 ISSN:2302-8149
e-ISSN:2540-9719

Literature Review: Elements and Criteria Methodology of Enterprise Architecture for E-Government

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(***received:*** 24 Agustus 2020, ***revised:*** 27 Oktober 2020, ***accepted:*** 3 Nopember 2020)

Abstract

Enterprise Architecture (EA) has become a major requirement for organizations to addresses business, data, infrastructure, and information systems. EA Implementation in the government is considered very important to improve the efficiency of electronic-based services. The documentation process is challenging and is often seen as very time consuming, error-prone, and requires the collection of quality data. To create a successful, it requires to emphasize the aspects of EA development properly to prevent failure of the documentation. So, this study aims to identify the aspects of how to develop EA for e-government. The method of this study was literature review of 30 previous studies that related with the topic. Thus, this study analyzed and synthesized the studies and it can be mapped into 2 categories. The mapping consists of 1) elements and 2) criteria methodology of EA development for e-government. The findings are 23 and 11 criteria methodology of development for e-government. This study also provides some reference for further research and also provides insight into EA development for e-government that will be used by practitioners.

Keywords: enterprise architecture, e-Government, e-Government EA, EA methodology

Abstrak

Arsitektur perusahaan telah menjadi kebutuhan utama bagi organisasi untuk mengembangkan bisnis, data, infrastruktur, dan sistem informasi. Penerapan arsitektur perusahaan di pemerintahan dinilai sangat penting untuk meningkatkan efisiensi layanan berbasis elektronik. Proses dokumentasi cukup menantang dan sering kali dianggap sangat memakan waktu, rawan kesalahan, dan memerlukan pengumpulan data yang berkualitas. Untuk menciptakan kesuksesan, perlu adanya penekanan pada aspek pengembangan arsitektur perusahaan dengan baik untuk mencegah kegagalan pendokumentasian. Jadi, penelitian ini bertujuan untuk mengidentifikasi aspek bagaimana mengembangkan arsitektur perusahaan untuk e-government. Metode penelitian ini adalah studi pustaka dari 30 penelitian sebelumnya yang berhubungan dengan topik. Dengan demikian, studi ini menganalisis dan mensintesis studi tersebut dan dapat dipetakan menjadi 2 kategori. Pemetaan terdiri dari 1) elemen dan 2) metodologi kriteria pengembangan arsitektur perusahaan untuk e-government. Temuan tersebut adalah 23 dan 11 kriteria metodologi pengembangan e-government. Studi ini juga memberikan beberapa referensi untuk penelitian selanjutnya dan juga memberikan wawasan tentang pengembangan arsitektur perusahaan untuk e-government yang akan digunakan oleh para praktisi.

Kata Kunci: arsitektur perusahaan, arsitektur perusahaan e-Government, e-Government, metodologi arsitektur perusahaan

1 Introduction

Enterprise Architecture (EA) was introduced for the first time by John Zachman in 1987. EA has become a major need for organizations to address structure organization, business processes, information flows, information systems and infrastructure [1]. Schekkerman [2], defines EA as an approach to coordinate all the aspects organization that form fundamental holistically. EA is holistic that covers a wide spectrum of information, business, technical and management [3]. Based on the definition of EA, it is concluded that EA implementation is very important for an organization because it provides a solution to make the business process more effective.

 ISSN:2302-8149
e-ISSN:2540-9719

In government sector, EA practices are used in developing e-government which aims to improve the efficiency of electronic-based services. Implementation of EA in government sector could be said grow rapidly. According to Siltanen [4], by 2013, 88% of government organizations have implemented EA. Then, 2014 most government organizations prioritize the implementation of EA projects, so it can be predicted that the use of EA in various state governments will be increase for the following years.

EA development for e-government is influenced by the documentation process which is a crucial process of EA management and often ends with poor documentation [5] [6]. Documentation process of EA is influenced by the level of organizational complexity. The documentation process is challenging and is often seen as very time consuming, error-prone, and requires the collection of quality data [5]. The failure of the documentation process is influenced by the limited systematic approach to develop EA [6] [7]. EA standards that have been found to used as a reference for developing e-government, have different stages to developing enterprise architecture, but have the same concept, it is the transition from the current architecture (As-Is) to the expected architecture (To-Be) [1]. The selection of EA standards for developing e-government needs to be done properly in order to avoid failure in the documentation process. In addition, this standard could not be directly applied in government organizations, because it does not contain elements that exist in a government.

In previous studies, there was not enough research on the process of developing enterprise architecture documentation for e-government. Several studies conducted by [8] [9] [10] [11] have discussed the developing of a master plan for government, but it is not systematically explained regarding its stages and there is no explanation of the aspects needed in developing an enterprise architecture for e-government.

Based on the problems and previous studies, this study cover 2 aspects discussions of develop EA for e-government, those are: 1) elements EA development for e-government; 2) criteria of EA development for e-government. This study uses literature review method by collecting 30 previous studies related to the development of egovernment EA taken from 5 databases. Next, do the analysis and mapping the subject of each of the studies. This study provides some guidelines for further research related to this topic and also provides knowledge about developing EA for e-government that can be used by practitioners.

2 Literature Review

EA is holistic in that it covers a wide spectrum of information, business, technical and management [3]. Based on the understanding of EA, it's concluded that EA is very important for an organization because it can provide a solution to make the business process more effective. Several studies have recommended various enterprise architecture implementation methodologies (e.g. TOGAF, DoDAF, TEAF, FEAF) for use by academics or practitioners in developing EA [1]. The various methodologies of EA implementation have different stages, but they have the same concept, it is the transition from the current architecture (As-Is) to the expected architecture (To-Be) [1]. The EA development stage includes the process of creating, updating, and managing the evolution of all architectural domains in harmony with business strategy [1].

The previous studies conducted by [8] [9] [10] [11] have discussed the developing of a master plan for government, but it is not systematically explained regarding its stages and there is no explanation of the aspects needed in developing an enterprise architecture for e-government. Besides that, the previous literature review studies have not discussed about documentation EA in e-government, but in general [12] [13] [14].

According to S.Aier [15], the ineffective EA development is due to the complexity of the processes, methods, and strategies used [15]. Thus, it is important for this study to help eliminate these complexities by identifying the elements and methodology criteria for the EA development for e-government. Several previous studies have discussed many of the elements, and methodology criteria but they do not use review literature as a method research of this study.

 ISSN:2302-8149
e-ISSN:2540-9719

3 Research Method

The research method in this study is the literature review, which follows Kitchenham and Charters [16] practical guidelines, which consists of three main stages: planning, execution, and result analysis. In this study, researches follows the stages which involves defining the research objectives and the way the review is carried out.

3.1 Search process

The literature search process for this study is more oriented towards journal and conference searches than books or reports. This process is the activity of choosing the previous studies and entering the keywords that accordance with the research objectives of this study. Sources selected for the previous study search process are well-known online databases:

- IEEE Xplore
- Science Direct
- Springer Link
- Emerald
- Google Scholar

The keywords used to search studies are keywords that have relevance to this study topic includes : "**enterprise architecture**", "**enterprise architecture for government"**, **"enterprise architecture design"**, **"e-government master plan"**, **"e-government planning"**, **"enterprise architecture framework"**, **"national enterprise architecture", "e-government enterprise architecture"** , **"government enterprise architecture"**, **"framework for e-government"** , **"government architecture"**. The search process is done on the title, abstract, and keyword by using predefined keywords.

3.2 Inclusion and Exclusion Criteria

At this stage, the researchers determines the inclusion and exclusion criteria that will be used to analyze and eliminate the studies included in the exclusion criteria and to take the study included in the inclusion criteria. Here are the inclusion and exclusion criteria used :

1) Inclusion Criteria:
   - English peer-reviewed studies
   - Journals and conferences published in 2004-2017
   - The studies related to research objectives of this study
   - The studies focuses on enterprise architecture development
2) Exclusion Criteria:
   - Studies are not English
   - Studie has duplication / redundancy
   - Not related to research objectives of this study
   - Thesis
   - Books

3.3 Studies Selection

At this stage is the selection stage of previous studies based on the search results in the source used in this study. Selection of studies conducted through 3 process, there are :

1) Studies found: studies that found in the search process based on predetermined keywords
2) Candidate studies: studies that have been selected based on inclusion and exclusion criteria, as well as studies that have titles and abstracts relevant to this study
3) Selected studies: candidates studies are read, analyzed, reviewed from background, analysis of results, discussion, conclusions align with this research objectives. Then, its found the selected studies that will be used in this study

 ISSN:2302-8149
e-ISSN:2540-9719

Table 1. Studies Selection Process

Source	Found	Candidates	Selected
IEEE Xplore	815	35	13
Science Direct – Elsevier	53	6	4
Springer Link	208	10	3
Emerald	124	20	7
Google Scholar	255	31	3
Total	1455	102	30

Table 1 shown that the studies search was carried out in 5 sources, those are: IEEE Xplore, science direct, springer link, emerald, google scholar. There are 1455 studies that have been found based on predetermined keywords and there are 102 studies that have titles and abstracts that are relevant to this research. In the end, after being reviewed, there were 30 studies that align the objectives of this study. Most selected studies were obtained from IEEE Xplore.

Next, in Table 2 it is shown that the 30 selected studies are journals and conferences. The percentage of conferences is greater than journals, so it can be concluded that this study uses more conferences to be reviewed.

Table 2. Number And Percentage Of Studies

Studies Type	Number	%
Journal	13	43,33 %
Conference	17	56,67 %

3.4 Identification and Clasification

In this section, the researchers identifies the theme of the studies that have been selected. The 30 selected studies were given IDs to facilitate the studies mapping in the next section. After identification the studies, researchers found 2 major themes. The 2 themes related to this research objectives. In this section is also shown the description and classification of studies into the 2 major themes.

Table 3. Description and Clasification

Themes	Description	Study ID
Elements in EA development for e-government	In the context of EA needs to involve the elements that must exist in the EA development process for e-government, so that it could be in accordance with the conditions of relevant government organizations.	S1;S2;S3;S4;S5;S6;S7; S8;S9;S10;S11;S12;S13; S14;S15;S16;S17;S18; S19;S20;S21;S22;S23;S24.
Criteria for EA development methodologies	In an effective EA development methodology it is necessary to have several criteria.	S25;S26;S27;S28;S29;S30

Table 3 shown the mapping results of selected studies that discuss the elements and criteria for

 ISSN:2302-8149
e-ISSN:2540-9719

the EA development methodology. There are 24 studies on the elements used, while there are 6 studies on the criteria for the EA development methodology.

4 Result and Analysis

Based on the selection of studies that have been done, the researchers then extracted data from 30 selected studies. In this section, researchers describes the findings and discusses the results of review 30 selected studies to meet research objectives that determined in this literature review research.

4.1. Elements in EA Development for E-Government

The first objective of this study is related to the process of developing an EA for e-government, which needs to includes the elements that should be within a government organization. It requires to be in accordance with the conditions of organization governments. This section shown the results of extraction and identification of what elements of EA development for e-government that found of each selected studies. Then, calculate what elements are most discussed by the studies, so it's found the key elements of EA development for e-government.

Table 4. Elements EA for E-Gov of The Selected Studies

Elements	Study ID
Vision and mission, objective strategy, and policy	S1;S2;S4;S5;S6;S7;S8;S10;S11; S12;S20;S21;S22
Enterprise architecture principles	S1;S2;S4;S5;S6;S7;S8;S10;S11; S12;S20;S21;S22
Structure organization	S4;S5;S6;S7;S8;S10
Sponsor / Stakeholder	S5;S6;S7;S10;S16;S18;S20
Current conditions	S1;S2;S3;S4;S5;S7;S8;S11;S12;S13
SWOT	S10;S12
Critical Success Factor	S10;S12
Target analysis	S1;S4;S5;S7;S8;S13
Gap analysis	S1;S5;S6;S7;S8;S13
Government Regulations	S4; S5;S6;S18
Business Process	S1;S2;S3;S5;S6;S7;S8;S10;S12; S15;S18;S19;S20;S21;S22;S23;S24
Data Integration	S1;S2;S4;S5;S7;S8;S12;S18;S22;S23
Information / knowledge	S5;S9;S12;S15;S19;S21; S20
Application	S1;S2;S3;S4;S5;S6;S7;S8;S9;S10;S12; S18;S20;S21;S22;S23;S24
Application Priotization	S1;S6;S12;S23
Network Infrastructure	S1;S2;S3;S4;S5;S6;S7;S8;S9;S10;S12; S15;S17;S18;S19;S20;S21; S22;S23
Security	S3;S5;S12;S14;S15;S18; S21;S22
Authorization of access rights	S3;S5;S6;S12;S17;S18;S21
Organization Readiness	S3;S15;S19
Services	S5;S18;S19;S22
Review by stakeholder	S4;S5;S6;S7;S10
Application Prioritization	S1;S5;S12;S16
Roadmap package work	S1;S5;S7;S8;S9;S10;S12

 ISSN:2302-8149
e-ISSN:2540-9719

Table 4 shown that there are 23 elements of EA development for e-government that have been discussed in the 24 previous studies. In Table 4 also shown that not all studies input the same elements in developing EAs for e-government. It may caused by limitations of their research.

The most common elements found in previous research is vision, mission, strategy, policy, enterprise architecture principles, business process, data integration, network infrastructure, application, security, current conditions, which indicate that they are the main elements. Where these elements are the principles of architecture and core elements in enterprise architecture.

In the previous study, it was explained that the architecture of vision in the development of EA is able to drive the achievement of targets from architecture that integrate networks, services, applications and organizational needs [17]. In other studies, also stated that in developing EA for e-government there is a vision architecture design phase, which includes an analysis of vision, mission, goals, and strategies [8] [9] [10] [11] [18] [19] [20] [21] [22].

Related to the principles of architecture, Firmansyah, et al [9] stated that the principle of architecture consists of 4 types, namely business principles, data principles, and application principles [17]. These principles describe what things the organization needs or wants to achieve regarding business, data, applications and technology. Identification and determination of architectural principles is carried out at the design stage of the vision [18].

Analysis of the current conditions of government organizations is needed to find out the problems that are being faced and the conditions of business, data, applications, technologies that exist in the current government organization [19] [23].

Business design in EA development consists of main business activities and business support activities. In addition, there is also a need to align business processes with existing IT within government organizations [24]. Business design results will be input for data design. The existing data needs to be analyzed so that it can understand the flow of data and data integration in government organizations [23][25]. Meanwhile, for the application design consists of the user interface, application services, and data entered in the application.

For network infrastructure design, it is necessary to analyze the needs of network elements, the type of connection needed (internet / intranet), the number of applications built, network access speed, network traffic [23]. Firmansyah, et al also stated that there is a need for service network integration, which includes service privacy, such as firewalls, network monitoring [17]. Security is an important thing in a government. Security is a requirement that can guarantee confidentiality, integrity, and authenticity of users [23]. In the development of e-government also need to build security data and information, access data and information, transparent [17]. security and full access rights considerations [20] [26] [27].

Infrastructure security is one of the most important and least understood problems. In the implementation of e-government, the level of risk is increasing because the use of public networks increases together with a database that stores citizen profiles and government information. Therefore, it is necessary to develop sophisticated security technologies such as firewalls, encryption techniques, and systems that can ensure protection against fraud and other vulnerabilities at all levels of government information infrastructure [25]. In EA, security management is needed [28].

Meanwhile, for elements whose elements are not discussed at the studies, these are: structure organization, sponsor / stakeholder, SWOT, CSF, target analysis, gap analysis, government regulations, information / knowledge, authorization of access rights, review by stakeholders , organization readiness, services, application prioritization, roadmap package. All elements found can be used by academics and practitioners.

4.2. Criteria for EA Development Methodologies

For this research objective of this study relates to the criteria of an EA development methodology. Several of EA standards or methodologies have been found and they have different criteria values. In the selected studies, there are 6 studies which evaluating or assessing the EA development methodology. In these studies conducted an assessment based on predetermined criteria. In this study, researchers collected the criteria found in the selected studies and then identified which

 ISSN:2302-8149
e-ISSN:2540-9719

methodologies were most discussed or used in terms of assessment or evaluation of the EA development methodology.

Table 5. Criteria for EA Development Methodologies

Criteria Methodology	Study ID
Ease of use	S26;S27
Ease to learn	S26;S27
Consistent	S26
Practical / no complex	S25; S26; S28; S30
Dynamic / flexible	S25; S26;27
Step by step	S26; S27;S30
Includes As-IS and To-be conditions	S27;S30
Detailed Design	S26; S28;S29
Completeness of the domain	S27;S29;S30
Documentation	S28;S29
Structured	S29;S30

In Table 5, it is shown that there are 11 criteria for assessment an EA methodology that have been found in 6 studies. The criteria most discussed by the researchers is the "practical / no complex" and "step by step" criteria. This indicates that both criteria are very important in an EA development methodology and it can be used as a reference for researchers who will develop methodology of EA development for e-government to emphasize practicality and create a step-by-step methodology.

The EA development methodology must reduce complexity for the current architecture and desired architecture, and create effective transition plans [29]. The EA methodology needs to have practical guidance properties. Complexity is inherent in all enterprise systems such as e-government so complexity management is very important to facilitate the development of enterprise architecture. However, so far there is no EA development methodology that is effective in terms of complexity when implemented [25].

Then, the step by step criteria on the methodology include detailed design, requirements, maintenance, and continual need to consider more due to lack of consideration in most EAIMs [29]. How complete the methodology guides you through a step-by-step process to create a corporate architecture. In addition, in terms of EA development refers to the availability of step-by-step guidance for a better understanding of the practice / process of implementation [30].

4.3. Discussion

This section describes discussions on this literature review study. The first discusses about the overall findings of selected studies reviews. Then, discusses deeply about the findings that align with 2 research objectives in this study. Finally the direction for future work and limitations of this literature review study are represented.

EA practices are used in developing e-government is grow rapidly. In this study, researchers analyze studied that published in 2004 - 2017. Based on a review of 30 selected studies with EA development area, it is found 2 discussion themes that consists of 24 studies were focuses on elements that should be in EA development for e-government, and 6 studies on development methodology criteria.

Next, discuss the findings for each research objectives in this study. The first objective is to find out what elements need to be incorporated into the EA development process for e-government. According to Iyer [17], elements of EA are essential for interact to provide the overall functionality of the system [31]. The findings suggest that there are 23 elements of EA development for e-government that have been discussed or used by researchers to developing EA.

Elements that are widely used are strategy, vision, mission, business processes, data, technology, applications, and security. But, it does not mean that other elements are not important and not

incorporated into EA development for e-government. The other elements, such as regulation, information, integration, access, communication, organization readiness, services, commitment / stakeholder support, and application prioritization also needed to be considered to get detailed and precise EA design results. So, this study proposes to use all of 23 elements that have been found.

This study makes it easy for academics and practitioners to develop EA for e-government, it can help reduce development time and reduce failures in the process of enterprise architecture e-government documentation.

The limitations of this study are in 2004-2017 and only use 5 online databases as a search source. It might be possible that there are missed some studies (journals or conferences) that relevant to the topic of this study which indexed in other databases with published before 2004.

There are several recommendations for further work. Firstly, the identified elements and the methodology of EA development for e-government need to be evaluated by practitioners who are experienced in developing EA or by experts judments. Secondly, explores studies deeply that related to the EA development methodology criteria. Thirdly, it would be very interesting to develop a new methodology of EA development for e-government with a structured and easy-to-implement methodology.

5 Conclusion

This study aims to conduct the literature review on how to develop EA for e-government. The researchers identifies and analyzes what elements need to be incorporated into the EA development for e-government and the criteria of the EA methodology to be easy to implement. To find these, the researchers used suitable studies and analyzed the content of the studies then mapped into 2 categories, those are elements and criteria methodology of developing enterprise architecture e-government. There are 26 elements and 2 criteria that should be prioritized in methodology, so it can be easy to implement the EA development methodology for e-government. This study explores requirements to be known and considered in developing EA for e-government, so it provides knowledge and make it easy for academics and practitioners to develop EA for e-government. EA implementation leads many challenges arise in EA development and in the study allows to address these emerging challenges by providing an overview of the elements and criteria methodology for developing EA e- government.

References

[1] D. Rouhani, M. N. Mahrin, R. B. Ahmad, and P. Nikfard, "A systematic literature review on Enterprise Architecture Implementation Methodologies.," *Information and Software Technology.*, 2015, doi: https://doi.org/10.1016/j.infsof.2015.01.012.

[2] J. Shekkerman, "Trends in Enterprise Architecture," 2004. http://www.enterprise-architecture.info/Images/EA%20Survey/EA%20Survey%20 2004%20IFEAD.PDF.

[3] T. Iyamu, "Implementation Of The Enterprise Architecture Through The Zachman Framework," *Journal of Systems and Information Technology*, 2013.

[4] J. Siltanen, "Enterprise Architecture in the Finnish public sector – It's the law.," 2015.

[5] M. Hauder, F. Matthes, and S. Roth, "Challenges for automated Enterprise Architecture Documentation," *Springer*, pp. 21–39, 2012.

[6] Roth, S., Hauder, M., "Enterprise Architecture Documentation: Current Practices and Future Directions," 2013.

[7] M. Farwick, C. M. Schweda, R. Breu, and I. Hanschke, "A situational method for semi-automated Enterprise Architecture Documentation," *Springer-Verl Berl Heidelb*, 2014, doi: //doi.org/DOI 10.1007/s10270-014-0407-3.

[8] E. Rasdiana and Y. Bandung, "A Centralized Design of Information Network Architecture for Local Government : Case Study of Hulu Sungai Selatan Regency," *IEEE*, 2016.
[9] C. M. Firmansyah and Yoanes, "Designing an Enterprise Architecture Government Organization Based on TOGAF ADM and SONA," *IEEE Conf.*, 2016, doi: 10.1109/ICITSI.2016.7858191.
[10] W. D. Sunindyo, S. Akbar, and Mohammad Iqbal, "Towards a Smart World Class City : Case: Building Bandung ICT Master Plan," *IEEE*, 2013, doi: 10.1109/ICTSS.2013.6588102.
[11] I. Y. M. Edward, W. Shalannanda, and Susmini Indriani Lestariningati, "E-Government Master Plan Design with TOGAF Framework : Case Study: Payakumbuh City Government, Indonesia," *IEEE Conf.*, 2014, doi: 10.1109/TSSA.2014.7065957.
[12] E. Putro, A. N. Hidayanto, Meyliana, and Harjanto Prabowo, "The Alignment Factors of Business-IT on Enterprise Architecture : a Systematic Literature Review," *IEEE*, 2017.
[13] A. E. J. E. Egeten, H. Prabowo, Meyliana, M. Hapsara, and Raymond Kosala, "The General Components of Enterprise Architecture Framework in e-Commerce: A Systematic Literature Review," *IEEE Conf.*, 2017.
[14] D. D. Dang and S. Pekkola, "Systematic Literature Review on Enterprise Architecture in the Public Sector," 2016.
[15] J. S. Aier, "Understanding processes for model-based enterprise transformation planning," *Int. J. Internet Enterprise Manage.*, vol. 7, no. 1, pp. 84–103, 2011.
[16] B. A. Kitchenham and S. Charters, *Guidelines for performing systematic literature reviews in software engineering*, 10th ed. 2007.
[17] B. Iyer and R. Gottlieb, "The Four-Domain Architecture: An approach to support enterprise architecture design," *IBM SYSTEMS JOURNAL*, vol. 43, no. 3, Art. no. 3, 2004.
[18] C. Batini, G. Viscusi, and D. Cherubini, "GovQual: A quality driven methodology for E-Government project planning," *Government Information Quarterly*, 2009.
[19] S. Buckl, F. Matthes, S. Roth, Christopher Schulz, and Christian M. Schweda, "A Conceptual Framework for Enterprise Architecture Design," *Springer Berl. Heidelb.*, doi: https://doi.org/10.1007/978-3-642-16819-2_4.
[20] X. Wang, Xiongwei Zhou, and Longbin Jiang, "A Method of Business and IT Alignment Based on Enterprise Architecture," *IEEE*, 2008, doi: 10.1109/SOLI.2008.4686496.
[21] N. B. Kurniawan and Suhardi, "Enterprise Architecture Design for Ensuring Strategic Business IT Alignment (Integrating SAMM with TOGAF 9.1)," *IEEE Conf.*, 2013, doi: 10.1109/rICT-ICeVT.2013.6741505.
[22] R. Delima, H. B. Santoso, and J. Purwadi, "Architecture Vision for Indonesian Integrated Agriculture Information Systems Using TOGAF Framework.," *IEEE*, 2016, doi: 10.1109/IAC.2016.7905691.
[23] F. Belanger and J. S. Hiller, "A framework for e-government: privacy implications," *Bus. Process Manag. J.*, 2006, doi: https://doi.org/10.1108/14637150610643751.
[24] N. D. Mamaghani, F. M. Madani, and Ali Sharifi, "Customer oriented enterprise IT architecture framework," *Elsevier*, 2011, doi: https://doi.org/10.1016/j.tele.2011.07.001.
[25] R. Winter and R. Fischer, "Essential Layers, Artifacts, and Dependencies of Enterprise Architecture," *IEEE*, 2006.
[26] Z. Ebrahim and Z. Irani, "E-government adoption: architecture and barriers," *Business Process Management Journal*, vol. 11, no. 15, Art. no. 15, 2005, doi: http://dx.doi.org/10.1108/14637150510619902.
[27] M. Dadashzadeh, "A New Methodology For Developing The MIS Master Plan," *10.19030/rbis.v13i1.4333*, vol. 13, 2009, doi: 10.19030/rbis.v13i1.4333.

 ISSN:2302-8149
e-ISSN:2540-9719

[28] B. Fritscher and Y. Pigneur, "Business IT Alignment from Business Model to Enterprise Architecture," *Springer Berl. Heidelb.*, vol. 83, 2011, doi: https://doi.org/10.1007/978-3-642-22056-2_2.
[29] S. Gregor, D. Hart, and N. Martin, "Enterprise architectures: enablers of business strategy and IS/IT alignment in government," *Information Technology & People*, 2007, doi: http://dx.doi.org/10.1108/09593840710758031.
[30] F. Nikpay, R. B. Ahmad, B. D. Rouhani, Mohd Naz'ri Mahrin, and Shahaboddin Shamshirband, "An effective Enterprise Architecture Implementation Methodology," *Springer-Verl. Berl. Heidelb.*, 2017, doi: DOI 10.1007/s10257-016-0336-5.
[31] B. Iyer and R. Gottlieb, "The Four-Domain Architecture: An approach to support enterprise architecture design," *IBM SYSTEMS JOURNAL*, vol. 43, no. 3, 2004.
[32] A. Wegmann, I. Rychkova, G. Regev, and L.-S. Lê, "Business and IT Alignment with SEAM for Enterprise Architecture," 2007, doi: 10.1109/EDOC.2007.54.
[33] N. Lim, T. Lee, and S. Park, "A Comparative Analysis of Enterprise Architecture Frameworks Based on EA Quality Attributes," 2009, doi: 10.1109/SNPD.2009.97.
[34] R. Rouhani, B. Darvish, F. Nikpay, Mohd Naz'ri Mahrin, and Pourya Nikfard, "A Comparison of the Top Four Enterprise- Architecture Methodologies," *International Conference on Informatics and Creative Multimedia*, 2013.
[35] M. A. Mohamed, G. H. Galal-Edeen, H. A. Hassan, and Ehab Ezzat Hasanien, "An Evaluation of Enterprise Architecture Frameworks for E-Government," *IEEE*, 2012.
[36] M. Kostoska, M. Gusev, and K. Kiroski, "Evaluation methodology for national enterprise architecture frameworks," in *ICT Innovations 2010 Web Proceedings*, 2010.

Appendix A. Selected tudies in review

ID Study	Title	Source	Type Studies
S1	GovQual: A quality driven methodology for E-Government project planning	ScienceDirect	Journal
S2	A Conceptual Framework for Enterprise Architecture Design	Springer	Conference
S3	A Centralized Design of Information Network Architecture for Local Government	IEEE	Conference
S4	A Method of Business and IT Alignment Based on Enterprise Architecture	IEEE	Conference
S5	Designing an Enterprise Architecture Government Organization Based on TOGAF ADM and SONA	IEEE	Conference
S6	Towards a Smart World Class City : Case: Building Bandung ICT Master Plan	IEEE	Conference
S7	Enterprise Architecture Design for Ensuring Strategic Business IT Alignment (Integrating SAMM with TOGAF 9.1)	IEEE	Conference

ISSN:2302-8149
e-ISSN:2540-9719

ID Study	Title	Source	Type Studies
S8	E-Government Master Plan Design with TOGAF Framework Case Study: Payakumbuh City Government, Indonesia	IEEE	Conference
S9	Implementation Of The Enterprise Architecture Through The Zachman Framework	Emerald	Journal
S10	Architecture Vision for Indonesian Integrated Agriculture Information Systems Using TOGAF Framework.	IEEE	Conference
S11	Customer oriented enterprise IT architecture framework	ScienceDirect	Journal
S12	A New Methodology For Developing The MIS Master Plan	Googgle scholar	Conference
S13	Enterprise architectures: enablers of business strategy and IS/IT alignment in government	Emerald	Journal
S14	framework for e-government: privacy implications	Emerald	Journal
S15	The Four-Domain Architecture: An approach to support enterprise architecture design	IEEE	Journal
S16	Information technology portfolio management implementation: a case study	Emerald	Journal
S17	Models for e-government	Emerald	Journal
S18	E-government adoption: architecture and barriers	Emerald	Journal
S19	Bridging theory and practice in e-government: A set of guidelines for architectural design	ScienceDirect	Journal
S20	An enterprise application integration methodology for e-government	Emerald	Journal
S21	Interoperability frameworks and enterprise architectures in e-government initiatives in Europe and the United States	ScienceDirect	Journal
S22	Essential Layers, Artifacts, and Dependencies of Enterprise Architecture	IEEE	Conference
S23	Business IT Alignment from Business Model to Enterprise Architecture	Springer	Conference
S24	Business and IT Alignment with SEAM for Enterprise Architecture	IEEE	Conference
S25	A Comparative Analysis of Enterprise Architecture Frameworks based on EA Quality Attributes	IEEE	Conference
S26	A Comparison Enterprise Architecture Implementation Methodologies	IEEE	Conference

ISSN:2302-8149
e-ISSN:2540-9719

ID Study	Title	Source	Type Studies
S27	An effective Enterprise Architecture Implementation Methodology	Springer	Journal
S28	An Evaluation of Enterprise Architecture Frameworks for E-Government	IEEE	Conference
S29	Evaluation methodology for national enterprise architecture frameworks	Goggle scholar	Conference
S30	A Comparison of the Top Four Enterprise-Architecture Methodologies	Goggle scholar	Conference

Appendix B. Theme of Selected Studies

ID Study	Themes
S1	Elements of EA development
S2	Elements of EA development
S3	Elements of EA development
S4	Elements of EA development
S5	Elements of EA development
S6	Elements of EA development
S7	Elements of EA development
S8	Elements of EA development
S9	Elements of EA development
S10	Elements of EA development
S11	Elements of EA development
S12	Elements of EA development
S13	Elements of EA development
S14	Elements of EA development
S15	Elements of EA development
S16	Elements of EA development
S17	Elements of EA development
S18	Elements of EA development
S19	Elements of EA development
S20	Elements of EA development
S21	Elements of EA development
S22	Elements of EA development
S23	Elements of EA development
S24	Elements of EA development
S25	Criteria Methodology of EA development
S26	Criteria Methodology of EA development
S27	Criteria Methodology of EA development

ISSN:2302-8149
e-ISSN:2540-9719

ID Study	Themes
S28	Criteria Methodology of EA development
S29	Criteria Methodology of EA development
S30	Criteria Methodology of EA development