, follow through, identify effort and benefits of EA establishment.						
	PP3-2	Gain **top management and stakeholder's** continuous engagement in EA project						
	PP3-3	Acquire **active involvement from management and other stakeholder groups** in early establishment of EA initiatives and throughout the journey.						
	PP3-4	Ensure **sufficient knowledge among stakeholders in fostering EA** (i.e.: Everyone are having a clear view on how implementation will occur, how it will be monitored and how realignment actions will be made)						
2.	Overall, the presence **Management commitment** is important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

SECTION D	ELEMENT: PROCESS (PS)
This section intends to look into multiple factors under process element that involves business case, communication and policy and rules towards readiness of EA establishment in the MPS.	

Sub-Section D1		FACTOR: BUSINESS CASE (PS1)						
Description		A business case consists of **focus for the project, benefits that must be achieved and thereby creating an imperative to succeed.** EA is driven by business requirement derived from business case.						
Source		**Interview:** Business case factor derive from an interview session						
		Literature review: Items derived from LR (Foorthuis et al., 2015); (Saha, 2012); (Seppanen et al., 2009);(Schmidt & Buxmann, 2011); (Van der Raadt et al., 2010)						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	In EA establishment, **business case** is important towards readiness of EA by:							
	PS1-1	**Identification of concrete benefits (revenues or savings)** that the organization is **committed to deliver.**						
	PS1-2	Clearly stated **points to goals that the organization is committed to achieved.**						
2.	Overall, the presence **Business Case** is important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section D2		FACTOR: COMMUNICATION (PS2)						
Description		Formalised processes through which **interactions and information sharing** between the Top management (CIO, ITO) and the EA team or employee took place in the organisation.						
Source		**Interview**						
		Literature review (Fatemeh Nikpay et al., 2013)**;** (Schmidt & Buxmann, 2011)**;** (Seppanen et al., 2009)**;** (Farwick et al., 2013)						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	In EA establishment, **communication** is important towards readiness of EA by:							
	PS2-1	Formation **of a common, well-defined vocabulary of terms and concepts** of **EA language**						
	PS2-2	Establishment of a **clear roadmap on EA implementation** to be understand by EA practitioner						
	PS2-3	Presence **of a documentation as a reference** consist of current and future state of an EA, EA roadmap, and EA principles is available.						
2.	Overall, the presence **Communication** is an important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section D3		FACTOR: POLICY AND RULES (PS3)						
Description		Define **guidelines for decision making on architecture development**, **implementation and management**, to ensure transparency and objectivity. They **govern** the relationship between EA and its stakeholders within and outside IT.						
Source		**Interview**						
		Literature review Aier & Schelp, 2010; S. Lee et al., 2016; Gilliland et al., 2015; Van der Raadt et al., 2010; Aziz et al., 2006						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	**Policy and rules** are important towards readiness of EA establishment in the MPS includes:							
	PS3-1	Presence of standard **business policies and rules** (i.e.: which assist the monitoring and controlling of continuous improvements in EA practices)						
	PS3-2	Presence of standard **principles and guidelines** (i.e.: for architecture arbitration improve acceptance of results and reduce time required for decision making.)						
2.	Overall, the presence **Policy and Rules** is an important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

SECTION E	ELEMENT: TECHNOLOGY (TC)
This section intends to look into multiple factors under technology element that involves EA repository, security, and practical EA Technology towards readiness of EA establishment in the MPS.	

Sub-Section E1	FACTOR: EA REPOSITORY (TC1)
Description	An **infrastructure that consist of a storage architecture, which manage and moves information to the most cost-effective data repository based on the value of each piece of information at that exact point in time.** This infrastructure should be accessible to EA team and secured**.**
Source	**Interview**
	Literature review (Ahuja & Ahuja, 2008)**;**(Iyamu & Mphahlele, 2014)**;** (S. Lee et al., 2016; Fatemeh Nikpay et al., 2013; B. T. Ylimäki, 2008)

	Items		Relevancy				
			1	**2**	**3**	**4**	**5**
1.	In EA establishment, **EA repository** should consider**:**						
	TC1-1	**Centralized Digital repository** to store EA information					
	TC1-2	**Easy access and retrieval** of the information via the repository for the EA team.					
2.	Overall, the present **EA Repository** is an important factor towards readiness of EA establishment in MPS.						

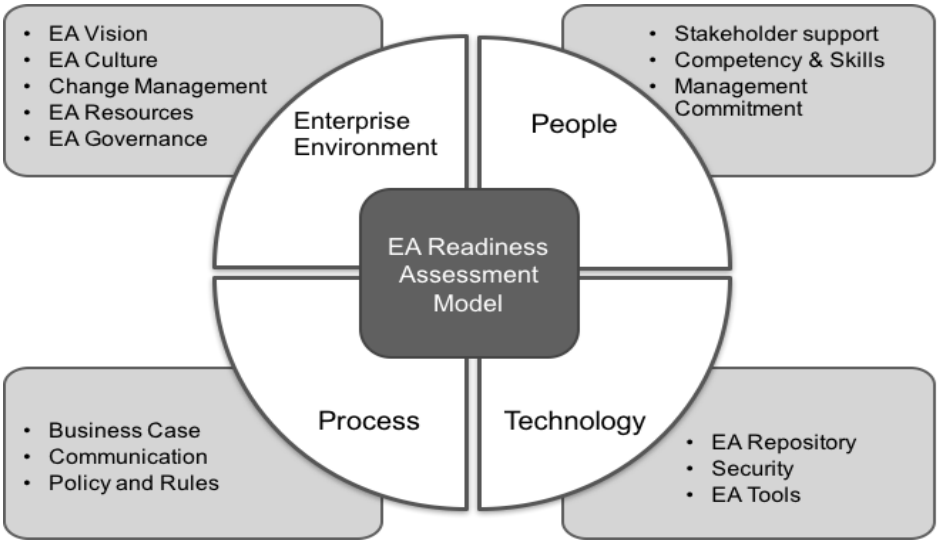
Comments/Suggestions (if any):

Sub-Section E2		FACTOR: SECURITY (TC2)						
Description		Refers to **security of the communication of systems, flow of information,** as well as the **exchange of data** and business processes						
Source		**Interview**						
		(Bader et al., 2012)**;** (Liimatainen et al., 2007)**;**(Saha, 2012)						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	In EA establishment, **security** should consider**:**							
	TC2-1	**Reliable security systems are in place** to ensure EA artifacts secured.						
2.	Overall, the presence **security** is an important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

Sub-Section E3		FACTOR: EA TOOLS (TC3)						
Description		Refers to **EA Management supporting tools** for its practices and procedure such as modelling and developing tools.						
Source		**Interview**						
		Literature review (Fischer et al., 2007) (Rouhani et al., 2015)						
Items			**Relevancy**					
			1	**2**	**3**	**4**	**5**	
1.	In EA establishment, **EA tools** should consider**:**							
	TC3-1	**Tools** that **suite with selected EA methodology and framework.**						
	TC3-2	**Adequate support** for EA tool for **management and maintenance.**						
2.	Overall, the presence **EA tools** are an important factor towards readiness of EA establishment in MPS.							
Comments/Suggestions (if any):								

SECTION 3: The Proposed EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS)

The concept of EA readiness has been studied based on different dimensions by different scholars and organisations, and they used different theories to support their arguments. Based on the literature, it can be concluded that there are a few major perspectives when discussing EA readiness, relevant theories and writings related to this area. The proposed EA Readiness Assessment Model is based on IT/IS Readiness Maturity Model developed by Salleh, Alshawi, Mohamed Sabli, Zolkafli, & Judi (2011). It is a generic model that evaluates four (4) elements; IT infrastructure (Technology), people, work environment (Enterprise Environment) and process. The assessment mechanism will adapt Business Transformation Enablement Program (BTEP) method from TOGAF 9.1. This assessment is based upon the determination and analysis/rating of a series of readiness factors from systematic review (SR). The factors proposed are derived based Salleh et al.(2011) model, SR study and interview with the experts. Below is the proposed EA Readiness Assessment Model for EA Establishment in Malaysian Public Sector for your references.



For this purpose, please kindly provide the insight on the proposed EA Readiness Assessment Model for EA establishment in MPS.

--END OF QUESTIONNAIRE-

Please email your answer to shsurya2@live.utm.my or cuyasuryahussein@gmail.com.

Thank you very much for your cooperation.

Appendix N

Delphi Round 2 Questionnaire

UTM Advanced Informatics School (UTM AIS) UNIVERSITI TEKNOLOGI MALAYSIA	**QUESTIONNAIRE ROUND 2** **VALIDATION OF THE READINESS FACTOR FOR DEVELOPMENT OF EA READINESS ASSESSMENT MODEL IN MALAYSIA PUBLIC SECTOR (MPS)** **PANEL INFORMATION:** **Dr. Ariffin Marzuki Mokhtar** **Timbalan Pengarah (Operasi)** **Pensyarah Perubatan** **Pakar Perunding Anesthesia Kardiothorasik** **HUSM, Kelantan, Malaysia** **(Previously a Consultant Anaesthesiologist at IJN, pioneered and involved in EA implementation at IJN also a certified IT Architect- Associate (CITA-A), COBIT 5 and Togaf 9.1))**

DELPHI ROUND TWO

Thank you for completing the questionnaire in Round One. Based on the answers and feedback from the panel of experts in Round One, I have analysed and formed a Round Two questionnaire. This questionnaire consists of three parts.

PART ONE: FEEDBACK ON FACTORS OF READINESS IN EA ESTABLISHMENT

This part pertains to the summary and results of Round One undertaken previously. Kindly assess the following statements and state your final answers in the "Final Answer" column. The "Final Answer (Round 2)" column can be left blank if an answer from Round 1 is retained. The researcher will use your previous round rating in the calculation of Delphi Round Two. If your new rating is not within the majority responses range (median), you need to give your reasons in the column provided.
This questionnaire uses the 5-point Likert scale, as follows (please mark 'X' where applicable):

Strongly Disagree	Disagree	Partially Agree	Agree	Strongly Agree
1	2	3	4	5

* The stages of consensus are fixed based on IQR as follows: i) High consensus = IQR is 0 to 1; ii) Moderate consensus = IQR is 1.01 to 1.99; and iii) Without consensus = IQR is 2.0 and above (Siraj & Ali, 2008)

No.	Item Code	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 1)	Final Answer (Round 2)	Reason (If the answer from Round 1 is retained)	Comments/Reasons from experts in Round One
1	EE1-1	5.00	0	5			
2	EE1-2	5.00	0	5			
3	EE1-3	5.00	1	5			
4	EE1-4	4.00	1	5			
5	EE1-5	5.00	1	5			
6	EE1-6	5.00	1	5			
7	EE1 (Generic)	5.00	1	5			**Comments/Suggestion (From round 1)** Business perspective to the EA objectives to be achieved are of paramount importance for the success of the enterprise/business **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section.
8	EE2-1	5.00	1	4			
9	EE2-2	5.00	1	5			
10	EE2-3	5.00	1	2			
11	EE2-4	5.00	1	5			
12	EE2 (Generic)	5.00	1	5			**Comments/Suggestion (From round 1)** According to Drucker, " culture eats strategy for breakfast and EA is a strategy execution tool. Cultural management is a very improtant component for the readiness of the

No.	Item Code	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 1)	Final Answer (Round 2)	Reason (If the answer from Round 1 is retained)	Comments/Reasons from experts in Round One
							organization to change according to the roadmap that is defined by the EA transition architecture. **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section.
13	EE3-1	5.00	1	4			
14	EE3-2	5.00	1	4			
15	EE3-3	4.00	1	4			
16	EE3-4	4.00	1	5			
17	EE3 (Generic)	5.00	1	5			**Comments/Suggestion (From round 1)** Change management is an important component in the framework for EA implementation/initiative hence it's in the central part of the ADM in TOGAF 9.1 and plays a role in all phases of the ADM. **Explanation** Agree. Appeciate the suggestion and will be good input in discussion section.
18	EE4-1	4.00	1	4			
19	EE4-2	4.00	1	3			
20	EE4-3	4.00	1	5			

No.	Item Code	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 1)	Final Answer (Round 2)	Reason (If the answer from Round 1 is retained)	Comments/Reasons from experts in Round One
21	EE4 (Generic)	4.00	1	4			**Comments/Suggestion (From round 1)** Sufficient is the correct term used to describe the quantity that needs to be defined by the enterprise **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section.
22	EE5-1	5.00	0	3			
23	EE5-2	5.00	0	5			
24	EE5-3	5.00	0	5			
25	EE5 (Generic)	5.00	0	5			**Comments/Suggestion (From round 1)** In the early part, it is important to define the roles as to have a formal structure is close to impossible. **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section.
26	PP1-1	5.00	1	4			
27	PP1-2	5.00	0	4			
28	PP1-3	5.00	0	5			
29	PP1 (Generic)	5.00	0	4			**Comments/Suggestion (From round 1)** Stakeholder support is important but not crucial for the readiness to

No.	Item Code	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 1)	Final Answer (Round 2)	Reason (If the answer from Round 1 is retained)	Comments/Reasons from experts in Round One
							implement the EA initiative. **Explanation** Agree. Appeciate the suggestion and will be good input in discussion section.
30	PP2-1	5.00	1	5			
31	PP2-2	4.00	1	3			
32	PP2-3	5.00	1	5			
33	PP2 (Generic)	5.00	1	5			**Comments/Suggestion (From round 1)** To have a competent architect is crucial and pivotal as the enterprise must have a person that is well versed with the core business to be the lead architect. **Explanation** Agree. Appeciate the suggestion and will be good input in discussion section.
34	PP3-1	5.00	0	5			
35	PP3-2	5.00	0	5			
36	PP3-3	5.00	0	4			
37	PP3-4	5.00	1	3			
38	PP3 (Generic)	5.00	0	5			**Comments/Suggestion (From round 1)** The management support is important to ensure the success of the

No.	Item Code	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 1)	Final Answer (Round 2)	Reason (If the answer from Round 1 is retained)	Comments/Reasons from experts in Round One
							implementation as the resources are allocated for the initiative. **Explanation** Agree. Appeciate the suggestion and will be good input in discussion section
39	PS1-1	5.00	1	4			
40	PS1-2	5.00	1	4			
41	PS1 (Generic)	5.00	1	4			**Comments/Suggestion (From round 1)** The business case for the contract that allows communication to the management and the non-architect team to refer and consent for the start and review of the EA initiative. **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section
42	PS2-1	5.00	0	5			
43	PS2-2	5.00	0	5			
44	PS2-3	5.00	0	4			
45	PS2 (Generic)	5.00	0	5			**Comments/Suggestion (From round 1)** As with other initiative that involves other people it is important to

No.	Item Code	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 1)	Final Answer (Round 2)	Reason (If the answer from Round 1 is retained)	Comments/Reasons from experts in Round One
							have in place a robust communication plan and executed in an orderly manner. **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section
46	PS3-1	5.00	0	5			
47	PS3-2	5.00	1	5			
48	PS3 (Generic)		1	5			**Comments/Suggestion (From round 1)** The policy forms the guide and guidelines for the constraint that can be utilised by the non-architect teams to do the tasks associated with the EA initiative. **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section
49	TC1-1	4.00	1	3			
50	TC1-2	5.00	1	2			
51	TC1 (Generic)	5.00	1	3			**Comments/Suggestion (From round 1)** In the early part, it is close to impossible to have a formal EA repository. However, in

No.	Item Code	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 1)	Final Answer (Round 2)	Reason (If the answer from Round 1 is retained)	Comments/Reasons from experts in Round One
							the middle or later part the repository is crucial to manage the artifacts of the enterprise. **Explanation** Agree. Appeciate the suggestion and will be good input in discussion section
52	TC2-1	4.00	1	3			
53	TC2 (Generic)	4.00	1	3			
54	TC3-1	4.00	1	4			
55	TC3-2	4.00	1	4			
56	TC3 (Generic)	4.00	1	4			**Comments/Suggestion (From round 1)** Appropriateness of the tool and tool selection to the needs of the organization are most important **Explanation** Noted. Appeciate the suggestion and will be good input in discussion section

PART TWO: NEW ITEMS SUGGESTED IN ROUND ONE

This section comprises of new items suggested by the Delphi panel of experts in Round One. Please rate all the items for the first time based on the Likert-scale of agreement 1 to 5**.**

Strongly Disagree	Disagree	Partially Agree	Agree	Strongly Agree
1	2	3	4	5

New Items			Your OPINION for this round (mark 'X')					Comments /Reason
			1	2	3	4	5	
1.	Element: Enterprise Environment (EE), Factor: Change Management (EE3)							
	EE3-5	**Performance Measurement Framework** (i.e. to provide decision makers and management with concrete data and information on which to make sound decisions and continuously improve performance.)						
3.	Element: Process (PS), Factor: Policy and Rules (PS3)							
	PS3-3	**Customised standard EA Methodology** (i.e. to develop EA in agency, include capability improvement, gap between practice and policy, process ownership etc.)						
4.	Element:Technology (TC), Factor: Security (TC2)							
	TC2-2	**Consistent review of EA to ensure accountability** (i.e. integrity and accuracy of outcome)						
Comments/Suggestions (if any):								

PART THREE: FEEDBACK ON EA READINESS ASSESSMENT MODEL FOR EA ESTABLISHMENT IN MALAYSIAN PUBLIC SECTOR (MPS)

Revised Proposed Model

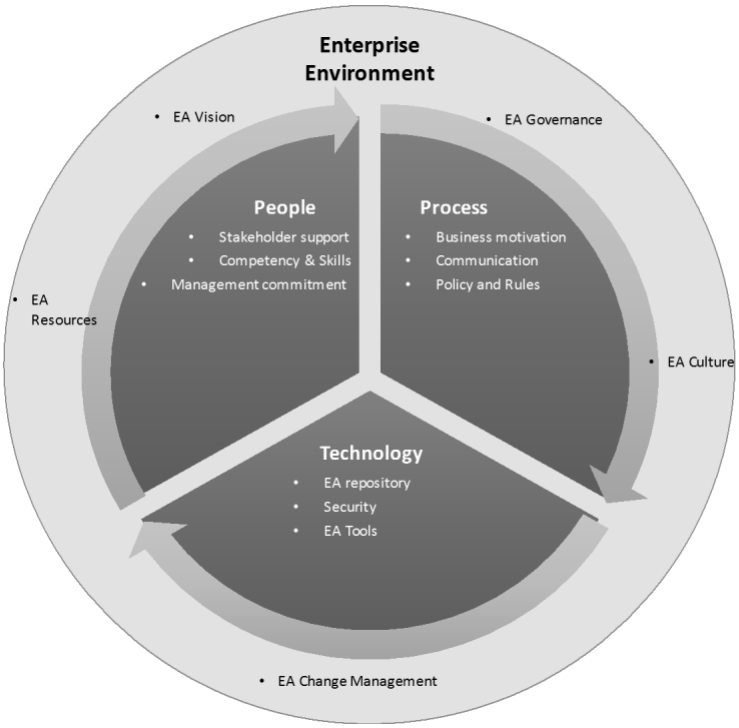


Figure 1: EA Readiness Assessment Model for EA Establishment in MPS

Improvements are as follows:

Comments/Insight (Round 1)
I wish to propose that the "capability based planning" from TOGAF 9.1 be included in the assessment framework as it is crucial in the success of the EA implementation and form the bulk of the readiness of the initiatives. The BTEP is good for the planning for the implementation but the "capability based planning" is important for the formulation of the work packages and the roadmap and the cross-functioning teams that is needed to formulate a well encompassing EA for the public sector implementation. My experience is that the public sector has no problem in planning but rather the execution of the plan successfully is the biggest challenge.

Justification/Improvement
Justification to your comments From studies and researcher understanding, capability based planning occur after readiness assessment are done. Result from the assessment will be used to formulate work packages, roadmap and cross functioning teams that include as a part of component in capability based planning framework. Capability based planning will have their specific criteria or component as a compliment to readiness assessment. We will consider the suggestion in the future work. However, it terms of planning to support EA readiness in agency, there is an items to support this, that is PS2-2: Communication and plan strategy – establishment of a clear roadmap on EA implementation to be understand by EA practitioner. Explanation of proposed model This study proposes a model which incorporates all such elements with the aim of providing managers with a tool to assess the EA readiness of their organisation, prior to the EA establishment, by highlighting the areas that are likely to require improvements. The study has divided these key elements into four sectors (see Figure 1) namely; (1) Entreprise Environment; (2) People; (3) Process; and (4) Technology. For "Enterprise Environment" quarter (including EA Vision, Governance, EA Change Management and all other comprising entities) will cover all of People, Process and Technology sectors. There are other factors that can affect enterprise environment in other context of research but only this five factors will be considered for enterprise environment element in EA context for the development of EA readiness in the model.
New Comments (Round 2) -Leave this column blank if agree

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THANK YOU FOR YOUR FEEDBACK

End of questionnaire.

Please email your respond to shsurya2@live.utm.my

Thank you very much for your cooperation.

Appendix O

Delphi Round 3 Questionnaire

	QUESTIONNAIRE ROUND 3 **VALIDATION OF THE READINESS FACTOR AND MODEL FOR DEVELOPMENT OF EA READINESS ASSESSMENT MODEL IN MALAYSIA PUBLIC SECTOR (MPS)** **PANEL INFORMATION:** **Dr. Ariffin Marzuki Mokhtar** **Timbalan Pengarah (Operasi)** **Pensyarah Perubatan** **Pakar Perunding Anestheisa Kardiothorasik** **HUSM, Kelantan, Malaysia** **(Previously a Consultant Anaesthesiologist at IJN, pioneered and involved in EA implementation at IJN also a certified IT Architect- Associate (CITA-A), COBIT 5 and Togaf 9.1))**

DELPHI ROUND THREE

Thank you for completing the questionnaire in Round One. Based on the answers and feedback from the panel of experts in Round One, I have analysed and formed a Round Two questionnaire. This questionnaire consists of three parts.

Thank you for completing the questionnaire in Round Two. I have finished analyzing the previous 56 items in Round One and Round Two. However, there are 3 new items which needed to be re-rated in Round Three as stipulated in the Delphi procedure. This questionnaire consists of **TWO PART** only, in which you are required to **re-rate the new items derived in Round Two** and **validate new EA Readiness Assessment Model in Malaysia Public Sector**

Your cooperation and patience in participating in this study is much appreciated.

PART ONE: SUMMARY AND RESULT FROM NEW ITEMS IN ROUND TWO – 3 ITEMS

This part pertains to the summary and results of Round Two undertaken previously.

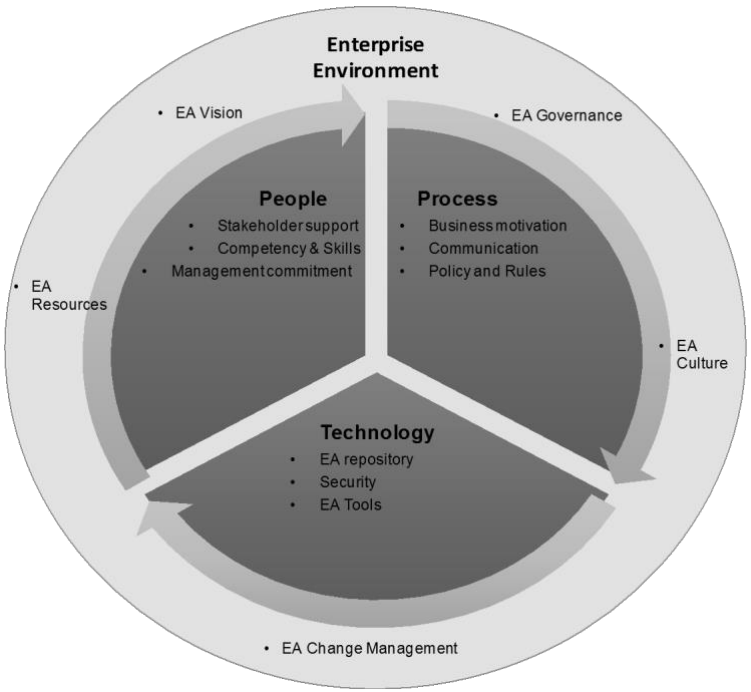
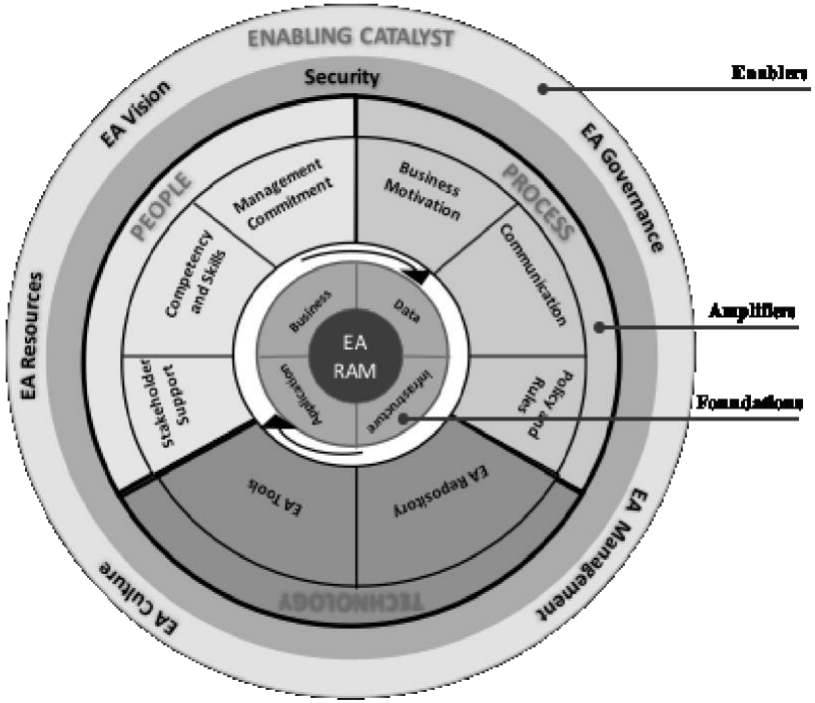
Strongly Disagree	Disagree	Partially Agree	Agree	Strongly Agree
1	2	3	4	5

* The stages of consensus are fixed based on Inter quartile range (IQR) as follows: i) High consensus = IQR is 0 to 1; ii) Moderate consensus = IQR is 1.01 to 1.99; and iii) Without consensus = IQR is 2.0 and above (Siraj & Ali, 2008)

No.	Item Code and Item	Median (Round 1)	*IQR (Q3-Q1)	Your Answer (Round 2)	Final Answer (Round 3) **If you wish to **re-rate**, otherwise you may leave the column blank.	Comments/Reasons from experts in Round Two
1	EE3-5: Performance Measurement Framework	5.00	1	5		
2	PS3-3: Customised standard EA Methodology	4.00	1	5		
3	TC2-2: Consistent review of EA to ensure accountability	5.00	1	5		

PART TWO: VALIDATION OF THE FINAL EA READINESS ASSESSMENT MODEL FOR EA ESTABLISHMENT IN MALAYSIAN PUBLIC SECTOR (MPS)

A. List of feedback and improvement on proposed model by experts

Expert Id	Figure 1 (Previous Model-Delphi Round 2)	Figure 2 (Final Model – Delphi Round 3)
		

1.	For future work Enterprise Architecture may be expend to Ecosystem Architecture moving forward to more holistic approach of Digital Government.	Noted.
2.	No comment.	-
3.	I would suggest the following readiness dimensions (taking a 3-dimensional, 360-degree approach): Foundations: Business, Data, Application and Infrastructure. [Note that I have not used the term "technology", else it may cause confusion]. Amplifiers: People, Process, Technology, Context. [I have added a new one]. Enablers: EA Vision, Governance, Culture, Resources and Management (this subsumes change management). I would collectively term these as Enterprise Architecture Ecosystem. Getting the Foundations right, would mean completeness and efficiency. Getting the Amplifiers right, would mean effectiveness. Getting the Enablers right, would mean results and impact. The security layer is positioned correctly, as it encompasses all foundations and amplifiers. It also influences and gets influenced by the enablers.	The suggestion is addressed at Figure 2 description of the model segment below.
4.	As mentioned above, Security should be part of the overall Enterprise and not just Technology – Many organisations now have Security Architects which cover Business, Data, Applications and Technology (historically a Security Architect would focus on the Technology area) or, in the three areas above (People, Process and Technology). Security is not just about Technology –	The suggestion is addressed at Figure 2 description of the model segment below.

	Many / most security exploits now target People primarily (or at least as a joint attack vector) as people are often the weakest link from a security perspective in an organisation to gain access to areas/systems that they should not have access. For the same reason, weak business processes are often exploited to provide an attacker with leverage to exploit a vulnerability, whether that vulnerability be system or business process orientated.	
5.	No comment.	-
6.	No comment.	-
7.	No comment.	-
8.	No comment.	-
9.	No comment.	-
10.	No comment.	-
11.	No comment.	-
12.	No comment.	-
13.	No comment.	-

B. List of elements, factors and items (final list)

Elements: Enabling catalyst (EC)	
Factors	Items
EA Vision (EE1)	EE1-1: Align EA with business vision EE1-2: Clear Objective EE1-3: Needs define include business and IT EE1-4: Predict and prove processes EE1-5: Clear drivers EE1-6: Clear scope and approach
EA Culture (EE2)	EE2-1: Awareness program EE2-2: Encourage participation EE2-3: EA Culture as delivery oriented EE2-4: Empowered and shared EA with staff and stakeholder
EA Change Management (EE3)	EE3-1: Business-technology convergence EE3-2: Management of the vertical and horizontal relationship EE3-3: Management processes are in places EE3-4: Reward and recognition EE3-5: Performance Management Framework
EA Resources (EE4)	EE4-1: Employee capability EE4-2: Service Management process EE4-3: Sufficient financial resource
EA Governance (EE5)	EE5-1: Formal governance structure EE5-2: Clear identification of stakeholder with interest EE5-3: Clear Roles and responsibilities
Elements: People (PP)	
Stakeholder support (PP1)	PP1-1: Leadership and management provision PP1-2: Stakeholder continuous support PP1-3: Mutual understanding among stakeholder
Competency & Skills (PP2)	PP2 -1: Sufficient competence and skillful PP2-2: Staff with necessary skills PP2-3: Model for EA competency skills
Management Commitment (PP3)	PP3-1: Support from top management PP3-2: Top management and stakeholder continuous engagement PP3-3: Active involvement from top management and other stakeholder groups PP3-4: Sufficient knowledge among stakeholder
Elements: Process (PS)	
Business Motivation (PS1)	PS1-1: Identification of concrete benefits of Business Case document PS1-2: Identification of clear stated points to goal in business case
Communication (PS2)	PS2-1: Common, well-defined vocabulary of terms and concepts PS2-2: Clear roadmap PS2-3: Documentation for references
Policy and Rules (PS3)	PS3-1: Standard business policies and rules PS3-2: Standard principles and guidelines exist PS3-3: Customised standard EA Methodology
Elements: Technology (TC)	
EA Repository (TC1)	TC1-1: Centralised EA repository TC1-2: Easy Retrieval
EA Tools (TC3)	TC3-1: EA tools are available, suitable, easy TC3-2: Adequate EA tool support
Elements: People (PP), Process (Ps) and Technology (TC)	
Security (TC2)	TC2-1: Reliable security system TC2-2: Continues EA review for accountability

C. Description of EA Readiness Assessment Model

This section describes the proposed comprehensive multi layers model for assessing readiness of EA establishment in MPS.

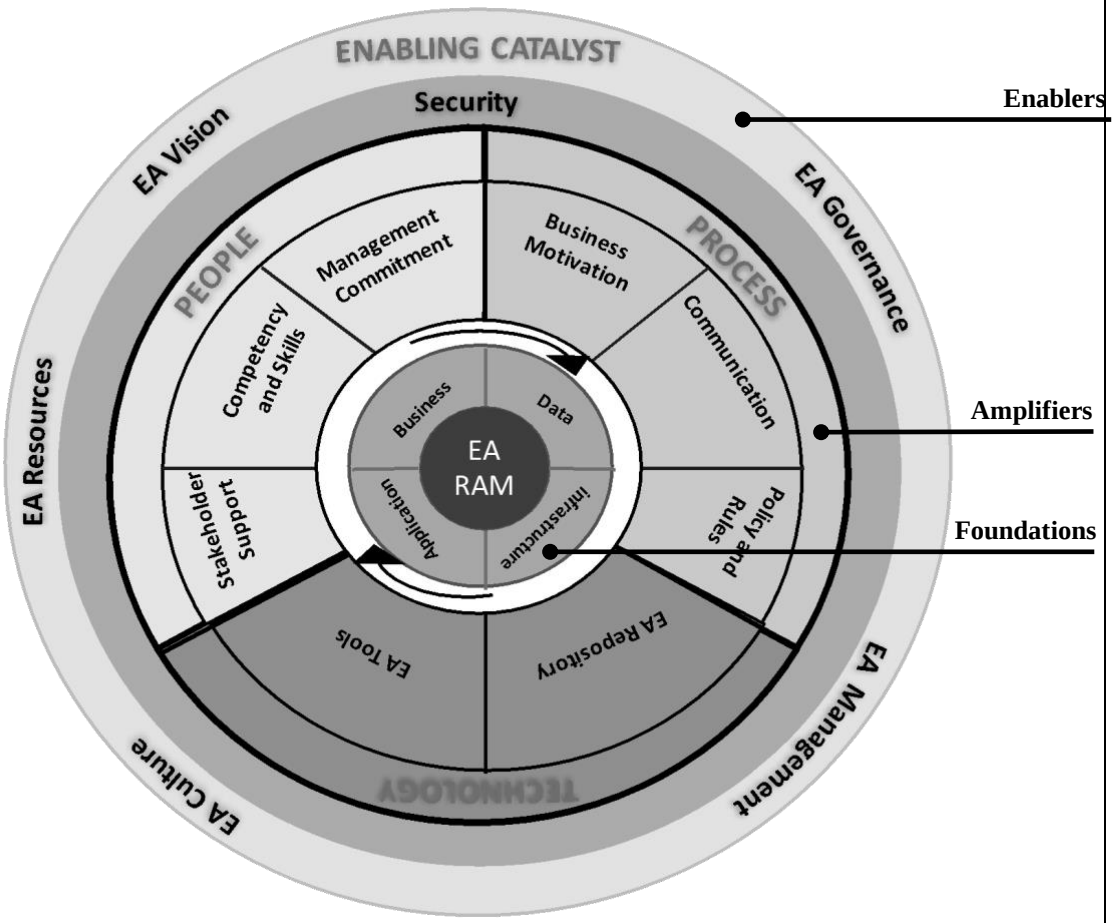


Figure 2: EA Readiness Assessment Model

Based on Table A above, there are two figures displayed. Figure 1 is a proposed model in Delphi Round 2 and Figure 2 is a final model based on suggestion in Delphi Round 2. This section will describe the proposed comprehensive multi layers model for assessing readiness of EA establishment in MPS.

The concept of Enterprise Architecture (EA) readiness has been studied based on different dimensions by different scholars and organisations. Current EA evaluation methods typically emphasize either on business and IT alignment or architecture maturity while ignoring all parts of the implementation (F Nikpay et al., 2015). This include the assessment at the early stage, including readiness assessment before embarking on EA implementation. Hence, a readiness assessment instrument is required to diagnose the dimensions mentioned by (Jahani et al., 2010) to ensure the success execution of EA.

This study proposed EA Readiness Assessment Model (EARAM) that is based on IT/IS Readiness Maturity Model developed by Salleh, Alshawi, Mohamed Sabli, Zolkafli, & Judi (2011). EARAM assess four elements which are People, Process, Technology and Enabling catalyst. These elements consist of 14 factors

that are classified with the main four elements in accordance with the extent of their respective homogeneity. This model being construct into layers to show the dependencies between each segment and layers:

Foundations layer - EA Domains

This layer consists of four EA domains, that is Business, Data, Application, Infrastructure. To assess readiness of EA, this domain need to be understand by agency as a foundation of EA.

Amplifiers layer - People, Process and Technology elements

This layer consists of three elements that is people, process and technology. Each of these elements comprises with factors that related to it such as people (stakeholder support, competency and skills, management commitment), process (business motivation, policy and rules) and technology (EA repository and EA tools). This elements and factors related to it will be shielded by the security factor that will be discuss in next layer.

Security Layer

Security layer encompasses all foundations and amplifiers. It also influences and gets influenced by the enablers.

Enablers layer - Enabling catalyst element

Enabler layers consist of five factors, namely as EA vision, EA governance, EA management, EA culture an EA resources. These factors serve as enabler towards readiness of an agency in embarking into EA practices.

This EARAM which incorporates all suggested elements with the aim of providing managers with a model to assess the EA readiness of their organisation, prior to the EA establishment by highlighting the areas that are likely require improvement. It can also help the decision makers to set a vision and a strategic statement action plan for the establishment of EA in their agencies. Table 1.1 list the descriptions and sources for each elements and factors.

Table 1.1 Descriptions and sources for each elements and factors

Elements	Factors	Description	Sources	Theories		
				IT/IS Readiness Maturity Model	SLR	Interview
Enterprise Environment (EE)	EA Vision (EE1)	Refer to the ability to clearly define and communicate what to be achieve. EA is driven by business approach to achieve vision. Provides the basis/foundation for the entire EA.	Jahani, Javadein, & Jafari, 2010; Alghamdi et al., 2011a; Azab, 2009		√	√
	EA Culture (EE2)	Refer to involvement and practices of EA by the employee in the organization. Include activities to embrace EA in the environment of organization.	Aier, 2014; Donaldson et al., 2015; Foorthuis et al., 2015; B. T. Ylimäki, 2008; Shah & El Kourdi, 2007; Seppanen et al., 2009; Jahani et al., 2010; Iyamu & Mphahlele, 2014; Al-Kharusi et al., 2016	√	√	√
	EA Management (EE3)	Refers to specific plan and governance structure is created to facilitate change in the organization.	Weiner, 2009; Aier, 2014; B. T. Ylimäki, 2008	√	√	√
	EA Resources (EE4)	Refers to sufficient resource to establish EA practices. Resource include human resources and asset resources in enterprise. It also refers to business and IT capacity. This dimension deals with all the resources (assets) available to be allocated to support organisational business processes.	Aier, 2014; Aier & Schelp, 2010; Short & Burke, 2010;		√	√

Elements	Factors	Description	Sources	Theories		
				IT/IS Readiness Maturity Model	SLR	Interview
	EA Governance (EE5)	Refers to structure, procedures and routines, and communications involving business and IT. The ability to engage the involvement and support of all parties with an interest in or responsibility to the project with the objective of ensuring that the corporate interests are served and the objectives achieved.	(Aagesen et al., 2011); (Janssen, 2012); (Saha, 2009b)(Seppanen et al., 2009); (Schmidt & Buxmann, 2011); (Van der Raadt et al., 2010); (Winter & Schelp, 2008)(S. Lee et al., 2016); (Donaldson et al., 2015) (Schmidt & Buxmann, 2011) (Al-Kharusi et al., 2016)	√	√	√
People (PP)	Stakeholder support (PP1)	Refers to the highest hierarchy in organization who continuously support EA practices. Stakeholder also act as an executive sponsor that accepts accountability for the project.	(Fatemeh Nikpay et al., 2013); (Schmidt & Buxmann, 2011); (Seppanen et al., 2009); (Farwick et al., 2013); (Iyamu & Mphahlele, 2014); (Saha, 2009b)	√	√	√
	Competency and skills (PP2)	Refers to the ability to perform all the IT tasks required by the project, including the skills, tools, processes, and management capability. The extent to which the architecture team is organized and established as well as the extent to which required skills are available or acquired.	Aier, 2014; Aier & Schelp, 2010; Iyamu & Mphahlele, 2014; Van der Raadt et al., 2010; B. T. Ylimäki, 2008; Romero et al., 2009	√	√	√
	Management Commitment (PP3)	Refers to which both the top-management and the employees of the organization are committed to and involved in the EA effort.	(Fatemeh Nikpay et al., 2013); (Schmidt & Buxmann, 2011); (Seppanen et al., 2009); (Farwick et al., 2013); (Saha, 2009b)	√	√	√

Elements	Factors	Description	Sources	Theories		
				IT/IS Readiness Maturity Model	SLR	Interview
Process (PS)	Business motivation (PS1)	Refers to a business case that consist of focus for the project, benefits that must be achieved and thereby creating an imperative to succeed. EA is driven by business requirement derived from business case.	(Foorthuis et al., 2015); (Saha, 2012); (Seppanen et al., 2009);(Schmidt & Buxmann, 2011); (Van der Raadt et al., 2010)		√	√
	Communication (PS2)	Refers to a formalised processes through which interactions and information sharing between the CIO, ITO and the chief enterprise architect took place in the organisation.	Aier & Schelp, 2010; Iyamu & Mphahlele, 2014; Schmidt & Buxmann, 2011; Van der Raadt et al., 2010; Ylimäki, 2008; Farwick et al., 2013; Buckl et al., 2009; Rahimi et al., 2017	√	√	√
	Policy and Rules (PS3)	Refers to a guidelines for decision making on architecture development, implementation and management, to ensure transparency and objectivity. They govern the relationship between enterprise architecture and its stakeholders within and outside IT.	Aier & Schelp, 2010; S. Lee et al., 2016; Gilliland et al., 2015; Van der Raadt et al., 2010; S. Lee et al., 2016; Aziz et al., 2006		√	√
Technology (TC)	EA Repository (TC1)	Refers to an infrastructure that consist of a storage architecture, which manage and moves information to the most cost-effective data repository based on the value of each piece of information at that exact point in time. This infrastructure should be accessible to EA team and secured.	Ahuja & Ahuja, 2008; Iyamu & Mphahlele, 2014; S. Lee et al., 2016; Nikpay et al., 2013; Ylimäki, 2008	√	√	√

Elements	Factors	Description	Sources	Theories		
				IT/IS Readiness Maturity Model	SLR	Interview
	EA Tools (TC2)	Refers to EA Management supporting tools for its practices and procedure such as modelling and developing tools.	(Fischer et al., 2007) (Rouhani et al., 2015)	√	√	√
	Security (TC3)	Refers to the safety of the communication of systems, flow of information, as well as the exchange of data and business processes. Include reliability security system and continues review for accountability.	(Bader et al., 2012)**;** (Liimatainen et al., 2007)**;**(Saha, 2012)		√	√

Based on Table A: Figure 2, Table B: List of elements, factors and items and Table C: Description of the model, I would like you to validate by stating (X) your opinion using these options:

[X] I hereby validate the EA Readiness Assessment Model for EA Establishment in MPS given above.

[ ] I hereby validate the EA Readiness Assessment Model for EA Establishment in MPS given above with an amendment. Please state:

_____

_____

_____

_____

Signature	:	
Name	:	**Dr. Ariffin Marzuki Mokhtar**
		Timbalan Pengarah (Operasi), Pensyarah Perubatan, Pakar
Designation	:	**Perunding Anestheisa Kardiothorasik**
		HUSM, Kelantan, Malaysia
Date	:	5/3/2018

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THANK YOU FOR YOUR FEEDBACK

End of questionnaire.

Please email your respond to shsurya2@live.utm.my

Thank you very much for your cooperation.

Appendix P

Case Study Session

i. Case Study Protocol

The Evaluation of Enterprise Architecture (EA) Readiness Assessment Model for EA Establishment in Malaysian Public Sector (MPS)

Research Team:

Surya Sumarni Hussein (Researcher/PhD Student) shsurya2@live.utm.my Phone:+60176347393	Associate Professor Dr. Mohd Naz'ri Mahrin Main Supervisor mdnazrim@utm.my Phone:+60321805211	Dr. Nurazean Maarop Co Supervisor nurazean.kl@utm.my Phone:+60322031341
Advanced Informatics School (UTM AIS) Universiti Teknologi Malaysia, Kuala Lumpur Jalan Semarak 54100 KUALA LUMPUR, MALAYSIA		

Overview:

This protocol is designed for main field work for multiple case study data collection in this research.

The objective of this protocol is as to evaluate the usefulness of the proposed EA Readiness Assessment Model by conducting case studies.

This protocol consists of the following:

- Assessment session (see Section A.1)
- List of targeted case studies (see Section A.2)
- Sample letter to approach target participants (see Section A.3)
- Evidence of Permission to Conduct the Study (see Section A.4)
- Assessment Scheduling Template (see Section A.5)

This case study protocol is developed based on in guideline by Kvale and Brinkmann (2009) and Seidman (2012)

A.1 Assessment Session

i. Assessment Briefing

a. Before starting the assessment, conduct a briefing.
b. Greet and thank participant for consenting to the assessment session and taking time off to participate
c. Explain the purpose of the assessment session

Example of Assessment Briefing

Thank you very much for participating in this assessment session. Your time is very much appreciated and your comments have been very helpful. The purpose of this assessment session is to evaluate the usefulness of the proposed EA Readiness Assessment Model that would be involved in successful EA establishment. The results of this research practically will provide useful information to all the EA team especially in public sector to assist the establishment of EA in more systematic manner. Therefore, the data collected is the input for developing useful EA Readiness Assessment Model towards successful EA establishment. You will be kept anonymous during all phases of this study including any experimental writings, published or not. Procedures for maintaining confidentiality are as follows: (1) individual participants' results will be pooled with group results; and two participants should not place any identifying information on data collection instruments. (Such identifiers include name, NRIC, staff identification number, personal telephone number, personal address.)

adapted from Moen (1998)

ii. Assessment Questionnaire

A.2 List Of Targeted Case Study

The case study would entail mainly quantitative evidence from assessment session. The list of targeted agencies is based on the list of EA Readiness Assessment Report by MAMPU and also based on recommendation from EA Practitioners in Malaysia. Agreement on a small number of sessions would be sought well in advance; these sessions would be professionally organised. The intended sessions seek the participation of EA team member from the case studies listed in this study. At the initial preparatory phase, the key contact person was approached through email explaining the objective and the expected outcome from this study. This is to allow them to have an idea of what to expect during the case study.

Below is the list of targeted Malaysian Public Sector agencies:

List of Agencies at Malaysian Public Sector for EA Readiness Case Studies

Agencies	Key contact person
Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), Prime Minister's Department	Dr Fazidah Dr Nurazaliah Pn Chua Swee Swan
Ministry of Health Malaysia (MOH)	Pn Dirayana Kamaruddin
Treasury Malaysia, Ministry of Finance (MOF)	En. Zainizam bin Haji Yusof
Economic Planning Unit (EPU), Prime Minister's Department	En Amran bin Hamzah Pn Nurhidayah
Implementation Coordination Unit (ICU), Prime Minister's Department	Pn Azlinda Md Jan
UiTM, KPT 3	Dr Kamaliyah Sarjo
Malaysian Centre for Geospatial Data Infrastructure (MacGDI), NRE	Pn Mageswari
Ministry of Works (KKR)	En Fikri Hafifi Yusof (/ send email 25118 case study on 8218)
Ministry of Women, Family and Community Development (KPWKM)	Puan Zaiton bt Ahmad

A.3 Sample Email To Approach Target Participants

Bahasa Malaysia Version

Assalamualaikum dan Salam Sejahtera <interviewee's name>,

PERMOHONAN UNTUK MENGADAKAN KAJIAN KES
Adalah dimaklumkan saya Surya Sumarni Hussein, Pegawai Teknologi Maklumat kini sedang melanjutkan pengajian di peringkat Doktor Falsafah (PhD) tajaan JPA di Universiti Teknologi Malaysia (UTM), Kuala Lumpur dalam bidang Enterprise Architecture (EA). Penyelia saya adalah Profesor Madya Dr. Mohd Naz'ri Mahrin dan Dr. Nurazean Maarop.
2. Untuk makluman, topik kajian ini ialah 'EA Readiness Assessment Model for EA Establishment in Malaysia Puclic Sector', bertujuan untuk menyediakan model kesediaan organisasi yang terlibat dalam fasa pra pembangunan EA dan mengenalpasti faktor kesediaan dalam memastikan kejayaan pelaksanaan EA di agensi kerajaan. Oleh yang demikian selaku peneraju pelaksanaan EA, input daripada <agency's name> adalah amat penting dalam kajian ini untuk mendapatkan pandangan tentang model yang telah dibangunkan.. Data yang sama akan dikumpulkan daripada beberapa agensi peneraju EA lain untuk membolehkan analisis bersilang dilaksanakan antara agensi. Dapatan daripada kajian ini berpotensi sebagai pemudahcara dalam proses pelaksanaan EA di agensi-agensi kerajaan yang lain pada masa akan datang. Kajian ini juga mendapat sokongan penuh daripada pasukan 1GovEA MAMPU.
3. Sehubungan itu, untuk mendapatkan maklumat lanjut bagi melengkapkan kajian ini, saya memohon kebenaran untuk menjalankan kajian kes pasukan EA yang terlibat. Cadangan tarikh kajian kes adalah < proposed date,time and venue for interview>, tertakluk kepada ketersediaan pihak tuan/puan. Untuk sebarang pertanyaan lanjut, bolehlah berhubung dengan saya di e-mel shsurya2@live.utm.my atau no. telefon 017-6347292.
4. Bersama-sama surat ini disertakan surat pengesahan kajian daripada UTM untuk perhatian tuan/puan jua. Kerjasama dan pertimbangan tuan/puan amatlah dihargai dan didahului dengan ucapan ribuan terima kasih.
Sekian.

Surya Sumarni Hussein
Pelajar PhD
Advanced Informatics School (UTM AIS)

Universiti Teknologi Malaysia, Kuala Lumpur
Jalan Semarak
54100 KUALA LUMPUR
☎ *017 6347292*
✉ *shsurya2@live.utm.my*

English Version

<Greetings>,
APPLICATION FOR CONDUCTING CASE STUDY

I am Surya Sumarni Hussein, PhD candidate from Advanced Informatics Schoold (AIS), Universiti Teknologi Malaysia (UTM), Kuala Lumpur. My research field is on Enterprise Architecture (EA) under supervision of Associate Professor Dr. Mohd Naz'ri Mahrin and Dr. Nurazean Maarop.

2. For your information, the subject of this study is 'EA Readiness Assessment Model for EA Establishment in Malaysia Puclic Sector', aims to develop a readiness model for the establishment of the EA in Malaysian Public Sector and to identify readiness factor towards successful EA establishment in public sector organisation. Therefore, as a leading organisation in EA implementation, the input of <agency's name> is very important to get feedback of model that has being develop. The same data will be collected from several other EA lead public sector organisations for the cross-analysis purposes. The findings of this study have the potential as an input to formulate a readiness assessment model. The study also received support from MAMPU 1GovEA team.
3 Therefore, I would like to interview you and your EA team on <date, day, time, venue>. For further information, I can be reached at e-mail mel shsurya2@live.utm.myor no. telephone 017-6347292. Together I enclosed the evidence of permission from UTM for your reference. Your cooperation and consideration are greatly appreciated.

Regards
Surya Sumarni Hussein
PhD students
Advanced Informatics School (UTM AIS)
Universiti Teknologi Malaysia, Kuala Lumpur
54100 KUALA LUMPUR

A.4 Evidence of Permission to Conduct Main Study

Refer to Appendix B (letter) 0388723382

A.5 Interview Scheduling Template

Agency	Date
KKR	8 Feb 2018
MOF	6 Feb 2018
EPU	9 Feb 2018

ii. Case Study session conducted with EARAT screen shot

a. Participation Information Sheet

Universiti Teknologi Malaysia
Advanced Informatics School

Project title: Evaluation of Enterprise Architecture (EA) Readiness Assessment Tool for EA Establishment in Malaysian Public Sector (MPS)

Participation Information Sheet

My name is Surya Sumarni Hussein and I am the PhD candidate at Advanced Informatics School (AIS) at Universiti Teknologi Malaysia (UTM), Kuala Lumpur. I am conducting an evaluation on EA Readiness assessment tool. You are invited to participate in this assessment and I would appreciate any assistance you can offer. EA readiness assessmnet tools evaluates four (4) elements which are People, Process, Technology and Enabling catalyst. This EA readiness assessment tool which incorporates all suggested elements with the aim of providing managers with a tool to assess the EA readiness of their organisation, prior to the EA establishment by highlighting the areas that are likely require improvement.

The participant is required to fill in the demography questionnaire that seek information about the participant's education program, knowledge and experience in EA establishment and EA practices . Briefing and training will be given to the participant on how to use the tools. The participant is required to fill in the assessment . At the end of the assessment, the participant is required to fill in the evaluation questionnaire which consists of five sections (usefulness, decision making support, information quality, ease of use and user satisfaction.

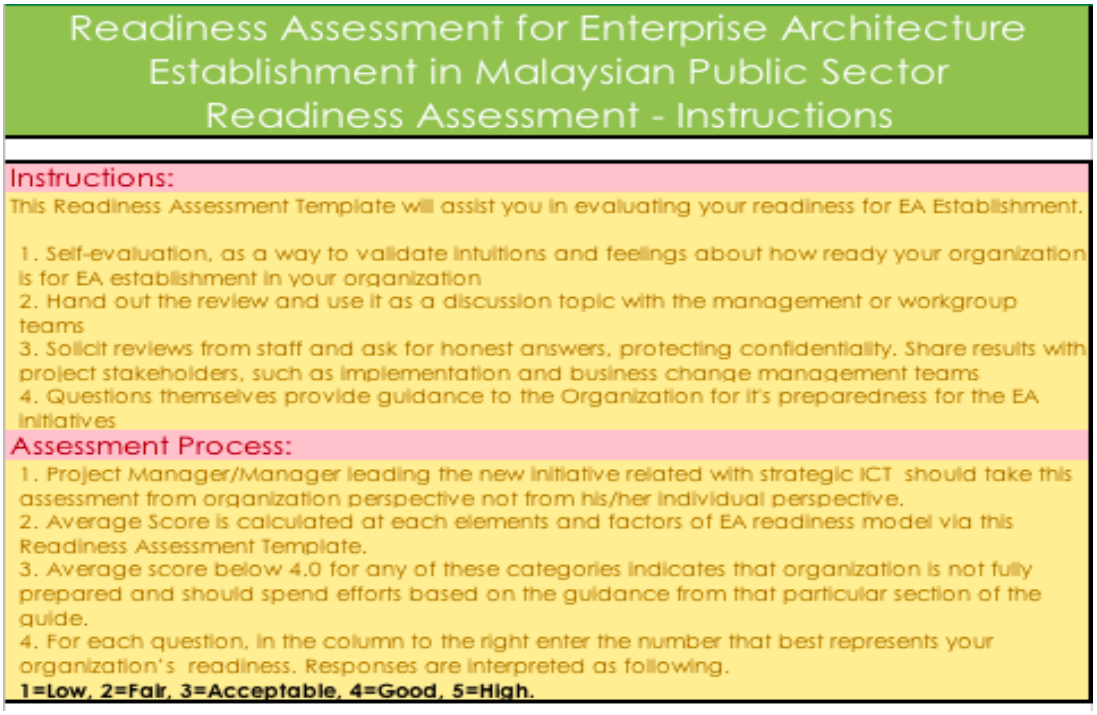
Right to Refuse or Withdraw

The participation in this experiment is voluntary. Refusal to participate will involve no penalty or loss of benefits. You are free to withdraw from the experiment at any time without penalty.

Confidentiality

The results of this experiment will be used for research purposes and research publications. Your identity will not be disclosed. All participants will be identified based only on their unique participant's number. Only the researcher involved in the experiment will have accessed to the participant's number.

b. Instruction to Participant



Readiness Assessment for Enterprise Architecture Establishment in Malaysian Public Sector
Readiness Assessment - Instructions

Instructions:

This Readiness Assessment Template will assist you in evaluating your readiness for EA Establishment.

1. Self-evaluation, as a way to validate intuitions and feelings about how ready your organization is for EA establishment in your organization
2. Hand out the review and use it as a discussion topic with the management or workgroup teams
3. Solicit reviews from staff and ask for honest answers, protecting confidentiality. Share results with project stakeholders, such as implementation and business change management teams
4. Questions themselves provide guidance to the Organization for it's preparedness for the EA initiatives

Assessment Process:

1. Project Manager/Manager leading the new initiative related with strategic ICT should take this assessment from organization perspective not from his/her individual perspective.
2. Average Score is calculated at each elements and factors of EA readiness model via this Readiness Assessment Template.
3. Average score below 4.0 for any of these categories indicates that organization is not fully prepared and should spend efforts based on the guidance from that particular section of the guide.
4. For each question, in the column to the right enter the number that best represents your organization's readiness. Responses are interpreted as following.

1=Low, 2=Fair, 3=Acceptable, 4=Good, 5=High.

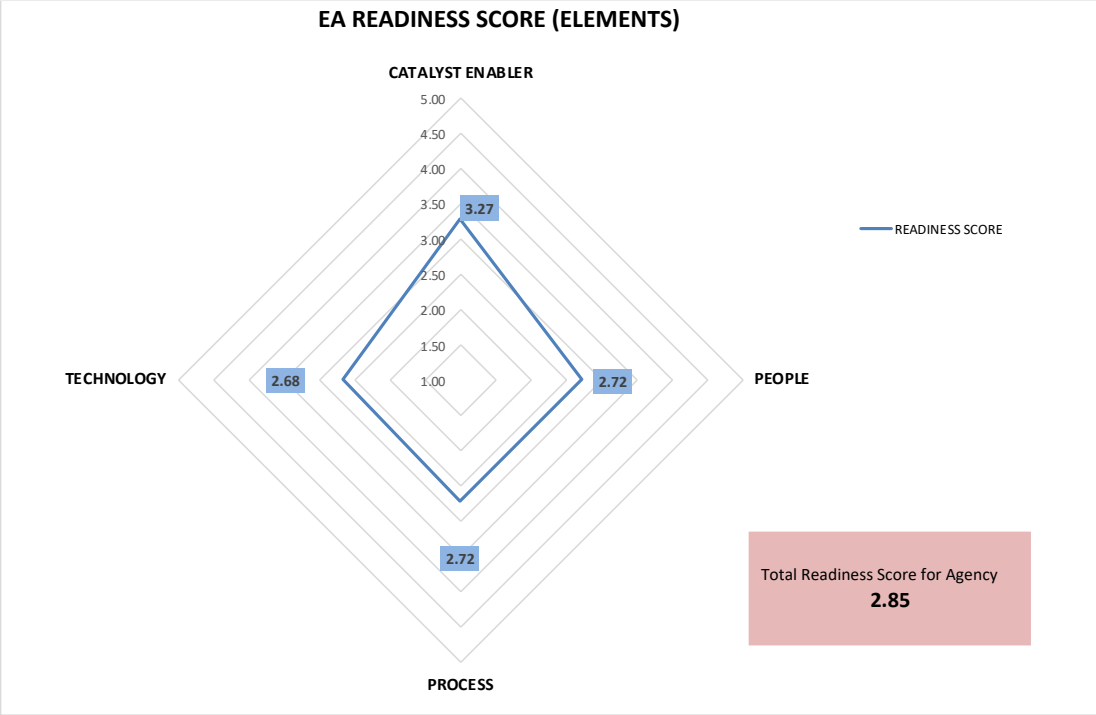
c. EA Readiness Assessment Questions

Readiness Assessment for Enterprise Architecture Establishment in Malaysian Public Sector

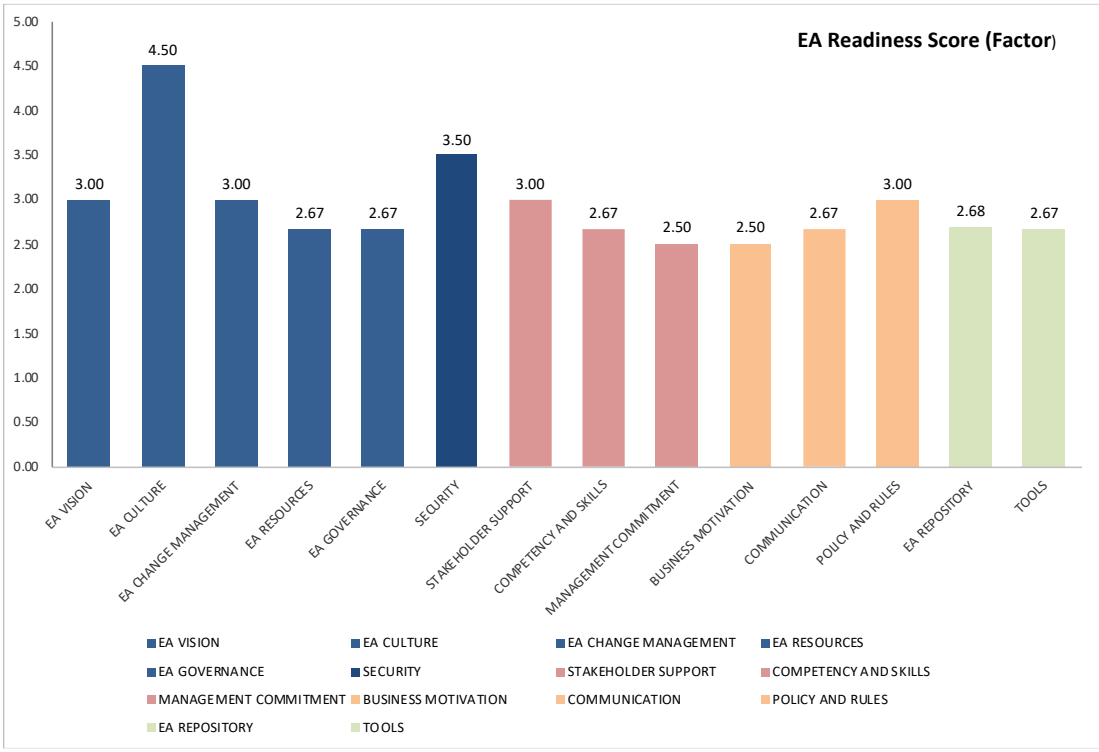
For each question, in the column to the right enter the number that best represents your organization's readiness. Responses are interpreted as following.
1=Low, 2=Fair, 3=Acceptable, 4=Good, 5=High.

	Element: Enterprise Environment Factor: EA VISION	Response: (Enter a Number between 1 and 5)
	My organisation:	
1	has the ability to align EA practice with organization (business) vision.	3
2	has a clear organization objectives, in both strategic and specific terms	3
3	needs are defined from the business perspective with IT strategic alignment.	3
4	has predict and prove processes for moving from vision to statement of requirements. i.e. strategy to tactics.	3
5	possess a clear driver to implement the initiatives.	3
6	has a clear scope and approach of the transformation initiative throughout the organization.	3
	Average Score	**3.00**
	Element: Enterprise Environment Factor: EA CULTURE	
	My organisation:	
7	has a program to promote awareness among employees to embrace EA in my organization	4
8	encourage participation of employees towards organization objectives rather than local objectives.	5
9	enforce EA culture as a delivery-oriented	4
10	empower and share EA knowledge in the organization learning culture among employees and stakeholder	5
	Average Score	**4.50**
	Element: Enterprise Environment Factor: EA CHANGE MANAGEMENT	
	In my organisation there is:	
11	business-technology convergence to facilitate change management in my organization. (i.e: alignment of business and IT)	3
12	top management that has the ability to manage vertical and horizontal relationship to accommodate	

d. EA Readiness Assessment Score According to Element



e. EA Readiness Assessment Score According to Factors



f. EA Readiness Indicator

EA Readiness Indicator

1	2	3	4	5
Low:	Fair:	Acceptable:	Good:	High:
Needs substantial work before proceeding	Needs some work before proceeding	Some readiness issues exist, no showstoppers	Relatively minor issues exist	No readiness issues

iii. Case Study Evaluation Questionnaire for EARAT based on EARAM

Date: _____

Participant's No: _____

ENTERPRISE ARCHITECTURE (EA) READINESS ASSESSMENT MODEL IN MALAYSIAN PUBLIC SECTOR (MPS): EA READINESS ASSESSMENT TOOLS

The purpose of this questionnaire is to evaluate the EA Readiness Assessment Tool (EARAT) as a part of EA Readiness Assessment Model (EARAM) in MPS (the assessment tool can be referred at the task sheet) used during the case study in terms of the usefulness, decision making supports, information quality, ease of use and user satisfaction.

Please tick (✓) the most appropriate answer based on your experience using the proposed EAR assessment model in this study	***Strongly Disagree***				***Strongly Agree***
	1	2	3	4	5
A. Usefulness refers to the *degree to which using the assessment tool and model for readiness assessment is able to help in indicating the readiness level in organisation*.					
A1. This model is useful to my job					
A2. This model enables me to accomplish task more quickly					
A3. This model improves my job performance					
A4. This model increases my productivity					
A5. This model enhances my job effectiveness					
A6. This model makes it easier to accomplish task					
B. Decision making supports refers to *the extent that using the readiness assessment model is able to improve the decision making processes or explain/justify the reasons for decisions.*					
B1. Using this model helps me to explain my decisions					
B2. Using this model helps me to justify my decisions					
B3. Using this model helps me to make explicit the reasons for my decisions					
B4. Using this model helps me to rationalize my decisions					
B5. Using this model helps me to control or shape the decision process					
B6. Using this model improves effectiveness and efficiency of the decision process					
B7. Using this model makes the decision process more rationale					
C. Information quality refers to *the quality of the information output produced by a in readiness assessment model and its usefulness to the user.*					
D1. The information provided by this model is useful					
D2. The information provided by this model is understandable					
D3. The information provided by this model is reliable					
D4. The information provided by this model is complete					

Please tick (✓) the most appropriate answer based on your experience using the proposed EAR assessment model in this study	***Strongly Disagree***				***Strongly Agree***
	1	2	3	4	5
D. Ease of use refers to *the degree to which the readiness assessment model is easy to use to accomplish tasks and free of effort.*					
E1. Using this model is clear and understandable					
E2. This model is flexible					
E3. This model is well structured					
E4. This model is easy to use					

E. User satisfaction refers to *the feelings of pleasure or displeasure regarding the readiness assessment model*					
F1. I am satisfied that this model adequately provides information processing need for software process tailoring.					
F2. I am satisfied with this model efficiency.					
F3. I am satisfied with this model effectiveness.					
F4. Overall, I am satisfied with this model.					

F. Other Comments

Please state other comments (if any)

G. Demography Information

Name :

Designation :

Organisation :

THANK YOU FOR YOUR TIME

Appendix Q

Evaluation Questionnaire Answer from Practitioners (Sample)

Date: 9/4/2018

Participant's No: 10

UTM UNIVERSITI TEKNOLOGI MALAYSIA | Advanced Informatics School (UTM AIS)

ENTERPRISE ARCHITECTURE (EA) READINESS ASSESSMENT MODEL IN MALAYSIAN PUBLIC SECTOR (MPS): EA READINESS ASSESSMENT TOOLS

The purpose of this questionnaire is to evaluate the EA Readiness Assessment Tool as a part of EA Readiness Assessment Model in MPS (the assessment tool can be referred at the task sheet) used during the case study in terms of the usefulness, decision making supports, information quality, ease of use and user satisfaction.

Please tick (✓) the most appropriate answer based on your experience using the proposed EAR assessment model in this study	*Strongly Disagree* 1	2	3	4	*Strongly Agree* 5
A. Usefulness refers to the *degree to which using the assessment tool and model for readiness assessment is able to help in indicating the readiness level in organisation.*					
A1. This model is useful to my job					✓
A2. This model enables me to accomplish task more quickly				✓	
A3. This model improves my job performance				✓	
A4. This model increases my productivity				✓	
A5. This model enhances my job effectiveness				✓	
A6. This model makes it easier to accomplish task					✓
B. Decision making supports refers to *the extent that using the readiness assessment model is able to improve the decision making processes or explain/justify the reasons for decisions.*					
B1. Using this model helps me to explain my decisions				✓	
B2. Using this model helps me to justify my decisions				✓	
B3. Using this model helps me to make explicit the reasons for my decisions				✓	
B4. Using this model helps me to rationalize my decisions				✓	
B5. Using this model helps me to control or shape the decision process				✓	
B6. Using this model improves effectiveness and efficiency of the decision process					✓
B7. Using this model makes the decision process more rationale				✓	
C. Information quality refers to *the quality of the information output produced by a in readiness assessment model and its usefulness to the user.*					
D1. The information provided by this model is useful					✓
D2. The information provided by this model is understandable					✓
D3. The information provided by this model is reliable				✓	
D4. The information provided by this model is complete				✓	
D. Ease of use refers to *the degree to which the readiness assessment model is easy to use to accomplish tasks and free of effort.*					
E1. Using this model is clear and understandable					✓
E2. This model is flexible					✓

E. User satisfaction refers to *the feelings of pleasure or displeasure regarding the readiness assessment model*					
F1. I am satisfied that this model adequately provides information processing need for software process tailoring.				✓	
F2. I am satisfied with this model efficiency.				✓	
F3. I am satisfied with this model effectiveness.				✓	
F4. Overall, I am satisfied with this model.				✓	

F. Other Comments

Please state other comments (if any)

G. Demography Information

Name : AMRAN HAMZAH

Designation : PENGARAH

Organisation : ECONOMIC PLANNING UNIT

THANK YOU FOR YOUR TIME

LIST OF PUBLICATIONS

Indexed Journals

1. **Hussein, S. S**., Mahrin, M. N. R., and Maarop, N. (2018). EA Governance towards Sustainability of EA Practices in Digital Government: A Systematic Review. *International Journal of Engineering and Technology*,Vol 7 No 3.20 (2018): Special Issue 20, pp. 311-315 **(Indexed by Scopus)**

2. **Hussein, S. S.**, Mahrin, M. N., Maarop, N., & Bakar, N. A. A. (2018). Evaluation of EA Readiness Assessment Model: A Case Study in Malaysia Public Sector. Journal of Advanced Research in Dynamical and Control Systems, 10 (issue 11), 151–157 **(Indexed by Scopus)**

3. **Sumarni Hussein**, S., Naz'Ri Mahrin, M., Maarop, N., Azaliah Abu Bakar, N. (2019). Content Validation of an Enterprise Architecture (EA) Readiness Assessment Instrument. Journal of Physics: Conference Series, 1196 (1), art. no. 12047. **(Indexed by Scopus)**

4. **Hussein, S. S.,** Mahrin, M. N. R., Maarop, N., & Bakar, N. A. A. (2020) Development and Validation of Enterprise Architecture (EA) Readiness Assessment Model. International Journal on Advanced Science, Engineering and Information Technology, Vol. 10 (2020) No. 1, pages: 157-163. (**Indexed by Scopus)**

5. **Hussein, S. S.**, Mahrin, M. N. R., and Maarop, N. (2017). Sustainability through Innovations of Enterprise Architecture (EA) in Public Sector's Management: Issues and Challenges. Journal of Southeast Asian Research. **(Indexed by EBSCO)**

Indexed Conference Proceedings

1. **Hussein, S. S.**, Ismail, Z., Mahrin, M. N. R., Abdullah, M. S., Rahim, N. Z. A., Samy, G. N., and Taib, M. Z. M. (2016, October). Towards designing an EA readiness instrument: A systematic review. In Information Science and Technology

(CiSt), 2016 4th IEEE International Colloquium, Tangier Morocco (pp. 158-163) **(Indexed by Scopus)**

2. **Hussein, S. S.**, Ismail, Z., Mahrin, M. N. R., EA innovations in managing public sectors: Issues and challenges. In Proceedings of the 27th International Business Information Management Association Conference, IBIMA 2016, Italy Pages 3498-3505 **(Indexed by Scopus)**

Non-Indexed Journals

1. **Hussein, S. S.**, Mahrin, M. N. R., and Maarop, N., Bakar, A. (2018). A Delphi Technique as a Method to Obtain Consensus in Validation of EA Readiness Assessment Model, Open International Journal of Informatics (OIJI).

Non-Indexed Conference Proceedings

1. **Hussein, S. S.**, Mahrin, M. N. R., and Ismail, Z. Towards Readiness in Enterprise Architecture Establishment: A Critical Success Factors. In Postgraduate Annual Research on Informatics Seminar (PARIS), 2016, Kuala Lumpur

2. **Hussein, S. S.**, Ismail, Z., and Mat, M. Z. Towards Sustainability of EA Practices: A Systematic Review. In International Conference on ICT for Transformation (ICT-4T), 2016, Sabah

3. **Hussein, S. S.**, Mahrin, M. N. R., and Maarop, N. Preliminary Study of Malaysian Public Sector (MPS) Transformation Readiness through Enterprise Architecture (EA) Establishment. 21st Pacific Asia Conference on Information Systems (PACIS 2017), Langkawi, Proceedings. 229.

4. **Hussein, S. S.**, Mahrin, M. N. R., and Maarop, N., Bakar, A. Development and Validation of EA Readiness Assessment Model: A Delphi Technique, Postgraduate Annual Research on Informatics Seminar (PARIS), 2018, Kuala Lumpur

Copyrights

1. **Hussein, S. S.**, Mahrin, M. N. R., and Maarop, N., Bakar, A. EA Readiness Assessment Model For Malaysian Public Sector IP/CR/2019/0488, August 2019