

# A SYSTEMATIC LITERATURE REVIEW ON ENTERPRISE ARCHITECTURE DEVELOPMENT IN VARIOUS INDUSTRY DOMAINS

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## ABSTRACT

Industry's needs for Enterprise Architecture (EA) support are increasing in line with the increasing development of EA in various industries globally. The level of business competition and the growing economic and technological developments have forced decision-makers to make critical decisions quickly yet effective for gaining enterprise's competitive advantage. It is argued, from information technology supports point of view, that in the current competitive business environment, the role of EA becomes crucial as the enabler to the decision makers. This study examines previous works specifically on EA development in various industry domains with the systematic literature review (SLR). An SLR search has resulted in 63 related journal articles published from 2013 to 2018. A content analysis of articles was carried out taking into account parameters such as publication year, a focused element of EA, and industry domain in which the EA element was implemented. The study concluded that e-government, healthcare, smart city, and software development are the industry domains where EA was mostly implemented. The study also found that the EA model is the element of EA most frequently discussed and implemented in almost all industry domains.

**Keywords:** *Enterprise Architecture, Systematic Literature Review, Enterprise Architecture Model, Business Competitive Advantage, Enterprise Architecture Development.*

## 1. INTRODUCTION

It is noted that Enterprise Architecture (EA) has recently been acknowledged to have significantly contributed to the success of enterprises' business objectives. A development of EA in an enterprise is often supported by a standard framework such as The Open Group Architecture Framework (TOGAF)[1] or Zachman Framework[2]. The EA framework defines business needs in a structured process and acts as a guide to ensure structured thinking, completeness, and consistency of all the business elements. The framework articulates business and stakeholders needs through EA development elements such as model, metamodel, and artifacts which are used as standard methods and notations for all the stakeholders involved in the development. It is argued that different industry domains may require different EA framework and element for successful EA development. Selecting the right framework and EA element for a specific industry domain are crucial since inappropriate framework may not be able to grab all the essential business requirements.

This paper purpose is to present an analysis of previous works on EA development in various industry domains including specifying the industry domains and the EA elements which EA mostly implemented. A Systematic Literature Review (SLR) [3] method was adopted to discover related literatures. In Section 2, a background on enterprise architecture and its role in achieving business objectives is presented. Here, TOGAF was used as the reference framework along with the Architecture Development Method (ADM) and its iterations. Section 3 discusses the SLR methodology used which involved the identification of research, selection of studies, study quality assessment, data extraction and monitoring, and data synthesis. Section 4 presents the analysis and results of a literature review, and finally, a conclusion is presented in Section 5.

## 2. BACKGROUND

An Enterprise Architecture (EA) is a blueprint that explains the organization structure and organization operations [4]. It determines the way to select the most effective strategies to achieve future organization objectives. The objective of enterprise architecture is to improve, across the enterprise, the often segmented processes legacy, into a unified environment that is relative to change and supportive to delivery of the organization strategy.

EA is a definite practice for supporting and conducting design, enterprise analysis, planning, and its development, using a broad and practical approach, for the successful strategy execution and development[5]. Enterprise architecture relates organization practices, architecture principles guided through business, process, information, and technology layers, and implies any changes required to execute the organization's strategies. These apply utilize various properties of enterprise architecture to motivate, identify, and achieve enterprise fluctuations[6]. An EA offers a blueprint to define and the structure of the organization through the four architecture layers. In brief, EA is an ordered way of relating how the business development, information systems, and people act in an organization function[7].

Enterprise architecture concept absorbed in The Open Group Architecture Framework (TOGAF) [1]. It is considering the Information Technology (IT) ways to support enterprise business and its transformation. TOGAF have Architecture Development Method (ADM) as the result of continuous discussions and contributions from a great number of EA practitioners around the world. The TOGAF ADM describes a methodology to develop and manage the EA lifecycle and forms the TOGAF core. It is iterative for the whole EA process, between and within each phase. The iterations consist of architecture capability, architecture development, transition planning, and architecture governance iterations.

The previous systematic literature review (SLR) on EA was discussed in the e-commerce domain [8]. Another SLR examined in data-driven EA [9], EA implementation evaluation practices [10]. This trend reflected the need for EA to support business achievement and influencing this research to study EA development trend on various industry domain.

The SLR about EA in e-commerce [8] discussed an EA development model for helping the enterprises to fix business problems. Literature review on data-driven EA discussed how the TOGAF ADM could support a data-driven enterprise [9]. The SLR for implementation evaluation practices propose a theory-based evaluation model for EA implementation [10]. This research discussed an EA development trend in various industry domain and an EA elements construction.

## 3. METHODOLOGY

A comparative study of EA development from various industrial domains is needed which can represent various needs of users from the various industrial domain. Since EA contribution applies to various industry domains, it requires more literature review to determine the appropriate EA development for each industry domain.

Systematic literature review (SLR) [3] was used as the methodology for this study. The objective of the study was to define the trend across an EA development in various industry domain. This literature review searched the publications from 2013 to 2018 on related EA development across the industry domain and development iterations. The following questions were used for data extractions:

1. What industry domains were studied in EA researches carried out between 2013 and 2018?
2. What EA elements were examined in the EA researches carried out between 2013 and 2018?
3. What EA elements frequently examined within a particular industry domain?
4. What is the trend in EA researches by industry domain concerning their publication years?

This study refers to the SLR stages as in [3] which consist of:



Figure 1: The SLR Stages

### 3.1 Identification of Research

This review aimed to find as several studies related to the research question. Based on the research questions, search terms classified as topic, activities, and elements. This review identified the

following alternative terms to construct a search string in table 1.

Table 1: Search String

Search String		
Topic	Activities	Elements
Enterprise Architecture	Development	Framework
EA	Implementation	Methodology
IT Architecture	Adaptation	Artifact
	Adoption	Model
		Metamodel

The search string can concatenate as "Enterprise Architecture" OR EA OR "IT Architecture" AND Development OR Implementation OR Adaption OR Adoption AND Framework OR Methodology OR Artifact OR Model OR "Metamodel".

The search string will be customized to different search databases as per its requirement while retaining the logical order of terms. The search selection string applies to a range of online search databases to guarantee no exclusion of any related study. The following search databases and publications had been selected:

1. ACM Digital Library (<http://dl.acm.org/>),
2. IEEE Xplore (<http://ieeexplore.ieee.org/>),
3. Science Direct (<http://www.sciencedirect.com/>),
4. Springer Link (<http://www.springerlink.com/>).

### 3.2 Selection of Studies

Once the conceivably relevant studies had been established, all the search results need to be reviewed. The search results were established from entirely selected search databases, and the selection criteria applied to remove the irrelevant publications. There were two steps of selection, a primary search, and a secondary search. The following primary criteria will be used in sequence;

1. If ('published between 2013-2018) then include, else discard,
2. If ('the search result is a general article') then discard, else include,
3. If ('duplicate or have multiple publications from the same study') then discard, else include,
4. If ('written in English') then include, else discard.

Duplicated publication citations were excluded before executing the selection filter. If multiple papers were using or describing the results from a similar study, or there were multiple publications from one research or study, it will be treated as one

study. The secondary search used the following criteria:

1. If ('industry domains are clearly stated) then include, else discard,
2. If ('using systematic review method') then discard, else include,
3. If ('include on architecture development iterations') then discard, else include.

### 3.3 Study Quality Assessment

This study followed the quality checklist provided by Barbara Kitchenham [11]. Since the checklist is for software engineering, modifications to suit with EA domain were necessary. The final checklist used in this study is as shown in Table 2.

Table 2: Quality Checklist Table

No	Quality Items
1	Are the aims clearly stated?
2	Are the study participants or observational units adequately described?
3	Was the study design appropriate concerning research aim?
4	Are the data collection methods adequately described?
5	Are all the study questions answered?
6	Do the researchers explain future implications?
7	Is EA industry-specific domain defined?
8	Is the case study linked to existing EA body of knowledge?
9	Is a clear chain of evidence established from observations to conclusions?

The quality checklist items were graded on YES/NO/PARTIAL. Scores assigned were according to the grades are 1 for YES, 0.5 for PARTIAL, and 0 for NO. The total scores were exercised for the study's quality assessment. The quality assessment was managed in parallel with Data Extraction.

### 3.4 Data Extraction And Monitoring

This research used data design extraction to input the information that was required from the publications to solve the research questions. The extracted data are publication title, authors name, journal or conference, publication year, industry domain, EA elements, and EA iteration. Data extraction will extract information specific to answer research questions.

### 3.5 Data Synthesis

After data extraction, the search results were then aggregated for further analysis. The following patterns were aggregated from search results:

1. The frequency of publications by industry domain,
2. The frequency of EA elements being studied,
3. The frequency of EA elements studied by industry domains, and
4. The frequency of studies in each industry domain by their publication year.

Illustration of the SLR execution process as discussed in subchapter 3.1 until 3.4, shows in figure 2. Based on the selected search database, search string, primary and secondary selection of studies, this study found 63 publications as a search selection result.

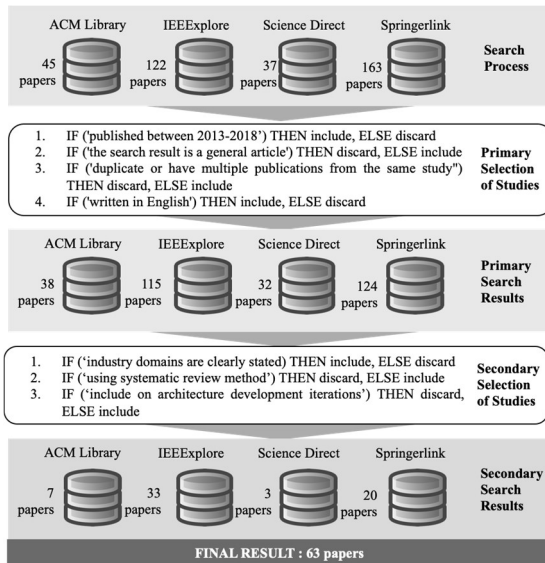


Figure 2: SLR execution process

#### 4. RESULT AND DISCUSSION

In this section, the search findings to answer the research questions are presented.

##### 4.1 The frequency of Industry Domains

Sixty-three search results were grouped based on case studies in the industry domain. Industry domains were grouped in table 3.

Table 3: Industry Domain and its Related Publications

No	Industry Domain	Publications
1	Aerospace	[12]
2	Agile	[13]
3	Big Data	[14]
4	Cloud	[15][16][17]
5	Data Management	[18]
6	Education	[19][20][21]

No	Industry Domain	Publications
7	eGovernment	[22][23][24][25][26][27][28][29][30]
8	Electricity	[31]
9	Finance	[32][33][34][35][36]
10	Fire Emergency	[37]
11	Healthcare	[38][39][40][41][42][43][44][45]
12	Manufacturing	[46][47]
13	Military	[48]
14	Ocean observing	[49]
15	Security	[50][51][52]
16	Service Management	[53][54][55][56][57]
17	Smart City	[58][59][60][61][62][63]
18	SME	[64][65]
19	Software Development	[66][67][68][69][70][71]
20	Supply Chain	[72]
21	Telecommunication	[73][74]

The frequency of publications by each industry domain is illustrated in Figure 3. The number of publications on EA development for eGovernment, finance, healthcare, service management, smart city, and software development, appeared to be more than five publications. EA studies need to be carried out on a broader range of industries.

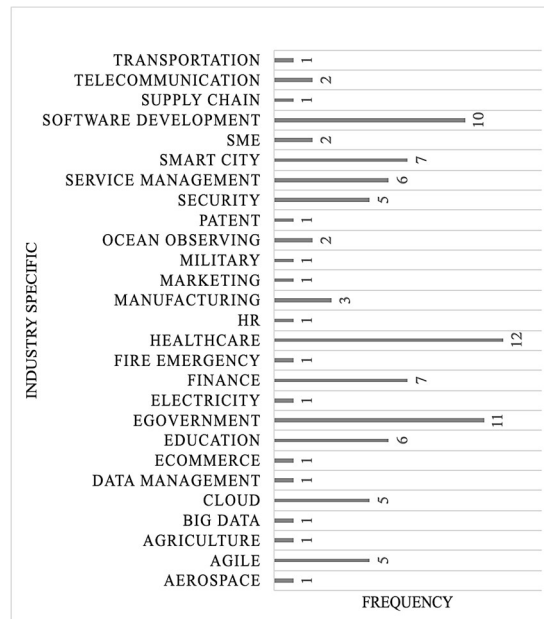


Figure 3: Number of EA development by industry domain

##### 4.2 The frequency of EA Elements

Analysis of EA element development trends was carried also out on the 63 search selection publications. The EA elements in the search

selection publications were grouped into models, frameworks, metamodel, and architecture. The distribution of publications based on EA elements is depicted in Table 4.

Table 4: EA elements publications

No	EA Elements	Publications
1	Model	[37][72][18][58][25][53][66][54][51][67][19][64][12][15][33][62][41][17][20][27][56][42][46][34][74][48][35][68][44][29][36][47][71]
2	Framework	[22][23][24][38][59][50][26][13][61][43][28][57][69][45][30]
3	Metamodel	[49][55][21][65][70][31]
4	Architecture	[14][60][73][32][39][40][52][16][63]

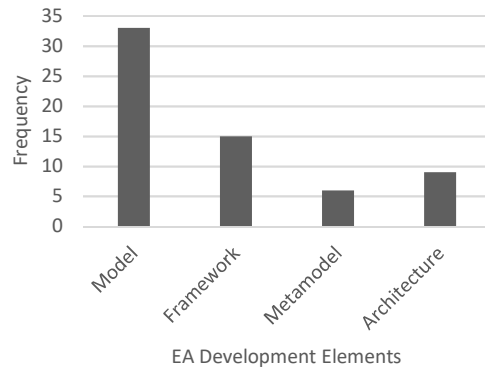


Figure 4: Frequency of EA development elements

The frequency of each EA element is illustrated in Figure 4. The most studied element of EA in search selection was the model, followed by the framework, architecture, and metamodel.

EA model was the most frequently studied EA element compared to other EA elements. The EA metamodel is the decomposition of the model. It has the smallest frequency in the search results. This fact illustrates that studied EA elements need to examine the elements in more detail. The diversity of models in EA solutions can be developed in more detail in the form of a metamodel.

### 4.3 Industry Domains vs EA Elements

The studies in EA show positive trends in all industry domains. Table 5 depicts the distribution of industry domains and the EA elements used. It is obvious that the EA model has become the most widely used EA element. Except for the eGovernment and Healthcare domains, EA framework and EA model were the dominant EA elements. The fact that EA metamodel is the decomposition of the EA model, it has not been widely studied by researchers. Due to the need to

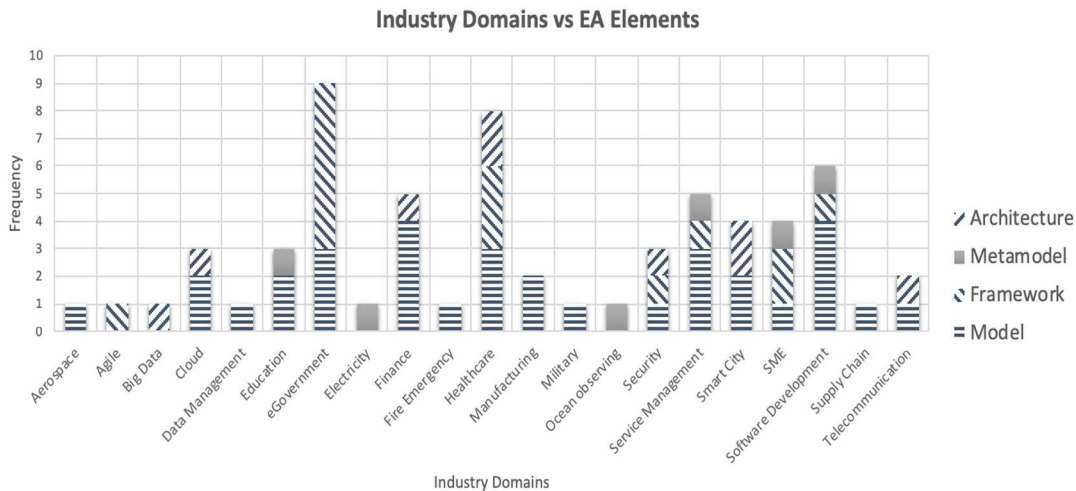


Figure 5: Trend Comparison between EA Elements on A Particular Industry

implement EA in various industry domains, it is therefore essential to study EA elements in more detail and more specific to an industry domain. Illustration of trend comparison between EA elements on a particular industry shows in figure 5.



Table 5: EA elements studied in a particular industry

	Model	Frame work	Metamo del	Architec ture
Aero space	[12]			
Agile		[13]		
Big Data				[14]
Cloud	[15][17]			[16]
Data Manage ment	[18]			
Edu cation	[19][20]		[21]	
eGovern ment	[25][27][29]	[22][23][24][26][28][30]		
Electri city			[31]	
Finance	[33][34][35][36]			[32]
Fire Emer gency	[37]			
Health care	[41][42][44]	[38][43][45]		[39][40]
Manufac turing	[46][47]			
Military	[48]			
Ocean obser ving			[49]	
Security	[51]	[50]		[52]
Service Manage ment	[53][54][56]	[57]	[55]	
Smart City	[58][62]	[59][61]		[60][63]
SME	[64]		[65]	
Software Develop ment	[66][67][68][71]	[69]	[70]	
Supply Chain	[72]			

The distribution of EA studies in various industrial domains is not evenly distributed. The dominance of several industry domains such as eGovernment and Healthcare shows that this sector has dominantly developed EA in the last five years. The trend of EA development focuses on developing an analysis of the EA model compared to other EA elements. This fact provides a new opportunity for research in the EA domain, considering that the EA model is a description of entities that can decompose as a metamodel. The analysis that examines metamodel needs to be developed in the future to support and facilitate the development of EA.

#### 4.4 Industry Domains vs Publication Year

Analysis of EA development studies versus the publication year showed a positive trend in recent years. Almost all industry domains have recently used EA to support the achievement of their business goals. Distribution of EA development shows in table 6. Illustration of EA trend development between 2013 and 2018 shows in figure 6.

Table 6: EA recent studies in a particular industry domain

	2013	2014	2015	2016	2017	2018
Aero space				[12]		
Agile				[13]		
Big Data	[14]					
Cloud				[15]	[16][17]	
Data Mana gement				[18]		
Educa tion		[19]	[21]		[20]	
eGo vern ment	[25][28]	[26][22][23]	[29]	[24]	[27][30]	
Electri city					[31]	
Finan ce		[32][34][35]		[33]	[36]	
Fire Emer gency			[37]			
Health care	[38]		[42][44]	[39][40]	[41][45]	[43]
Manu factu ring	[46]					[47]
Mili tary		[48]				
Ocean obser ving			[49]			
Secu rity		[50]	[51]		[52]	
Service Mana gement	[53][56]	[54][57]	[55]			
Smart City		[59][60]		[61]	[58][62][63]	
SME			[64]	[65]		
Softwa re Deve lop ment		[66][68][69]	[67]	[70]		[71]
Supply Chain		[72]				
Tele commu nica tion		[74]	[73]			

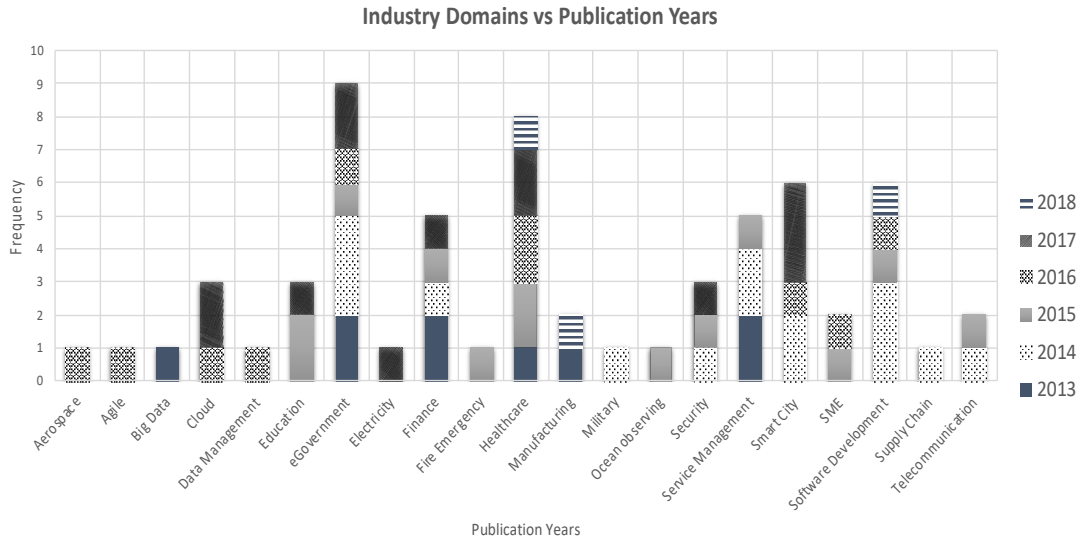


Figure 6: Trend EA Development 2013-2018

**5. DISCUSSION**

EA research that uses case studies in specific industry domains is not evenly distributed. Based on this fact, the enthusiasm of practitioners in developing EA is still unpredictable. However, the trend of EA development from year to year, it shows a positive trend. This fact gives opportunities for the EA development in the future. The development of EA is expected to continue to increase not only in the domain industry which in this study dominates the frequency of EA development but also in various other industry domains.

The development of EA with a study of model elements as the basis for developing EA is the proper step. The study of the use of the appropriate EA model is a more detailed study than a study that discusses the EA framework and EA architecture. This phenomenon shows that the EA study has discussed detail elements to help achieve the successful development of EA. However, the opportunity arises and the possibility of further research, since the model elements can be decomposed in the form of a metamodel.

**6. CONCLUSION**

EA has recently been contributing positively to the achievement of enterprises' business goals in many industry domains. Since this study uses the SLR method as a research methodology, the results of the study are an analysis of the trends of previous

studies. By the objectives of this research, this research produces industry domains which were dominantly used as case studies in EA studies along with the frequency of EA element usage in previous studies.

The analysis on EA studies based on industry domain concluded that eGovernment, finance, healthcare, service management, smart city, and software development are the dominant industry domains where EA has been implemented. This positive trend needs to be extended to various other industry domains. In the search results, it is found that the EA model was the dominant element in EA development. Even though EA metamodel is the decomposition of the EA model, yet its studies are still lacking, more studies are therefore required to expand, develop and implement specific EA metamodel for specific industry domain. In general, a more detailed and specific EA element will support better and more complete EA artifacts.

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**APPENDIX: SLR DATA**

Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
ACM Library	Social Data Mining and Knowledge Flows Between Government and its Citizenry in Crisis and Normal Situations	Riel, Arthur J. Popescu, Denisa Guanlao, Luisita	Proceedings of the 4th International Conference on Web Intelligence, Mining and Semantics (WIMS14) - WIMS '14	2014	eGovernment	Framework	Development
ACM Library	Enterprise architecture and e-government projects in Punjab, Pakistan	Rehman, Maria Shamail, Shafay	Proceedings of the 8th International Conference on Theory and Practice of Electronic Governance - ICEGOV '14	2014	eGovernment	Framework	Development
ACM Library	EmergencyFire : An Ontology for Fire Emergency Situations	Bitencourt, Kattiuscia Durão, Frederico Mendonça, Manoel	Proceedings of the 21st Brazilian Symposium on Multimedia and the Web - WebMedia '15	2015	Fire Emergency	Model	Development
ACM Library	CyberGIS-BioScope: A Cyberinfrastructure-Based Spatial Decision-Making Environment for Biomass-to-Biofuel Supply Chain Optimization	Hao Hu Tao Lin Yan Liu Shaowen Wang Rodriguez, Luis F.	2014 9th Gateway Computing Environments Workshop	2014	Supply Chain	Model	Development
ACM Library	EXPERIENCE : Succeeding at Data Management—BigCo Attempts to Leverage Data	Aiken, Peter	Journal of Data and Information Quality	2016	Data Management	Model	Development
ACM Library	e-Governance in Central Bureau of Narcotics: A framework for implementation in India	Katara, Sanjeev Kumar Shastri, Nagesh	Proceedings of the International Conference on Electronic Governance and Open Society Challenges in Eurasia - EGOSE '16	2016	eGovernment	Framework	Development
ACM Library	Using a Model-driven Approach in Building a Provenance Framework for Tracking Policy-making Processes in Smart Cities	Javed, Barkha Khan, Zaheer McClatchey, Richard	Proceedings of the 21st International Database Engineering & Applications Symposium on - IDEAS 2017	2017	Smart City	Model	Development



Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
IEEE	Towards Service-oriented Enterprise Architectures for Big Data Applications in the Cloud	Zimmerman, Alfred Pretz, Michael Zimmerman, Gertrud Firesmith, Donald G. Petrov, Ilia El-Sheikh, Eman	2013 17th IEEE International Enterprise Distributed Object Computing Conference Workshops	2013	Big Data	Architecture	Development
IEEE	An Enterprise Architecture Mapping Approach for Realizing e-Government	Al-Nasrawi, Sukaina Ibrahim, Maysoun	2013 3rd International Conference on Communications and Information Technology, ICCIT 2013	2013	eGovernment	Model	Development
IEEE	Enterprise Architecture for e-Health System	Natalia, Costetchi Alexandru, Moisescu Mihnea Mihai, Stanescu Aurelian Stefan, Sacala Ioan Munteanu, Calin Aurel	2013 E-Health and Bioengineering Conference (EHB)	2013	Healthcare	Framework	Development
IEEE	The Value of ITIL in Enterprise Architecture	Vicente, Marco Gama, Nelson Silva, Miguel Mira Da	Proceedings - IEEE International Enterprise Distributed Object Computing Workshop, EDOC	2013	Service Management	Model	Development
IEEE	Semantic Variability Modeling in Business Processes: A Comparative Study	Faquih, Loubna El Sbai, Hanae Fredj, Mounia	Internet Technology and Secured Transactions (ICITST), 2014 9th International Conference for	2014	Software Development	Model	Development
IEEE	A Conceptual Enterprise Architecture Framework for Smart Cities	Kakarontzas, George Anthopoulos, Leonidas Chatzakou, Despoina Vakali, Athena	11th Int. Conf. on E-Business (ICE-B) 2014	2014	Smart City	Framework	Development
IEEE	Alert-Response for Distributed Surveillance: DODAF-based Services and Systems	Shahrah, Abobakr Y. Hossain, M. Anwar Alghamdi, Abdullah S.	16th International Conference on Advanced Communication Technology	2014	Security	Framework	Development
IEEE	Analyzing National e-Government Interoperability Frameworks: A Case of Thailand	Suchaiya, Sasithorn Keretho, Somnuk	Ninth International Conference on Digital Information Management (ICDIM 2014)	2014	eGovernment	Framework	Development

Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
IEEE	Patterns for Value-Added Services Illustrated with SEAM	Tapandjieva , Gorica Gopal, Aarthi Grossan, Maude Wegmann, Alain	2014 IEEE 18th International Enterprise Distributed Object Computing Conference Workshops and Demonstrations	2014	Service Management	Model	Development
IEEE	Adaptable Enterprise Architectures for Software Evolution of SmartLife Ecosystems	Zimmerman n, Alfred Gonen, Bilal Schmidt, Rainer El-Sheikh, Eman Bagui, Sikha Wilde, Norman	2014 IEEE 18th International Enterprise Distributed Object Computing Conference Workshops and Demonstrations	2014	Smart City	Architecture	Development
IEEE	Enterprise Architecture Advances in Technical Communication	Bellman, Beryl Griesi, Ken	2015 IEEE International Professional Communication Conference (IPCC)	2015	Telecommunication	Architecture	Development
IEEE	securiCAD by foreseeti A CAD tool for enterprise cyber security management	Ekstedt, Mathias Johnson, Pontus Lagerström, Robert Gorton, Dan Nydrén, Joakim Shahzad, Khurram	Proceedings of the 2015 IEEE 19th International Enterprise Distributed Object Computing Conference Workshops and Demonstrations, EDOCW 2015	2015	Security	Model	Development
IEEE	Enterprise Architecture for Cloud-based ERP System Development	Gunawan, Ardian Indra Surendro, Kridanto	2014 International Conference of Advanced Informatics: Concept, Theory and Application (ICAICTA)	2014	ERP	Architecture	Development
IEEE	Combining Process Modeling and Requirements Engineering an Experience Report	Hiisilä, Heli Kujala, Mika	Proceedings - 17th IEEE Conference on Business Informatics, CBI 2015	2015	Software Development	Model	Development
IEEE	Enterprise Architecture of Colombian Higher Education	Llamosa-Villalba, Ricardo Carreno, Luz Torres Paez, Q. Ana M. Delgado, Q. Dario J. Barajas, Andres Bueno Sneyder, Edgar Garcia	2015 IEEE Frontiers in Education Conference (FIE)	2015	Education	Model	Development

Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
IEEE	A Mapping Approach for Marine Observatory Relying on Enterprise Architecture	Aoun, Charbel Geryes Alloush, Iyas Kermarrec, Yvon Champeau, Joel Zein, Oussama Kassem	Sensors & Transducers	2015	Ocean observing	Metamodel	Development
IEEE	Design of a Business Architecture in a Medium Metal Mechanic Firm	Valdez, Alicia Cortes, Griselda Arzola, Orlando Castaneda, Sergio Luna, Alejandro	Proceedings of the 2015 Science and Information Conference, SAI 2015	2015	SME	Model	Development
IEEE	Investigating Enterprise Architecture implementation in public sector organisation: A case study of Ministry of Health Malaysia	Bakar, Nur Azaliah A. Selamat, Harihodin	2016 3rd International Conference on Computer and Information Sciences (ICCOINS)	2016	Healthcare	Architecture	Development
IEEE	A Proposed Agile Enterprise Architecture Framework	Kaddoumi, Tarek Watfa, Mohamed	The Sixth International Conference on Innovative Computing Technology (INTECH 2016)	2016	Agile	Framework	Development
IEEE	Developing a CubeSat Model-Based System Engineering (MBSE) reference model — Interim status	Kaslow, David Hart, Laura Ayres, Bradley Massa, Chris Chonoles, Michael Jesse Yntema, Rose Gasster, Samuel D. Shiotani, Bungo	2016 IEEE Aerospace Conference	2016	Aerospace	Model	Development
IEEE	ClouNS - A Cloud-native Applications Reference Model for Enterprise Architects	Kratzke, Nane Peinl, Rene	8th Workshop on Service oriented Enterprise Architecture for Enterprise Engineering (SoEA4EE 2016) in conjunction with the EDOC 2016 conference	2016	Cloud	Model	Development

Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
IEEE	Enterprise Capability Modeling Concepts, Method and Application	Loucopoulos, Pericles Stratigaki, Christina Danesh, Mohammad Hossein Bravos, George Anagnostopoulos, Dimosthenis Dimitrakopoulos, George	2015 International Conference on Enterprise Systems (ES)	2015	Service Management	Metamodel	Development
IEEE	Urban Enterprise: a review of Smart City frameworks from an Enterprise Architecture perspective	Mamkaitis, Aleksas Bezbradica, Marija Helfert, Markus	IEEE 2nd International Smart Cities Conference: Improving the Citizens Quality of Life, ISC2 2016 - Proceedings	2016	Smart City	Framework	Development
IEEE	Building Enterprise Architecture for Hospital Information System	Purnawan, Dilla Anindita Surendro, Kridanto	2016 4th International Conference on Information and Communication Technology (ICoICT)	2016	Healthcare	Architecture	Development
IEEE	Integration and Implementation of an EA strategy based operating model with BPM technology Case Study: Housing Credit Process, Banco Estado Ecuador	Salazar, Nancy Rodriguez Heyl, Bernhard Hitpass	2015 34th International Conference of the Chilean Computer Science Society (SCCC)	2015	Finance	Model	Development
IEEE	A Secure Enterprise Architecture Focused on Security and Technology-transformation (SEAST)	Ahmed, Md. Tomig Uddin Bhuiya, Nazrul Islam Rahman, Md. Mahburur	2017 12th International Conference for Internet Technology and Secured Transactions (ICITST)	2017	Security	Architecture	Development
IEEE	Design and Implementation of Government Cloud Computing Requirements: TOGAF	Alghamdi, Bader Potter, Leigh Ellen Drew, Steve	2017 11th International Conference on Telecommunication Systems Services and Applications (TSSA)	2017	Cloud	Architecture	Development
IEEE	ArchiMedes Publication and Integration of Architectural Knowledge	De Boer, Remco C.	Proceedings - 2017 IEEE International Conference on Software Architecture Workshops, ICSAW	2017	Smart City	Model	Development

Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
			2017: Side Track Proceedings				
IEEE	Enterprise Architecture of Mobile Healthcare for large Crowd Events	Eldein, Amar Ibrahim E. Sharaf Ammar, Hany H Dzielski, Dale G	2017 6th International Conference on Information and Communication Technology and Accessibility (ICTA)	2017	Healthcare	Model	Development
IEEE	Enterprise Architecture Modeling Based on Cloud Computing Security Ontology as a Reference Model	Janulevicius, Justinas Marozas, Leonardas Cenys, Antanas Goranin, Nikolaj Ramanauskaitė, Simona	2017 Open Conference of Electrical, Electronic and Information Sciences (eStream)	2017	Cloud	Model	Development
IEEE	Proposing an Access Gate to Facilitate Knowledge Exchange for Smart City Services	Pourzolfaghar, Zohreh Helfert, Markus Melo, Viviana Angely Bastidas Khaliljafar abad, Ahmad	2017 IEEE International Conference on Big Data (Big Data)	2017	Smart City	Architecture	Development
IEEE	Enterprise Architecture Modeling for Oriental University in Timor Leste to Support the Strategic Plan of Integrated Information System.	Soares, Sergio Setyohady, Djoko Budiyanto	2017 5th International Conference on Cyber and IT Service Management (CITSM)	2017	Education	Model	Development
IEEE	Open Government Data Assessment Model: An indicator development in Thailand	Srimuang, Chatipot Cooharajanone, Nagul Tanlamai, Uthai Chandrachi, Achara	2017 19th International Conference on Advanced Communication Technology (ICACT)	2017	eGovernment	Model	Development
Science Direct	Using enterprise architecture analysis and interview data to estimate service response time	Närman, Per Holm, Hannes Ekstedt, Mathias Honeth, Nicholas	Journal of Strategic Information Systems	2013	Service Management	Model	Development



Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
Science Direct	Model Driven Upstream and Downstream Artifacts	Javed, Adnan Azam, Farooque Umar, Amjad	Procedia Computer Science 64	2015	Healthcare	Model	Development
Science Direct	Hospital enterprise Architecture Framework (Study of Iranian University Hospital Organization)	Haghighath oseini, Atefehsadat Bobarshad, Hossein Saghafi, Fatehmeh Rezaei, Mohammad Sadegh Bagherzadeh, Nader	International Journal of Medical Informatics	2018	Healthcare	Framework	Development
Springerlink	A Framework for Alignment of Data and Processes Architectures Applied in a Government Institution	Castellanos, Camilo Correal, Dario	Journal on Data Semantics	2013	eGovernment	Framework	Development
Springerlink	A Modelling Approach to Support Enterprise Architecture Interoperability	Guédria, Wided Gaaloul, Khaled Naudet, Yannick Proper, Henderik A.	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	2013	Manufacturing	Model	Development
Springerlink	Ontology Transformation of Enterprise Architecture Models	Bakhshadeh, Marzieh Morais, André Caetano, Artur Borbinha, José	IFIP Advances in Information and Communication Technology	2014	Finance	Model	Development
Springerlink	Extending enterprise architecture modeling languages for domain specificity and collaboration: application to telecommunication service design	Chiprianov, Vanea Kermarrec, Yvon Rouvrais, Siegfried Simonin, Jacques	Software and Systems Modeling	2014	Telecommunication	Model	Development
Springerlink	Simulation Preorder Semantics for Traceability Relations in Enterprise Architecture	Cohen, Mika	Lecture Notes in Business Information Processing	2014	Military	Model	Development
Springerlink	An architecture framework for enterprise IT service	Franke, Ulrik Johnson, Pontus	Software & Systems Modeling	2014	Service Management	Framework	Development

Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
	availability analysis	König, Johan					
Springerlink	Enterprise Architecture: A Formalism for Modeling Organizational Structures in Information Systems	Lawall, Alexander Schaller, Thomas Reichelt, Dominik	Enterprise and Organizational Modeling and Simulation	2014	Finance	Model	Development
Springerlink	Requirements model driven adaption and evolution of Internetware	Liu, Lin Yang, Chen Wang, Jian Min Ye, Xiao Jun Liu, Ying Bo Yang, Hong Ji Liu, Xiao Dong	Science China Information Sciences	2014	Software Development	Model	Development
Springerlink	An enterprise architecture framework for multi-attribute information systems analysis	Närman, Per Buschle, Markus Ekstedt, Mathias	Software & Systems Modeling	2014	Software Development	Framework	Development
Springerlink	eHealth integration and interoperability issues: towards a solution through enterprise architecture	Adenuga, Olugbenga A Kekwaletsw e, Ray M Coleman, Alfred	Health Information Science and Systems	2015	Healthcare	Model	Development
Springerlink	Extending Feature Models to Express Variability in Business Process Models	Cognini, Riccardo Corradini, Flavio Polini, Andrea Re, Barbara	Advanced Information Systems Engineering Workshops	2015	eGovernment	Model	Development
Springerlink	Modeling Decisions for Collaborative Enterprise Architecture Engineering	Jugel, Dierk Schweda, Christian M Zimmerman, Alfred	Advanced Information Systems Engineering Workshops	2015	Education	Metamodel	Development
Springerlink	CHOOSE: Towards a metamodel for enterprise architecture in small and medium-sized enterprises	Bernaert, Maxime Poels, Geert Snoeck, Monique De Backer, Manu	Information Systems Frontiers	2016	SME	Metamodel	Development
Springerlink	Towards a Meta-Model for Networked Enterprise	Leal, Gabriel Guédria, Wided Panetto,	Enterprise, Business-Process and Information Systems Modeling	2016	Software Development	Metamodel	Development

Search Database	Title	Authors	Books, Journal or Conference	Publication year	Industry Domain	EA Components	EA Stage
		Hervé Proper, Erik					
Springerlink	Towards Meta Model Provenance: A Goal-Driven Approach to Document the Provenance of Meta Models	de Kinderen, Sybren Kaczmarek-Heß, Monika Ma, Qin Razo-Zapata, Iván S.	Lecture Notes in Business Information Processing	2017	Electricity	Metamodel	Development
Springerlink	Architectural frameworks: defining the structures for implementing learning health systems	Lessard, Lysanne Michalowski, Wojtek Fung-Kee-Fung, Michael Jones, Lori Grudniewicz, Agnes	Implementation Science	2017	Healthcare	Framework	Development
Springerlink	Management Structure Based Government Enterprise Architecture Framework Adaption in Situ	Valtonen, Meri Katariina	Lecture Notes in Business Information Processing	2017	eGovernment	Framework	Development
Springerlink	Formalising Enterprise Architecture Decision Models	van Zee, Marc	Architectural Coordination of Enterprise Transformation	2017	Finance	Model	Development
Springerlink	Towards an Integrated Architecture Model of Smart Manufacturing Enterprises	Franck, Thijs Iacob, Maria-eugenia van Sinderen, Marten Wombacher, Andreas	Business Modeling and Software Design	2018	Manufacturing	Model	Development
Springerlink	An integrated conceptual model for information system security risk management supported by enterprise architecture management	Mayer, Nicolas Aubert, Jocelyn Grandry, Eric Feltus, Christophe Goettelman, Elio Wieringa, Roel	Software & Systems Modeling	2018	Software Development	Model	Development