

A Review of Architecture, Integration and Networking in Enterprise Information Systems

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ABSTRACT

Nowadays, organization development is needed to handle fast-changing market, organizations can utilize information system as their main support for creating business processes with effectiveness and efficiency. One of information system types that can implement to organization in order to provide the competitive advantage and manage the business resource is Enterprise Information Systems (EIS). The superiority of EIS is integration of all areas of business in organization and improvement of business process. This paper is systematic literature review paper that will present new trend of architecture, network and integration of EIS to support the success of EIS implementation. We conducted deep-review of 15 literatures as main data in this research and found enterprise networking are Dynamic Multipoint VPN (DMVPN), Manufacturing Execution Systems (MES) and Enterprise Social Network (ESN); The enterprise architectures are The Open Group Architecture Framework (TOGAF), ISO/IEC 15288, ISO/IEC/IEEE 42010 and Axiomatic Design (AD); The enterprise integrations are Extensible Markup Language (XML), Service Oriented Architecture (SOA) and Cloud Computing.

Keywords : Systematic Literature Review, Enterprise Architecture; Enterprise Integration; Enterprise Networking

I. INTRODUCTION

The development of organization is urgently needed to support and tackle market changes in order to improve its business (Agostinho et al., 2016; Ani and Noprisson, 2018), to handle fast-changing market, organizations can utilize information system as their main support for creating business processes with effectiveness and efficiency (Eroğlu and Çakmak, 2016).

One of information system types that can implement to organization in order to provide the competitive advantage and manage the business resource is Enterprise Information Systems (EIS) (Eroğlu and

Çakmak, 2016). EIS is information system type with several aims of management functions of enterprise, for example; planning, marketing, distribution, manufacturing, accounting, management of project, management of resource, management of service human resource, and e-business (Rashid, Hossain and Patrick, 2002).

The example of implementation is research by (Behrouz and Fathollah, 2016) which is present enterprise architecture utilizing axiomatic design to integrate business elements in the pursuit of organizations goals and strategy. Other research by (Qehaja, Bajraliu and Shabani, 2016) deliver enterprise integration and network implementation by

proposing DMVPN as the solution for increasing self-awareness on VPN technologies.

EIS have three imperative components, including physical, making and information component (Romero and Vernadat, 2016). Moreover, the superiority of EIS is integration of all areas of business in organization and improvement of business process (El Kadiri et al., 2016).

To support the success of EIS implementation, the knowledge architecture, network and integration of EIS is specially needed. This paper is systematic literature review paper that will present new trend of architecture, network and integration of EIS.

II. METHODOLOGY

This research is utilizing the systematic approach for the literature review that is related to architecture, network and integration of EIS named Systematic Literature Review (SLR). SLR is a systematic review that obtained previous research literatures to identify, select and synthesize with the purpose of answering the research question (Moher et al., 2009). In this research, we used SLR method named Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). PRISMA have a guideline that comprises of 27 items in the form of checklist that is recommended to create SLR, in order to improve review process (Moher et al., 2009). In PRISMA diagram, there are four phases to obtain information, which are; identification screening, eligibility and included (Moher et al., 2009) as depicted in Figure 1.

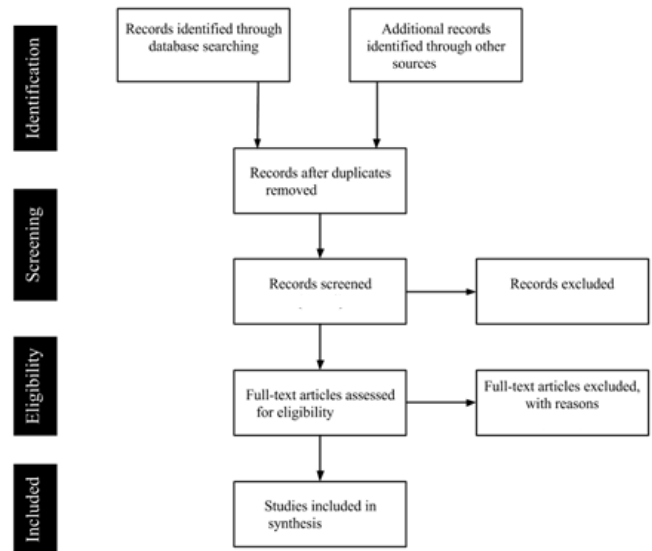


Figure 1. PRISMA diagram

In the identification process, we conducted research in several databases, for example Scopus, ScienceDirect, Google Scholar, Emerald and IEEE.

In identification phase, we found 112 literatures with 4 duplicate literatures. In screening phase, we identify 70 relevant literatures and 38 unrelated literatures. In eligibility phase, we found 15 eligible literatures and 17 literatures will be excluded. As the final phase, we conducted deep-review of 15 literatures as main data in this research.

III. RESULTS AND DISCUSSION

A. Enterprise Architecture

Enterprise Architecture is a strategy to integrate company's business environment with information technology (IT) by using a framework or methodology (Rouhani et al., 2015).

Enterprise architecture framework could be set as a guideline to create an enterprise architecture that consists of various correlating elements and a scope of enterprise architecture (Agievich, V., Taratukhin, V., Becker, J., Gimranov, 2012).

We found literature that explained about enterprise architecture including TOGAF, ISO/IEC 15288, ISO/IEC/IEEE 42010 (Agievich, V., Taratukhin, V., Becker, J., Gimranov, 2012), Axiomatic Design (Behrouz and Fathollah, 2016), TOGAF (Rijo, Martinho and Ermida, 2015) (Gunawan and Surendro, 2015), ISO/IEC 15288, ISO/IEC/IEEE 42010 (Effenberger and Hilbert, 2016).

As the result of deep-review, we found four frameworks or standards that mostly applied in organization as guidelines to implement enterprise architecture. The architectures are The Open Group Architecture Framework (TOGAF), ISO/IEC 15288, ISO/IEC/IEEE 42010 and Axiomatic Design (AD) in which description is elaborated below.

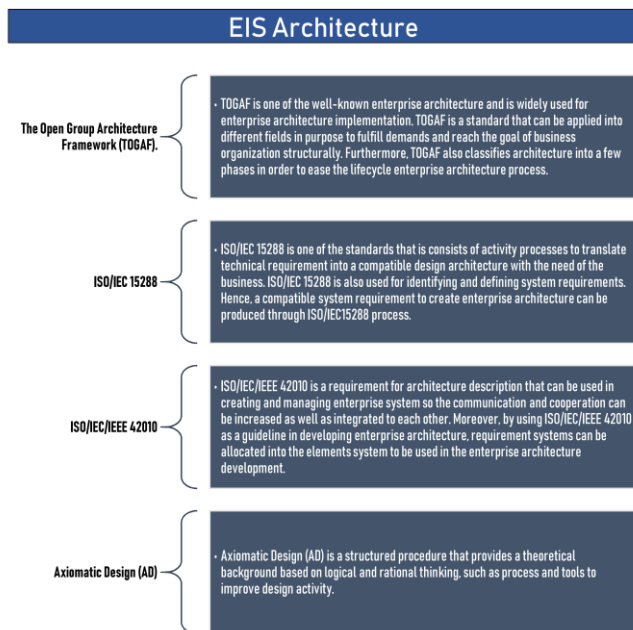


Figure 2. EIS Architecture

B. Enterprise Integration

Enterprise integration is a media to connect information, control, and materials with the entire function of the organization so that all the elements are integrated to each other and able to increase the organization's productivity (Romero and Vernadat, 2016). Enterprise integration could be in the form of

system interconnection, data exchange, Interoperability of software applications and coordination of functions, processes and people (Romero and Vernadat, 2016).

As the result of deep-review, we found the enterprise integration could be facilitated by Extensible Markup Language (XML) (Qiu, n.d.; Ibrahim and Hassan, 2015), Service Oriented Architecture (SOA) (Ibrahim and Hassan, 2015) (Mohammadi and Mukhtar, 2013) and Cloud Computing (Palanimalai and Paramasivamb, 2015) (Mezgár and Rauschecker, 2014) (Gunawan and Surendro, 2015) to integrate elements of organization business process.

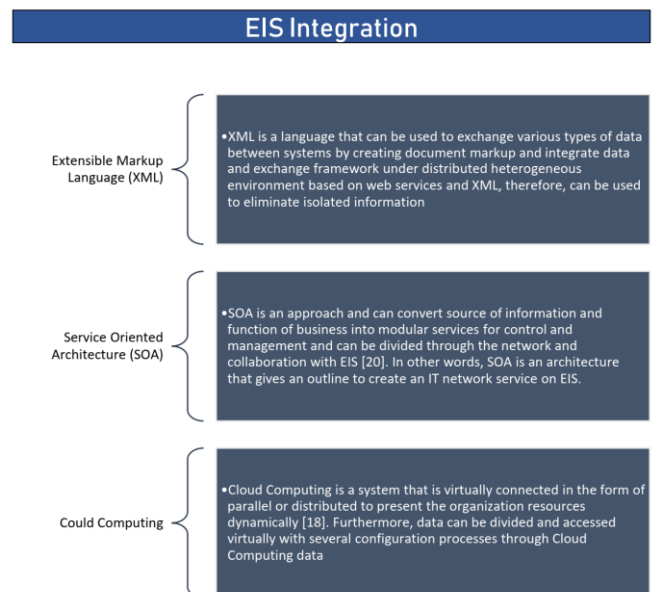
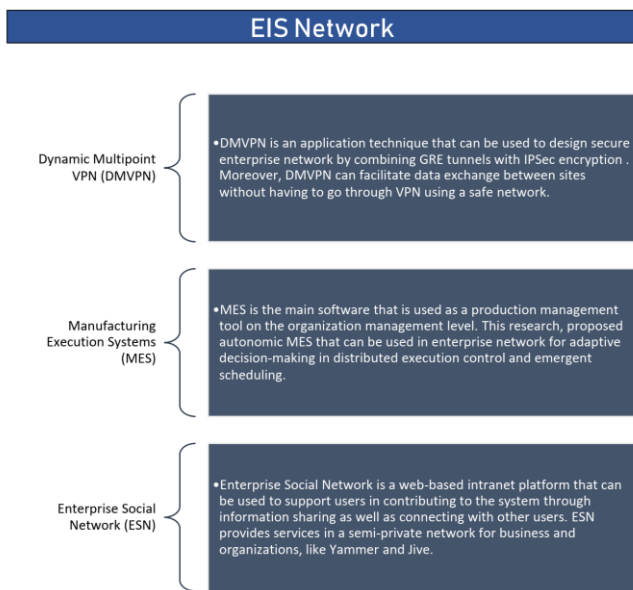


Figure 3. EIS Integration

C. Enterprise Networking

Enterprise networking is a connecting method between the elements related to organization business processes and synchronized through EIS (Romero and Vernadat, 2016). Enterprise networking could be in the form of instant messaging (chat), e-mail, shared workspaces, forums and collaborative real-time editors (Romero and Vernadat, 2016).

Hence, in this study, other enterprise networking examples that can be used to connect all of the organization elements by using EIS were obtained. Several other examples of enterprise networking based on research are Dynamic Multipoint VPN (DMVPN) (Chen, 2011) (Qehaja, Bajraliu and Shabani, 2016), Manufacturing Execution Systems (MES) (Rol??n and Mart??nez, 2012) (Mezgár and Rauschecker, 2014) and Enterprise Social Network (ESN) (Scott, Sorokti and Merrell, 2015) (Behrendt, Richter and Trier, 2014).



IV.CONCLUSION

As conclusion, after conducting deep-review of 15 literatures as main data in this research, we found enterprise networking are Dynamic Multipoint VPN (DMVPN), Manufacturing Execution Systems (MES) and Enterprise Social Network (ESN); The enterprise architectures are The Open Group Architecture Framework (TOGAF), ISO/IEC 15288, ISO/IEC/IEEE 42010 and Axiomatic Design (AD); The enterprise integrations are Extensible Markup Language (XML), Service Oriented Architecture (SOA) and Cloud Computing.

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VI. REFERENCES

- [1]. Agievich, V., Taratukhin, V., Becker, J., Gimranov, R., 2012. A New Approach for Collaborative Enterprise Architecture Development. Ieee.
- [2]. Agostinho, C., Ducq, Y., Zacharewicz, G., Sarraipa, J., Lampathaki, F., Poler, R. and Jardim-Goncalves, R., 2016. Towards a sustainable interoperability in networked enterprise information systems: Trends of knowledge and model-driven technology. *Computers in Industry*, 79, pp.64–76.
- [3]. Ani, N. and Noprisson, H., 2018. Consumer-level Factors of Purchase Intention in Online Travel Booking Application Based on Product Perspective. 3(7), pp.205–212.
- [4]. Behrendt, S., Richter, A. and Trier, M., 2014. Mixed methods analysis of enterprise social networks. *Computer Networks*, 75(PB), pp.560–577.
- [5]. Behrouz, F. and Fathollah, M., 2016. A Systematic Approach to Enterprise Architecture Using Axiomatic Design. *Procedia CIRP*, 53, pp.158–165.
- [6]. Chen, H., 2011. Design and implementation of secure enterprise network based on DMVPN. *BMEI 2011 - Proceedings 2011 International Conference on Business Management and Electronic Information*, 1, pp.506–511.
- [7]. Effenberger, F. and Hilbert, A., 2016. Towards an energy information system architecture description for industrial manufacturers: Decomposition & allocation view. *Energy*, 112, pp.599–605.
- [8]. Eroğlu, Ş. and Çakmak, T., 2016. Enterprise Information Systems within the Context of

- Information Security: A Risk Assessment for a Health Organization in Turkey. *Procedia Computer Science*, 100, pp.979–986.
- [9]. Gunawan, A.I. and Surendro, K., 2015. Enterprise architecture for cloud-based ERP system development. *Proceedings - 2014 International Conference on Advanced Informatics: Concept, Theory and Application, ICAICTA 2014*, pp.57–62.
- [10]. Ibrahim, B.M. and Hassan, M.F., 2015. A new customizable security framework for preventing WSDL attacks. *2015 International Symposium on Mathematical Sciences and Computing Research (iSMSC)*, 2015, pp.24–29.
- [11]. El Kadiri, S., Grabot, B., Thoben, K.D., Hribernik, K., Emmanouilidis, C., Von Cieminski, G. and Kiritsis, D., 2016. Current trends on ICT technologies for enterprise information systems. *Computers in Industry*, 79, pp.14–33.
- [12]. Mezgár, I. and Rauschecker, U., 2014. The challenge of networked enterprises for cloud computing interoperability. *Computers in Industry*, 65(4), pp.657–674.
- [13]. Mohammadi, M. and Mukhtar, M., 2013. A Review of SOA Modeling Approaches for Enterprise Information Systems *ScienceDirect. Procedia Technology*, 11(11), pp.794–800.
- [14]. Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. and Grp, P., 2009. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement (Reprinted from *Annals of Internal Medicine*). *Physical Therapy*, 89(9), pp.873–880.
- [15]. Palanimalai, S. and Paramasivamb, I., 2015. AN enterprise oriented view on the cloud integration approaches -hybrid cloud and big data. *Procedia Computer Science*, 50, pp.163–168.
- [16]. Qehaja, B., Bajraliu, A. and Shabani, A., 2016. Enterprise Integration, Networking and Virtual Communications. *IFAC-PapersOnLine*, 49(29), pp.144–147.
- [17]. Qiu, D., n.d. Design and Application of Data Integration Platform Based on Web Services and XML.
- [18]. Rashid, M., Hossain, L. and Patrick, J.D., 2002. The evolution of ERP Systems: A historical perspective. *The Evolution of ERP Systems: A Historical Perspective*, pp.1–16.
- [19]. Rijo, R., Martinho, R. and Ermida, D., 2015. Developing an Enterprise Architecture Proof of Concept in a Portuguese Hospital. *Procedia Computer Science*, 64, pp.1217–1225.
- [20]. Rol??n, M. and Mart??nez, E., 2012. Agent learning in autonomic manufacturing execution systems for enterprise networking. *Computers and Industrial Engineering*, 63(4), pp.901–925.
- [21]. Romero, D. and Vernadat, F., 2016. Enterprise information systems state of the art: Past, present and future trends. *Computers in Industry*, 79, pp.3–13.
- [22]. Rouhani, B.D., Mahrin, M.N.R., Nikpay, F., Ahmad, R.B. and Nikfard, P., 2015. A systematic literature review on Enterprise Architecture Implementation Methodologies. *Information and Software Technology*, 62(1), pp.1–20.
- [23]. Scott, K.S., Sorokti, K.H. and Merrell, J.D., 2015. Learning “beyond the classroom” within an enterprise social network system. *The Internet and Higher Education*, 29, pp.75–90.

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