VOL. 10, NO. 23, DECEMBER 2015 ISSN 1819-6608
ARPN Journal of Engineering and Applied Sciences

www.arpnjournals.com

A CONCEPTUAL FRAMEWORK FOR THE IMPLEMENTATION PROCESS OF ENTERPRISE APPLICATION INTEGRATION (EAI) IN GOVERNMENT

Fatma Mohammed Al-Balushi, Mahadi Bahari and Azizah Abdul Rahman
Department of Information Systems, Universiti Teknologi Malaysia, Johor, Malaysia
E-Mail: mahadi@utm.my

ABSTRACT

Although there have been several studies on Enterprise Application Integration (EAI) in recent years, they only focus upon the initial phase of the implementation process. The implementation literature indicates that there are scant studies regarding the EAI implementation process as a whole. Therefore, this paper fills this gap by presenting a conceptual framework for the implementation process of EAI. The paper not only consolidates, but also extends the existing literature on the technology implementation process for complex organization-wide technologies. Based on a content analysis of the reviewed literature, this paper identifies thirty (30) factors contributing to the implementation process of EAI. These factors are categorized based on the Technology, Organizational and Environmental (TOE) Model. The factors subsequently were mapped to the Lewin's Change Model, to outline the structure of EAI implementation process framework. The proposed conceptual framework contributes to the understanding of the EAI implementation process, which may support practitioners in implementing the EAI technology in their organizations.

Keywords: enterprise application integration, EAI implementation, implementation process, content analysis.

INTRODUCTION

Nowadays, most business processes in both private and public organizations are becoming increasingly complex. Although the complexity of such projects may rely on the technology and how it can be managed to make its implementation successful to gain the expected benefits [1], [2], many government legacy systems are designed to support current business processes and functions, which are not flexible, and are difficult to integrate with other systems. This makes it very difficult for the public sector to integrate different systems across various government organizations. In addition, to achieve a dynamic improvement, several software based business systems have been created to facilitate and accelerate the business processes. Consequently, many organizations have to employ, develop and maintain a wide variety of different applications [1], [3].

A study conducted by Local Government Authorities (LGA) in the UK has found many 'non-integrated' IT infrastructures [4], [5] in e-government project implementation. This disintegrated nature of information systems (IS) has resulted in inconsistent and redundant data of poor quality with less data integrity and with over-reaching maintenance and operational costs [6]. Therefore, the nature of applications developed independently must be integrated in order to perform versatile functions in the government field. Enterprise Application Integration (EAI) technology has proved its worth by offering a solution for seamless integration of the existing applications without disturbing the existing functionality [7].

Unfortunately, as reported in the literature, there has been a lack of successful EAI project implementation in government cases regarding the integration of the existing IS environment. The technology integration industry has already revealed that the failure rate of EAI projects is around 70% with the major reasons encountered in the process of implementing it being software, technical limitations and adversity, and management issues [8]. This shows that EAI implementation is suffering due to a lack of awareness concerning the implementation process [9]. The significant threat faced by many implementation projects is a lack of ability to identify the critical factors leading to failure or success during the integration of newer EAI projects [8]. The catastrophic result of this inability can lead to the wastage of money, bad perception about the responsible agencies fronting the government administration and loss of trust [10], [11]. Therefore, investigating the influential factors in the EAI implementation process may encourage the practitioners (e.g. system developers, senior managers, project managers) and make them aware of the characteristics required for the success of technology implementation.

The aim of this paper is to purpose a conceptual framework for the EAI implementation process to guide the public sector as they embark upon the implementation of EAI technologies. The paper is structured as follows: the following section presents the body of knowledge concerning EAI implementation research; the third section describes the research methodology adopted and how the study is conducted. The fourth section discusses the proposed conceptual framework for the EAI implementation process, and the final section concludes the study and provides some possible directions for future research.

LITERATURE REVIEW

EAI concept

The EAI concept has existed for a decade and has gained prominence due to the advantages of the components of EAI that bundle many valuable services required for the organization [12], [13]. The most

generally accepted definition of EAI is a generation of software that combines a variety of integration technologies (e.g. message brokers; adapters; and application servers) to build a centralized integration infrastructure [1], [14]. EAI improves the interaction among processes, human resources, applications and organizations while facilitating the product integration of IS by conducting the conventional developments already at work (e.g. middleware data systems, the front end or desktop systems, distributed object based software or components) with the new approach of an integration framework (e.g. message brokerage and the adapters) [15].

EAI implementation research in government

To date, only a few government studies on the EAI implementation process have been reported. In addition, most of the existing studies on EAI implementation have focused on the early stage of the implementation life cycle e.g. [2,16,17,18,19]. As IS implementation is an-going process, which incorporates the whole development of the system or technology, from the beginning to the end of the process [20], [21], study only the early stage cannot possibly represent the entire process of EAI implementation. This is because any narrower stage of the EAI implementation process can omit factors that are crucial to the process. Hence, it is the broader view of the implementation that this study will scrutinize. The broad definition of EAI implementation will allow this study to establish the factors that lead to the success of EAI implementation.

Several factors have also been identified from the existing studies on EAI implementation in government. The common factors reported in EAI and government studies are technological risks [2], [8], IT infrastructure [22], [23], IT sophistication [2], [8], commitment by management [12], [24], [25] and ROI [2], [8]. Such studies normally emphasise a particular factor or a combination of factors that are related with the success (or failure) of the EAI outcomes. Although such factors are indeed useful, an in-depth understanding of the complexities related with the implementation is essential. This is because only studying the identifying factors have been found to be limited in terms of showing the interactions among them [26], [27]. In other words, the existing studies on EAI implementation were not able of describing how the factors "combine together" and take place throughout the whole implementation life cycle (i.e. as they are only concerned with the early stage of the implementation process). Since IS implementation is considered to be a social action that develops a system through social interactions of multiple actors within several related social environments [28], [29], the state of a given factor can change or be changed throughout the implementation process. Thus, understanding the implementation of EAI requires consideration of an array of factors and the interrelationships among them over time, which may help in increasing the implementation success. Hence, the need for studies that scrutinize the combination of sequential events and activities that are related [30], [31] for the success of EAI implementation has become vital.

Models of IS implementation for EAI implementation research

As a technology, EAI in itself is designed to integrate the organization's capability to link and fit all existing applications, and to support multiple applications, and, therefore, EAI technology can be considered as IS by its own right. The IS is usually tailored to support specific business processes and functions that are difficult to integrate whereas EAI enables them to be integrated. Therefore, IS implementation models have inevitably been referred to, and, accordingly, this study considers the study conducted by [20], [21] as a basis to frame the boundary of the EAI implementation structure. This includes Lewin's [32], Kolb-Frohman's Frohman [33], Cooper and Zmud's [34], Kotter's [35] and Garvin and Roberto's [36] models of change. These models recommend a series of phases for organizations to achieve the success of the change in the implementation process.

In his study, [20], [21] concluded that the IS implementation models from Kolb-Frohman, Cooper and Zmud, Kotter, and Garvin-Roberto are similar in terms of the thought and the level of Lewin's three-stage model. This can be seen by mapping all their stages from the models to the generic stages of Lewin's model (see Table-1).

Table-1. Different frameworks of IS implementation models with their phases (adapted from [21]).

Phase	IS Models for Implementation Process				
	Lewin	Kolb-Frohman	Cooper & Zmud	Kotter	Gavin & Roberto
Phase 1	Unfreezing	Scouting, Entry, Diagnosis	Initiation	Urgency, Coalition, Vision, Communication,	Set stage, Create frame
Phase 2	Moving	Planning, Action, Evaluation	Adoption, Adaptation	Empower, Wins, Consolidation	Manage mood
Phase 3	Refreezing	Termination	Acceptance, Routinisation, Infusion	Institutionalisation	Good habits

The similarity between these five models is that an implementation process is used to plan an organizational change to achieve the success of the outcome. There are two important lessons taken from these models, which as follows: 1) the change commonly happens in different stages that required a lot of time to be completely developed; and 2) faults in any stage can moderate the implementation and additionally discredit the progress achieved. These two lessons are helpful for all those implementers involved in implementing the technological

change in any organizations [20], [21], including EAI implementation projects in government.

Two other IS models have been reviewed in this study – the System Development Life Cycle (SDLC) [37] and the [38] innovation implementation model. These models have been examined as an alternative to Lewin's. The SDLC model consists of five phases: 1) system integration, 2) understanding the solution, 3) system design, 4) system implementation, and 5) completed by maintenance and review [37]. In addition, Klein and Sorra's model consider that factors of implementation climate and innovation-values fit are two factors that determine the effectiveness of an innovation implementation. The variables in the implementation climate that affect implementation effectiveness are skills, incentives and the absence of obstacles, while the relevant variable for innovation-values fit is user commitment (see Figure-1). These models, however, have not been selected as the study's framework because of their inability to encapsulate the EAI implementation process better than Lewin's model. However, their inclusion in the study is essential to compare how well the Lewin's model encapsulates the projects of implementation process compared to the two alternatives.

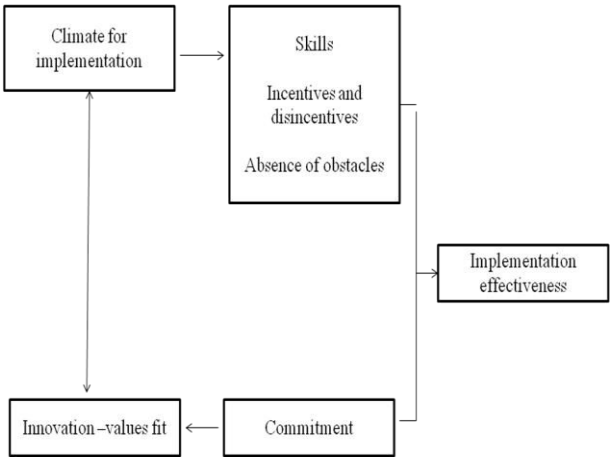

Figure-1. Klein and Sorra's model of implementation (adapted from [38]).

Besides several similarities, dissimilarities were also found from the models of IS implementation. It is obviously shows (see Table-1) that the Lewin's model offers a simpler framework to encapsulate the implementation process by providing three broad stages – Unfreezing, Moving and Refreezing. The simple implementation inbuilt in the model has attracted the implementers' consideration of the deployment of IS [39], [40]. The studies of [39], and [20], for instances, have employed Lewin's model to reveal an e-Government project implementation process in different countries of local governments.

Although, Cooper and Zmud's, and Gavin and Roberto's models for IS implementation offer recommendations for administering the change process, they are more closed with change agents. For instance, the consultants play a supporting role for the change process in an organization in terms of the implementation. It is worth mentioning that these models lack the support from the key stakeholders who are aggressively involved in all activities related to the implementation. In contrast, Lewin's model takes into consideration the change related to people's attitudes and values [39]. Therefore, it can be applied as a means to group the processes undertaken by different stakeholders who have experienced implementing EAI technology. The selection of Lewin's model of change supports this research in comprehending the EAI implementation. For the aforementioned reasons, this study adopts the three phases of Lewin's model to structure a conceptual framework of the EAI implementation process.

RESEARCH METHODOLOGY

To build a conceptual framework for the EAI implementation process, two steps suggested by [41] were carried out: (1) content analysis phase – to explore all priori factors for EAI implementation; and (2) mapping phase – to understand how priori factors could influence the process of EAI implementation.

Step 1 - Exploring transition factors

The Content Analysis method was applied to explore the possible factors that influence the EAI implementation process. In doing so, firstly, a literature review of the existing studies that are relevant to the topic was required. This study used certain processes and standards to assure its validity. The analysis of studies was based on the approach by [41]. To locate papers that represent the topic adequately, full-text papers in Elsevier, Web of Science, Science Direct and Emerald databases were extracted to ensure an extended search from multiple disciplines. This search covers the literature published between 2005 and 2015. The main keywords employed in the academic search were limited in extent to the title and body text search by selecting keywords, namely, 1) EAI and 2) EAI implementation. The first phase of search yielded 1000 studies. By filtering through the abstracts, 800 papers that were found to be irrelevant to the topic being investigated were eliminated. The remaining 200 papers were chosen since they were closely related to the implementation of EAI systems. Following this, the study critically reviewed each paper and identified various factors that were considered to be vital for the success of EAI implementation.

All 200 papers were then scanned for the stated implementation factors. The process yielded a total of 80 implementation factors. Approximately 85% of the stated implementation factors were factors in SMEs, healthcare and multinational organizations. In other words, they were not related to government agencies. The implementation process factors were then extracted from the related papers. This process of extraction followed two simple guidelines conducted with another two experts in the IS implementation process. The guidelines involved: 1) when implementation factors were identical, they were

consolidated into a single proclamation, and 2) when the implementation factors used diverse keywords but had a similar meaning, a list of synonyms were considered, by referring to a thesaurus.

The same search was done for other keywords e.g. e-government, e-government integration and e-government implementation. This search yielded 500 papers, which were filtered in the same way as was done for the EAI studies. Then, the factors from the related papers were extracted using the same process as for the EAIs. The search for e-government integration yielded 33 papers [42]. As a final result, after reviewing the literature thirty (30) priori factors for EAI implementation were identified. It is believed that the factors found are the most common and priori ones that should be considered when implementing EAI technology in government.

Step 2 - Mapping transition factors

Many studies have discussed EAI implementation factors in different sectors (e.g. healthcare [17], [19], in multinational [16], in Small and Medium Enterprises (SMEs) and Large Organizations [18], and in LGAs [43]. This study (i.e. which focuses on the public sector), applied the Technology, Organizational and Environment (TOE) model to categorize the factors found in the literature. This model is created by [44] and it is used frequently at organizational level [45], [46]. This study is applying TOE to map the factors found according to TOE categories. The model has been adapted in IT adoption studies because of it is a useful analytical tool for studying the adoption and assimilation of different types of IT innovation [46]. It has solid theoretical basis which supports the potential for applying it in IS innovation domains, though specific factors identified within the three categories may vary across different studies [46].

In an attempt to group all possible 30 factors found in Step 1, this study viewed the TOE model as follows. In the Technology division, the study needed to identify the existing as well as new EAI technologies that are relevant to the government. Factors that fall under this division play a significant role in the government implementation decision, as they determine the ability of that government to obtain benefit from the EAI project. In this case, factors such as evaluation frameworks, technological risks, IT infrastructure, personnel IT knowledge, IT sophistication, data security and privacy, data consistency, IT infrastructure, distributed database and data quality were considered as technology division.

In the Organizational division, the study had to identify any factor that provides descriptive measures related to government structure, financial support, managerial beliefs and top management support within the organization. In doing this, factors such as centralization, return on investment, managerial capability, barriers, benefits, formalization, size, IT support, implementation planning, meeting user requirements, system training, cost, top management support and project champion were considered as organizational division. Whilst in the Environmental division, the ways in which the government focuses on the external factors that drive their organization to implement new EAI technology were investigated. Factors such as higher administrative authority, citizen's satisfaction, critical mass, market knowledge and external support were considered as environmental division. Table-2 shows the EAI implementation factors with their categories according to TOE model, description and sources respectively.

CONCEPTUAL FRAMEWORK FOR EAI IMPLEMENTATION PROCESS

There are two main components in the proposed framework of EAI implementation process in government: EAI implementation process and TOE factors. In the trail of identifying the EAI implementation factors (i.e., that associate with TOE model) and their phases (i.e., throughout the process of implementing EAI), this study examined Lewin's Change Model as follows. In the Unfreezing phase, this study will distinguish how the stakeholders (e.g. system developers, senior managers, project managers) bring awareness to the importance of EAI implementation. In the Moving phase, the implementation of the EAI will be completely analysed. In this stage, the study will recognize how the diverse stakeholders build the EAI and how they manage the system. While in the Refreezing phase, the ways in which stakeholders balance and maintain the system will be identified. In doing this, the study has derived a proposed conceptual framework, as shown in Figure-2.

In addition to the force-field theory and three-stage model of change, this study will apply group dynamics, an element of Lewin's Change Model. It will be employed by the different case studies and interviewing different categories of stakeholders. While for the group dynamics, its main focus will be the attitude of the stakeholders, which will be shown through the case studies. The action research element will not be employed in this study, as it is not perceived to be appropriate to the study because it will be covered in the case study itself [21].

The framework presented is formulated to determine the potential issues (i.e. technical, organizational and environmental factors) that may have an effect on the stakeholders in implementing the EAI technology. The importance of these issues make them difficult to ignore because the EAI implementation process includes change in the government organizations, thus, its implementation requires an understanding of how stakeholders manage an issue effectively. Therefore, the 30 implementation factors (i.e., 10 technological, 15 organizational and 5 organizational factors) leading to EAI implementation, which were presented in Table-2, are proposed to comprehend the EAI implementation phenomenon in question.

Table-2. Summary of the common factors for the EAI implementation process.

	Factors	Description	Sources
Technology	IT infrastructure	This relates to the heterogeneity of the platforms and the networking capabilities of the organizations that are planning for EAI implementation.	[10,22,23]
	IT sophistication	Organizations with sophisticated IT resources are likely to be implementers of integration technology because they are ready to implement new EAI technologies.	[2,8]
	Distributed databases	Challenging for EAI to be implemented as organizations have a scattered database. Usually, organizations are not located in the same area and their data are not saved in one single repository.	[24, 47,48]
	Integration standards	The problems of access and use of information from diverse sources typically involves the development of EAI standards and other EAI software devices (e.g. xml, message brokers, message adaptors).	[49,50,51]
	Data quality	The diverse database designs, structures and highly variable data quality, pressures organizations to make efforts to ensure the quality of EAI.	[1,22, 47]
	Technological risks	The risk and uncertainty associated with EAI can make risk-averse managers require higher, not lower, rates of return before they invest.	[2,8]
	Evaluation frameworks	The integration marketplace is extremely complex with a diversity of EAI products and technologies solving different types of problem.	[2,8]
	Personnel IT knowledge	Available skill set of the personnel is an important factor that constrains the introduction of EAI.	[2,8]
	Data security and privacy	The security and privacy of citizens' data have always been important. Trust and confidence between users and government is recognized as a critical success factor in the implementation of EAI.	[2,8,52]
	Data consistency	Absence of data consistency and presence of data redundancies and duplication have been identified as the most common problems faced by government organizations for EAI implementation.	[2,43]
Organizational	Commitment by management	The criticality in the implementation of EAI studies is interlinked with the extended commitment by the management.	[12, 24, 25]
	System champion	The critical factor revealed by the literature review for EAI based implementation strategies is a system champion. This is the person in charge with sole responsibility for complete liaison and supervision to ensure the centralization.	[12,53,54]
	Implementation planning	Literature has thrown light on procedural plans and other implementation details with respect to EAI focus.	[53, 55, 56]
	Meeting user requirements	The capability to miss or badly address the user requirements is a potential failure while implementing EAI.	[56,57]
	Change resistance	Change resistance is another significant hurdle, especially in government agencies where employees have been working with a traditional manual system for ages and they refuse to move to new systems, which makes the implementation difficult.	[25,58,59,60]
	System training	Employees' productivity can be enhanced by empowering them with EAI training.	[53,55,61]
	Centralisation	EAI projects will increase the efficiency and effectiveness of the government and save money through increased centralisation of resources. Centralisation refers to the decision-making authority and encompasses participation in the decision-making and authority hierarchy.	[2,8]
	Return on investment	Governments are often reluctant to proceed with new investments before justifying their costs and expected benefits.	[2,8,62]
	Cost	The implementation of new technology depends on its cost. For EAI implementation, considering the cost is indispensable for procuring and developing adequate levels of hardware and software, and training end-users as needed.	[2,8]
	Managerial capability	The availability of personnel who have ample competencies for producing new ideas is one of the significant factors for IT implementation and innovations are likely to be proposed by personnel who have expertise in a particular discipline.	[2,8]
	Barriers	Since there have been many failures of ERP implementation, organisations tend to estimate the possible impact of EAI implementation before proceeding with its implementation.	[2,8]
	Benefits	Benefits refer to the level of recognition of the advantages that the integration technologies could provide to the organisation. They are classified into direct (e.g. reduced transaction cost) and indirect (e.g. increased operational efficiency) benefits.	[2,8]
	Formalisation	Formalisation refers to the existence of clear procedures, norms and formal processes for carrying out organisational tasks more effectively and efficiently, which is supposed to make the EAI implementation process much clearer.	[2,8]
	Size	This is the size of the community served and the number of the services provided by the organisation to them. As the size becomes bigger the demand for the services might be the same, which means more EAI technologies need to be implemented.	[2,8]
	IT support	The available skill set of the personnel is an important factor that constrains the introduction of EAI technologies.	[2,8]

Environmental	Higher administrative authority	Even if IT managers initiate EAI implementation, support from higher administrative authorities may play a significant role.	[2,8]
	Citizen's satisfaction	Citizen's satisfaction has a significant impact on the performance of government organizations, which demands for better services. The accomplishment of this factor will not be attained without integrating the services needed by citizens and EAI technologies usage.	[2,8,63]
	Critical mass	Research indicates that government organizations are affected by the actions of other governments in IT implementation, which means that if others are doing well using certain technologies then others might follow them in implementing the same set.	[2,8]
	Market knowledge	The majority of successful IT implementation cases refer to the recognition of demands in the market, which supports stakeholders with the knowledge needed to be updated about what is the trend in the market regarding EAI technologies.	[2,8]
	External support	Obviously, the system implementation can never be successful without external support and it is also an important factor. EAI distributors have to arrange this support implicitly (e.g. consultancy, maintenance and updates).	[2, 8,61,64]

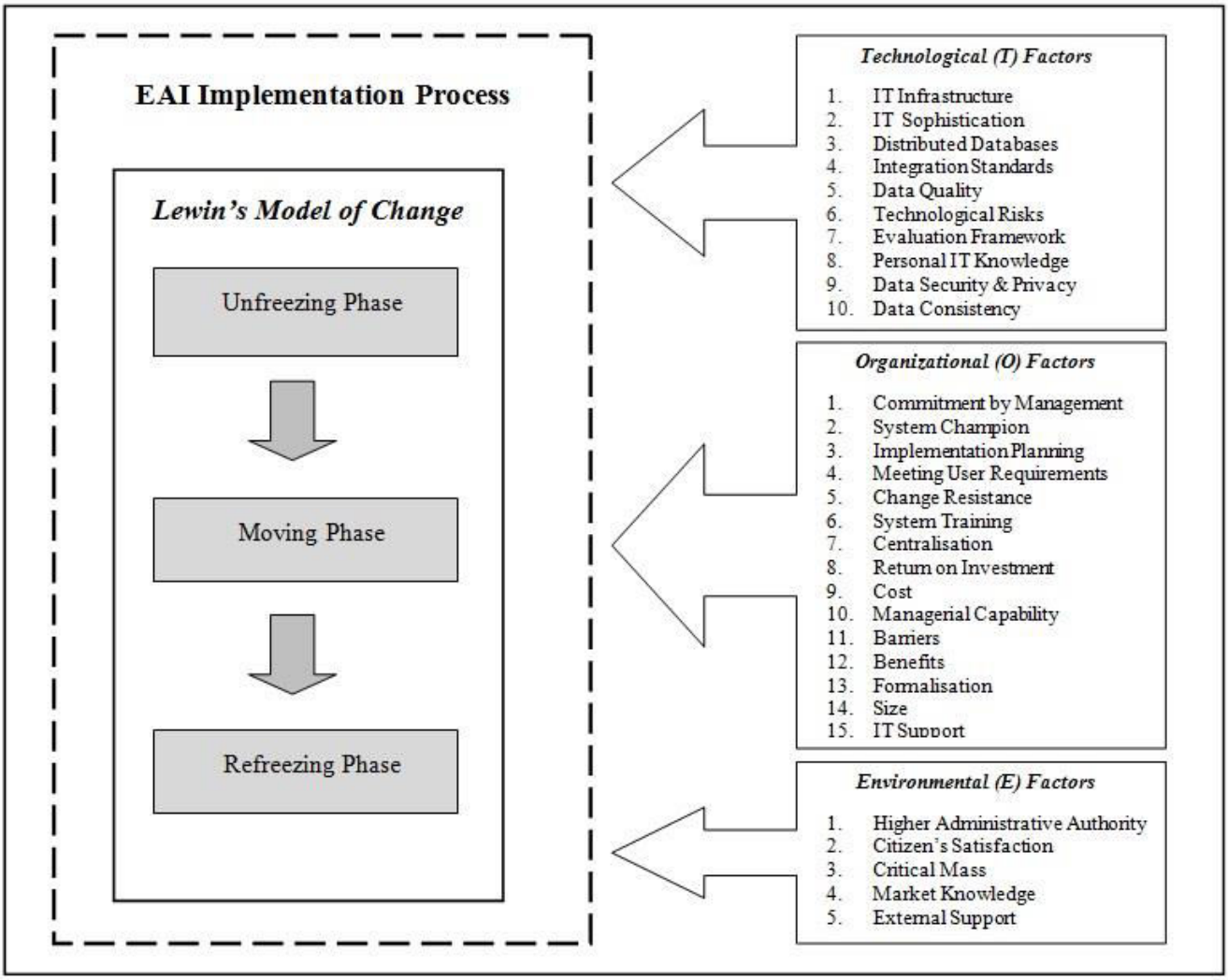

Figure-2. Proposed conceptual framework for EAI implementation process (adapted from [32]).

CONCLUSIONS

This study is an ongoing research that addresses the EAI implementation process factors. These factors are derived from different areas of study that are highly related to the topic of the research. The study found that there are 30 (thirty) factors for the EAI implementation process. Based on the TOE model, the identified factors are categorized into three divisions: technical, organizational and environmental. 10 (ten) factors were found related to technological division as they played significant role for government decision's to start implementing EAI project. Furthermore, 15 (fifteen) factors were related to organizational category as they played their roles in providing descriptive measures for

government to continue implementing EAI. Whilst only 5 (five) factors were considered as environmental division because of their roles from outside that would drive government organization to implement new EAI technology.

All the identified factors could potentially be different in other scenarios; however, this paper aims to explore the priori factors, which is an applicable framework for the EAI implementation process for the government. It is confident it will provide the practitioners (e.g. system developers, senior managers, and project managers) with greater understanding concerning the process of EAI implementation projects, by identifying the activities involved in each stage for better comprehension of the process. The proposed framework provides insights for additional studies regarding EAI implementation, and it is expected that other researchers will reach similar paths of enquiry to further investigate this new and interesting area of study. The proposed framework assists researchers to address the diverse emerging factors that are associated with the EAI implementation process. It also applies Lewin's change management model to represent the implementation process for the EAI, which is expected to reach similar paths of enquiry to further investigate this new and interesting area of study.

However, further research with detailed activities of real phenomena in EAI implementation would enrich the usefulness of the proposed conceptual framework. Therefore, to validate this preliminary finding, a series of case studies will be conducted with the EAI project stakeholders to assess the relevance of each factor in each phase and the details of the activities. Therefore, more empirical qualitative research efforts in this emerging field should be carried out.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the Human Resources Information Systems, Ministry of Civil Service, Oman for supporting the first author in doing her PhD study.

REFERENCES

[1] W. Lam. 2005. Barriers to e-government integration. Journal of Enterprise Information Management. Vol. 18, No.5, pp.511-530.

[2] M. M. Kamal. 2008. Investigating enterprise application integration adoption in the local government authorities. PhD Thesis, Department of Information Systems and Computing, Brunel University, London, UK.

[3] G. Riempp and S. Gieffers-Ankel. 2007. Application portfolio management: a decision-oriented view of enterprise architecture. Information Systems and E-Business Management. Vol. 5, No. 4, pp.359-378.

[4] N. Erasala, D. C.Yen and T. M. Rajkumar. 2003. Enterprise Application Integration in the electronic commerce world. Computer Standards & Interfaces. Vol.25, No.2, pp. 69-82.

[5] C. Esposito, M. Ficco, F. Palmieri and A. Castiglione. 2015. A knowledge-based platform for big data analytics based on publish/subscribe services and stream processing. Knowledge-Based Systems, Vol.79, pp.3-17.

[6] M.M. Kamal, and M. Themistocleous. 2006. A conceptual model for EAI Adoption in an e-government environment. In European and Mediterranean Conference on Information System. Pp. 1–11.

[7] R. Kaur. 2006. Malaysian e-government implementation framework (Doctoral dissertation, University of Malaya).

[8] M. B. Sohimi and W. F. Abbas. 2011. The prioritization factors of Enterprise Application Integration (EAI) adoption in Malaysian e-Government. In Research and Innovation in Information Systems (ICRIIS), 2011 International Conference on (pp. 1-6). IEEE.

[9] Z., Ebrahim and Z. Irani. 2005. E-government adoption: architecture and barriers. Business process management journal. Vol.11, No.5, pp.589-611.

[10] L. F. Luna-Reyes, J. R. Gil-Garcia and C. B. Cruz. 2007. Collaborative digital government in Mexico: Some lessons from federal Web-based interorganizational information integration initiatives. Government Information Quarterly. Vol.24, No.4, pp. 808-826.

[11] X., Gao, Y.Song and X. Zhu. 2013. Integration and coordination: Advancing China's fragmented e-government to holistic governance. Government Information Quarterly. Vol.30, No.2, pp.173-181.

[12] M. Kamal, V. Weerakkody and Z. Irani. 2011. Analyzing the role of stakeholders in the adoption of technology integration solutions in UK local government: An exploratory study. Government Information Quarterly. Vol. 28, No.2, pp.200-210.

[13] M. M., Kamal, R., Hackney and M. Ali. 2013. Facilitating enterprise application integration adoption: An empirical analysis of UK local government authorities. International Journal of Information Management. Vol. 33, No.1, pp.61-75.

[14] M.Themistocleous. 2004. Justifying the decisions for EAI implementations: A validated proposition of influential factors. Journal of Enterprise Information Management. Vol.17, No.2, pp.85–104.

[15] M. Rehan and G. Akyuz. 2010. EAI (Enterprise Application Integration), SOA (Service Oriented Architectures) and its relevance to e-supply chain formation. African Journal of Business Management. Vol.4, No.13, pp.2604-2614.

[16] M. Themistocleous. 2002. Evaluating the Adoption of Enterprise Application Integration in Multinational Organisations, PhD Thesis, Department of Information Systems and Computing, Brunel University, London, UK.

[17] K. Khoumbati. 2005. Evaluating the adoption of Enterprise Application Integration in Healthcare Organisations. (Doctoral dissertation, Brunel University).

[18] X. Chen. 2005. Adopting emerging integration technologies in organisations (Doctoral dissertation, Brunel University).

[19] V. Mantzana. 2006. Investigating the adoption of enterprise application integration in healthcare organisations using an actor-oriented approach (Doctoral dissertation, Brunel University).

[20] M. Bahari. 2012. Citizen relationship management implementation in local government-towards a theoretical research framework. Journal of Information Systems Research and Innovation. Vol.2, pp.51-61.

[21] M. Bahari. 2013. Citizen relationship management implementation in Malaysian local governments (Doctoral dissertation, Brunel University London, School of Information Systems, Computing and Mathematics).

[22] M. M. Kamal, V. Weerakkody and S. Jones. 2009. The case of EAI in facilitating e-Government services in a Welsh authority. International Journal of Information Management. Vol. 29, No.2, pp.161-165.

[23] H. Scholl, H. Kubicek, R. Cimander and R. Klischewski. 2012. Process integration, information sharing, and system interoperation in government: A comparative case analysis. Government Information Quarterly. Vol. 29, No.3, pp.313-323.

[24] Y. Chen. 2010. Citizen-centric e-government services: Understanding integrated citizen service information systems. Social Science Computer Review. Vol.28, No.4, pp.427-442.

[25] C. Reddick. 2010. Impact of citizen relationship management (CRM) on government: Evidence from US local governments. Journal of E-governance. Vol.33, No.2, pp.88-99.

[26] M. Markus and D. Robey. 1988. Information technology and organizational change: causal structure in theory and research. Management science. Vol.34, No.5, pp.583-598.

[27] W. A. Cram, M. K. Brohman and R. B. Gallupe. 2015. Hitting a moving target: a process model of information systems control change. Information Systems Journal.

[28] T. Butler and B. Fitzgerald. 1999. Unpacking the systems development process: an empirical application of the CSF concept in a research context. The Journal of Strategic Information Systems. Vol. 8, No.4, pp.351-371.

[29] R. Irvine and H. Hall. 2015. Factors, frameworks and theory: a review of the information systems literature on success factors in project management. Information Research.

[30] V. Sambamurthy and L. Kirsch. 2000. An integrative framework of the information systems development process. Decision Sciences. Vol. 31, pp.391-412.

[31] S. Tams and K. Hill. 2015. Information Systems Project Management Risk: Does it Matter for Firm Performance?. Journal of Organizational and End User Computing (JOEUC), Vol.27, No.4, pp.43-60.

[32] D.E. Zand and R.E. Sorensen. 1975. Theory of change and the effective use of management science. Administrative Science Quarterly. Vol.20, pp.532-545.

[33] M. Ginzberg. 1981. Key recurrent issues in the MIS implementation process. MIS quarterly. Pp.47-59.

[34] R. B. Cooper and R. W. Zmud. 1990. Information technology implementation research: a technological diffusion approach. Management science. Vol.36, No.2, pp.123-139.

[35] J. Kotter. 1995. Leading change: Why transformation efforts fail. Harvard business review. Vol. 73, No.2, pp.59-67.

[36] D. A. Garvin and M. A. Roberto. 2005. Change through persuasion.Harvard Business Review. Pp. 26-36.

[37] R.Stair and G. Reynolds. 2011. Principles of information systems. Cengage Learning.

[38] K. J., Klein and J. S. Sorra. 1996. The challenge of innovation implementation. Academy of management review. Vol.21, No.4, pp.1055-1080.

[39] S.L.Pan, C.W. Tan and E.T. Lim. 2006. Customer relationship management (CRM) in e-government: a relational perspective. Decision Support Systems. Vol.42, pp. 237-250.

[40] J., Šuc, H. Prokosch and T. Ganslandt. 2009. Applicability of Lewin's change management model in a hospital setting. Methods of Information in Medicine. Vol. 5, pp. 419-428.

[41] H. F., Hsieh and S. E. Shannon, 2005. Three approaches to qualitative content analysis. Qualitative health research. Vol.15, No.9, pp.1277-1288.

[42] F. Al-Balushi, M. Bahari and A. Abdul Rahman. 2015. A Review of E-Government Integration Studies. In 1st ICRIL-International Conference on Innovation in Science and Technology (IICIST 2015),pp. 274-278.

[43] M. M. Kamal. 2009. A multiple case study on integrating IT infrastructures in the public sector. International Journal of Electronic Government Research. Vol.5, No.3, pp.1–20.

[44] L. Tornatzky and M. Fleischer. 2010. Processes of Technological Innovation Lexington, MA: Lexington Books.

[45] C. Parker and T. Castleman. 2009. Small firm e-business adoption: a critical analysis of theory. Journal of Enterprise Information Management. Vol. 22, pp.167-182.

[46] T. Oliveira and M. Martins. 2011. Literature Review of Information Technology Adoption Models at Firm Level. The Electronic Journal Information Systems Evaluation. Vol.14, No.1, pp.110- 121.

[47] T. A. Pardo and G. K. Tayi. 2007. Interorganizational information integration: A key enabler for digital government. Government Information Quarterly. Vol. 24, No.4, pp. 691-715.

[48] V. Bekkers. 2007. The governance of back-office integration: organizing co-operation between information domains. Public management review. Vol.9, No.3, pp.377-400.

[49] D. A. Maluf and P. B. Tran. 2008. Managing Unstructured Data With Structured Legacy Systems. In Aerospace Conference, 2008, pp.1-5.

[50] Y. Charalabidis, F. Lampathaki and D. Askounis. 2009. A comparative analysis of national interoperability frameworks. AMCIS 2009 Proceedings. Pp. 694.

[51] Y. Charalabidis, F. Lampathaki, A. Kavalaki, and D. Askounis. 2010. A review of electronic government interoperability frameworks: patterns and challenges. International Journal of Electronic Governance. Vol. 3, No.2, pp.189-221.

[52] O. Signore, F. Chesi and M. Pallotti. 2005. E-Government: challenges and opportunities. In Proceedings of the CMG Italy XIX annual conference. Pp. 1-16.

[53] C. Fleming. 2008. Connecting citizens with local government–recommendations from the ICMA National Study of 311 and customer service technology. Public Management. Pp.16-18.

[54] Chen, S. Pan, J. Zhang, W. Huang and S. Zhu. 2009. Managing e-government implementation in China: A process perspective. Information & Management. Vol. 46, No.4, pp.203-212.

[55] P. Tseng, D. Chen, Y. Hung and N. Wang. 2008. To explore managerial issues and their implications on e-government deployment in the public sector: lessons from Taiwan's Bureau of Foreign Trade. Government Information Quarterly. Vol. 25, pp.732-756.

[56] W. R. Rose and G. G. Grant. 2010. Critical issues pertaining to the planning and implementation of E-Government initiatives. Government Information Quarterly. Vol. 27, No.1, pp.26-33.

[57] L.Van Velsen, T. Van Der Geest, M. Ter Hedde and W. Derks. 2009. Requirements engineering for e-Government services: A citizen-centric approach and case study. Government Information Quarterly. Vol. 26, No.3, pp.477-486.

[58] W. E. Ebbers and J. A. Van Dijk. 2007. Resistance and support to electronic government, building a model of innovation. Government Information Quarterly. Vol. 24, No.3, pp.554-575.

[59] C. Reddick. 2011. Customer Relationship Management (CRM) technology and organizational change: Evidence for the bureaucratic and e-Government paradigms. Government Information Quarterly. Vol. 28, No.3, pp.346-353.

[60] M. Al-Sebie. 2014. Organizational challenges facing integrating e-government systems: an empirical study. European Scientific Journal. Vol.10, No.10.

[61] S. Y. Hung, W. H. Hung, C. A. Tsai and S. C. Jiang. 2010. Critical factors of hospital adoption on CRM system: Organizational and information system perspectives. Decision Support Systems. Vol.48, No.4, pp. 592-603.

[62] M. Janssen and A. Cresswell. 2005. Enterprise architecture integration in e-government. In System Sciences, 2005. HICSS'05. Proceedings of the 38th Annual Hawaii International Conference. pp.118b-118b.

[63] E. W. Welch, C. C. Hinnant and M. J. Moon. 2005. Linking citizen satisfaction with e-government and trust in government. Journal of public administration research and theory. Vol.15, No.3, pp.371-391.

[64] B. Larsen and M. Milakovich. 2005. Citizen relationship management and e-Government. In Wimmer *et al*., (Edition) Electronic Government. Lecture Notes in Computer Science. Vol. 35, pp.57-68.