

USE OF DOI TO ESTABLISH THE EFFECTS OF GWEA IMPLEMENTATION: A CASE OF SOUTH AFRICAN GOVERNMENT

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Abstract - Organisations often use enterprise architecture (EA) as a bridging method to align their business and Information Technology (IT) strategies. As a result, different available industrial enterprise architecture frameworks are adopted and used by these organisations to facilitate the EA implementation process. However, EA effort is presumed to be very costly and often takes a long time to implement before one can realize its benefits. It is also imperative to indicate that if the deployment of these EA frameworks is not well interpreted, challenges that can lead to the whole architecture implementation process being fruitless can be encountered. This study was conducted with the primary aim to understand the effects of government wide enterprise architecture framework (GWEA) implementation in the South African government departments through the use of diffusion of innovation (DOI) theory.

Keywords: *Enterprise Architecture, GWEA, Diffusion of Innovation.*

I. INTRODUCTION

Enterprise architecture is perceived to be the essential approach for examining the key business, information, applications, and technology strategies and their impact on business functions, including its potential for planning and implementing a rich, standards-based, digital information infrastructure with well-integrated services and activities [19]. Moreover, EA continues to gain more recognition as a result of its capability to organize and align collection of plans for the integrated representation of the business and information technology (IT) enterprise landscape, in past, current, and future states [5]. Bischoff, Aier and Winter [19] added saying that, many organisations use EA blueprints and EA decisions as a mechanism to leverage compliance with rules like, standardization, reusability and the target-oriented planning and the execution of projects that help to implement EA roadmaps.

To leverage and manage the Information and Communication Technology (ICT) systems among and within government entities, public sector entities and government departments around the world are adopting EA programmes as their preferred approach [21]. In addition, Alhujran [22] posited that EA is often recognized as a solution that can assist government departments and public sector entities to decrease operations costs, reduce corruption, and increase transparency, accountability, and enhance informed decision making process. Therefore, the EA in the public sector is receiving increasing recognition [4]. Hence, Saha [16] further endorsed EA as a critical success factor for all types, scales, and intensities of e-government programmes, again asserting that government-wide architecture allows end-to-end business processes, standard technologies, rationalised data structure, and modularised e-services

that may be assembled as required to deliver e-services.

GWEA framework was developed by the Government IT Officers Council (GITOC) in alignment of TOGAF 9 as a minimum standard to be used by all South African government departments and agencies to address inconsistencies and misalignment of ICT plans [9]. Therefore, the interest of this study was to establish the effects of GWEA implementation in South African government departments.

II. RESEARCH METHOD

The approaches and methods employed in the study include the case study, qualitative research method, and semi structured interview approach. The pre-defined interview questions were prepared using the Innovation-decision process from the perspective of DOI theory as a guideline. These Innovation-decision process steps were also used comprehensively during data analysis.

The purpose of a phenomenological research is to focus on fresh, complex, rich descriptions of the phenomenon as it is [15]. In concurrence, Lester [18] maintains that phenomenological research is intended to identify the way in which the phenomenon is identified by the actors in a particular situation. Therefore this study applied a phenomenological research philosophy to help on the achievement of the study aims and objectives.

A case study is described as an empirical inquiry that investigates a contemporary phenomenon within its real-life context [17]. In support of this view, Flyvbjerg [2] posited that a case study is an intensive analysis on individual units emphasising developmental factors in relation to context.

According to Cooper and Schindler [3], the case study is an approach which combines individual and (sometimes) group interviews with record analysis and observation; used to understand events and their ramifications and processes.

The study purposely used the qualitative research because this approach involves exploring issues, understanding phenomena, and answering questions through multiple methods such as open-ended interviews, informal and formal observations, open-ended questionnaires, and case studies [12]. Hence, qualitative research has been praised for its capability of producing findings that are not derived from any kind of statistical procedures or any other means of quantification [1].

For the purpose of this study, the semi-structured interview approach was used as a primary data collection method; and the DOI process steps were purposely used to guide the enquiry. The interview approach allowed the researcher to put questions to a respondent face-to-face [14].

III. DIFFUSION OF INNOVATION THEORY

Diffusion depict the special type of communication in that the messages are concerned with the innovation or new ideas [8], while Diffusion of innovation (DOI) is the framework that guides the adoption and implementation of new ideas, processes, products or services including the procedures through which the innovation is adopted by members of society [10]. Therefore, DOI theory portrays the way in which a new technological idea, artefact or technique, or a new use of an old one, migrates from creation to use. Rogers [7] established the following five Innovation-decision process steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. These stages typically follow each other in a time-ordered manner as presented in Fig. 1. The stages are briefly described next.

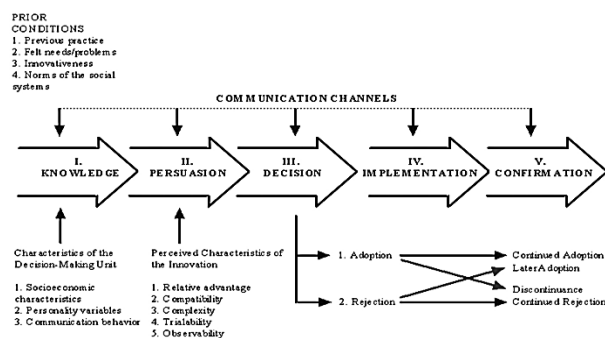


Figure 1: DOI Theory [7]

Knowledge occurs when individuals are aware of the Innovation and gain understanding of its functions. Persuasion is when individuals or decision-making units exhibit favourable or unfavourable behaviour toward the Innovation. Decision indicates when the

individual or unit decides to adopt or reject the Innovation. Implementation occurs when the individual or unit decides to use the Innovation. Confirmation occurs when decision makers confirm or reject their decision to adopt the Innovation [6]. Next section presents the study data analysis using the five Innovation-decision process steps.

IV. DATA ANALYSIS

A. Knowledge

This element of DOI assists in assessing whether people do have the knowledge of the GWEA framework, its purpose, and the status of its implementation in their department where sounds evidence already exists. According to Dept A_04 (p13: 433-435), the department has adopted GWEA as part of their master systems plan and it forms part of the core pillar of the department's ICT strategy and it is an approved master systems plan throughout the organisation. The general view is that, GWEA is known and welcomed within the department and everybody tries to align to it.

In contrast, another view suggested that, only certain components within the department were more advanced in terms of knowledge of the GWEA framework. Hence Dept A_02 (p5: 172) indicated that, in the department the only people who understand GWEA are in the application space. Adding to this notion, (Dept B_01, p1: 328-27) posited that within advisory services unit basically everybody is like taking GWEA as one of the nicest framework that have been develop. Therefore, it is clear that the knowledge of GWEA in the department exist within some of the sections but not necessarily department wide. This further indicates that there is much effort still required in order to create awareness in the department on the GWEA framework and its significance to stimulate the smooth adoption.

B. Persuasion

This stage was used to guide the research in understanding when individuals or decision-making units exhibited either favourable or unfavourable reactions toward the innovation, GWEA framework to be precise. Sahin [11] posited that the attitude towards an innovation may be either negative or positive. It is at this stage that an individual may evaluate the attributes of innovation, such as relative advantage, complexity, compatibility, trialability, and observability.

The intention of the GWEA framework development was to ensure that all SA government departments and other entities that run enterprise-architecture projects on behalf of the government use this framework as their implementation guideline. According to Dept A_01 (p2: 56-57) the department ICT was little bit in a mess, it was not according to

standards, people were not satisfied with the ICT function. Moreover, Dept A_02 (p6: 186-187) highlighted that the department had a lot of processes that were not standardised and duplication of applications. This resulted in the need of strategies that would assist the department to standardise the ICT processes, aligning them to the business strategy.

Furthermore, it became clear that standardisation was one of the critical factors that influenced the departments to explore GWEA framework as their standardisation approach (Dept B_01, p1: 52-54). This was further substantiated by (Dept C_01, p1: 23-25) outlining the reasons why the department had to pursue GWEA implementation stating that GWEA was adopted to start to formalize the ICT planning process. Therefore it can be deduced that the values of GWEA in this case were well understood (Dept C_01, p1: 23-25).

C. Decision

After assessing several options to consider, a selection had to be made. When asked to be specific as to when the decision to implement GWEA in the department was made, one participant said, the decision to implement GWEA was made somewhere around 2009 with the aim to assist the department on the issues of ICT standardisation” (Dept B_01, p1: 62-63). However, Dept A_01 (p2: 63) indicated that, I don’t think it was a once-off decision, I think it was a decision that was made over time.

In contrast, the other participant stated that, the decision was made in 2010 to implement TOGAF, the decision started as an implementation for TOGAF and SOA (Dept A_02, p6: 196-197). It became evident that, when introducing the architecture project initially, the idea was to use the TOGAF. However, later it was realised that there was already a government-wide enterprise architecture (GWEA) available that align with TOGAF. Dept A_02 (p6: 198-200) added that, the GWEA implementation only came into effect once we realise that there was actually a framework that was specifically for government that is also align to TOGAF, so we were at the right track and we adopted GWEA.

D. Implementation

This is a crucial stage at which this DOI element was used in the research to obtain finer details of the GWEA implementation process within the department. It is absolutely imperative to understand that, after the individual or unit decides to use the innovation and a framework has been decided on, the implementation commence.

When trying to give finer details on how the GWEA occurred, or rather ICT architecture as referred to in the department. Dept A_01 (p3: 86-89) highlighted that, all the managers of the whole ICT were involved

in a total implementation so you don’t really feel I’ve implemented the total GWEA, I’ve implemented the only business part or infrastructure implemented another part so it was like a total implementation from different sectors and different things all at the same time. Therefore, it was found that there was a mutual collaboration amongst all the ICT managers during the architecture implementation, with each having a particular artefact to deliver, starting from the time when the decision to implement GWEA was made.

In addition, Dept A_01 (p2: 30-34) eluded that whether we build our data architecture, whether we build our business architecture, whether we build our technology architecture we try to build all around the GWEA framework or all around our ICT framework. Moreover, Dept B_02 (p5: 178-181) mentioned that we use GWEA in the application or in the implementation or development of architectures and in other words we use it as a guide, as a baseline to customise the needs of the specific architecture as we are developing.

It has been acknowledge that the GWEA implementation approach in each case was slightly different. In support of this view, Dept B_02 (p8: 257-262) emphasized that, one does not necessarily have to implement all of GWEA but only the elements that are relevant in the context of the definition scope of the enterprise architecture project. Therefore, each department or business component might have specific architectural scope for which the key elements from the GWEA framework could be mapped to guide the specific architecture implementation.

E. Confirmation

This element of DOI was used in the study to specifically cover these two categories: the GWEA implementation challenges and the benefits realised through the GWEA implementation at the time of evidence collection.

1) Implementation Challenges

When asked the nature of the challenges encountered during the GWEA implementation, the participant replied: The first problem was perhaps the buy in from top managers” (Dept A_01, p3: 103). In addition, “One challenge is always the people to adapt to the new architecture and to see what is that coming (Dept A_01, p3: 77-78). Another respondent added saying, most of the challenges that we experienced were your architecture space problems in terms of not agreeing on a thing until you can convince the other guys on the value that the implementation of that will bring in the organisation (Dept A_02, p7:225-227). It would seem that even in the architecture project team it was problematic to agree on the planning of what needed to be delivered within the project. Therefore, it is clear that convincing the business of the value added by investing in this architecture project has

caused the business to level many questions, as they try to virtualise the benefits of this architectural effort.

Another problem highlighted was the shortage of the skilled resources, the participant said, the skills I think within South Africa we are really lacking. If you look at data architect, I am sure you can name few, there are many people who are saying yes I am a data architect but they are not really doing that (Dept B_01, p3: 109-112). Therefore it is quite evident that the shortage of skilled architecture resources is a barrier that results in a poor or rather unsuccessful implementation of the GWEA.

2) GWEA Implementation Benefits

When responding to the question of the benefits realised through the implementation of the GWEA, the participant replied: it gives us direction, it gives ICT a standard on which they could work (Dept A_01, p4: 130). The participant further said: it sort of helped to manage scope creep as well. Another responded stated that, it allows us to identify duplicated applications (Dept A_04, p16: 553-554). Moreover, one of the participant said that, implementation of GWEA has made it simple for us to just plug in technology and still stick with the same architecture, it has made it less complex, it has made our IT environment less complex (Dept A_02, p6: 217-219). Hence this study acknowledges that already other departments though not in all cases are already benefiting from GWEA implementation.

In contrary, there are other departments that are still struggling to get the intended benefits from GWEA implementation. When asked the benefits emanating from GWEA implementation the participant said: I think for now there is none that I can maybe mention (Dept B_01, p4: 141). Therefore it can be deduced that by only implementing GWEA, it does not necessarily mean that all intended benefits will be realised, but the only success factor will be based on how well GWEA is being implemented as per specific given requirements.

V. FINDINGS

There were finding established from the analysis discussed on section IV above. These findings are discussed as follows:

A. Lack of Effective Communication Plan

The implementation of enterprise architecture programmes requires all levels of management within a business to have a common understanding in terms of the whole architectural road map and its intended value. Hence, communication becomes a crucial element in ensuring that all relevant stakeholders are either included in the process or well informed, so that there is not a problem of resistance, and that

support is given at every stage during the implementation process. Having a communication plan would also mean that there is a buy-in from business, serving to reduce the risks of the EA project turning into a fruitless exercise.

GWEA framework does provide some generic guidelines and processes that suggest how the communication channels should be structured when implementing enterprise architecture. However, it remains the responsibility of the EA programme leader to see that such guidelines are selected and tailored according to the departmental needs; also to ensuring that those guidelines are followed at all times. Some of the domain architectures within the EA project team, however, have affirmed that not much was done in terms of communicating these new initiatives to the business. Therefore, various business units within the departments were still not fully aware of what this initiative is about.

B. Scarcity of Skilled Resources

Enterprise architecture is one aspect deemed to be complex in all of its phases: it often requires highly skilled resources to achieve the implementation. One common challenge that was often expressed by the respondents during the evidence collection and observation in all cases was the shortage of skilled resources.

However, because GWEA was the architecture framework adopted by Government departments to guide their enterprise architecture implementation, and also for the mere fact that this framework was developed in alignment with TOGAF, Some of the department gave some of the team members training on TOGAF as a contingency means to develop some skills internally and to improve the capability within the team. However, owing to the nature of the project, it was necessary to outsource some of the skilled resources so as to bring more quality and to guarantee the success of the GWEA implementation. This would save time; once all the required skills were present the project was likely to produce the expected outcome within project schedule.

C. Limited Knowledge

Allowing or motivating people to share knowledge is one of the challenges often recognised by organisations. In any organisation, much depends on teamwork and collective knowledge sharing. It is important to note that only a few people who were involved in the initial set-up of the GWEA implementation have knowledge of it or what needs to be achieved. That is because only certain people have been with the organisation for a number of years, and have found a unique, strategic way of gaining results and achieving success without even understanding knowledge in the way this is accomplished.

When organisations wished to innovate, knowledge-holders guarded their expertise; not having had to ask

advice from colleagues, simply discovering new ways to solve the issue at hand. The departments needed to create a commitment of culture, to address change, and the challenge of implementing the GWEA.

D. Uncertainty

Uncertainty is defined as “not knowing for sure”. In organisations, this may apply to daily business. In trying to handle uncertainties, one must determine the type of uncertainty currently being faced. There were several occasions on which interviewees stressed that they were not aware or did not have knowledge of an area of EA or of the actual implementation process of the GWEA in their department. It is also important to address future uncertainties, which add to the complexity; one is now uncertain about uncertainties. The first step is to “define uncertainty”.

By defining this, one will be able to understand and analyse what is being sought. Most people within the organisation were not clear on the aim of the GWEA framework, hence the uncertainty. In order for the organisation to understand why the GWEA implementation is important, this uncertainty should be addressed.

If the infrastructure manager is uncertain whether employees have understood the GWEA, he will be unable to address the issue of training. The infrastructure manager is responsible for organising the training, and ensuring that the employees understand what they are dealing with.

E. Innovation Resistance

Resistance to change is normal within an organisation comprising of people. Innovations bring about change in the organisation. Not all change is necessarily healthy; resistance on its own merits may be desirable and useful. It has thus been suggested by some scholars that viewing innovations from the “Adoption” and “Diffusion” perspectives should be de-emphasised: it may be preferable to study the process of innovation resistance. Innovation in an organisation must have fundamental value. Sometimes a small minority of individuals are seeking change simply for the sake of change, and not for the fundamental value of change. In such cases it is important to take note of the vast majority of people who “have no prior desire to change”. Such individuals may be more rational than the small minority of individuals.

Every individual involved at the beginning of the GWEA implementation should have an opportunity of either adopting or rejecting this innovation. In order to achieve this, one must respect individuals who resist change, understanding their reasons for resistance. In that way, one may utilise their knowledge in the development and promotion of innovations, rather than their simply having preconceived innovations thrust upon them.

The importance, of focusing on influence and finding a way of gaining trust cannot be over-emphasised, so that managers understand the need for change.

F. GWEA Implementation Factors

The analysis findings are interpreted to be the factors which influence the implementation of GWEA within the South African government departments. This is depicted in Fig. 2 below.

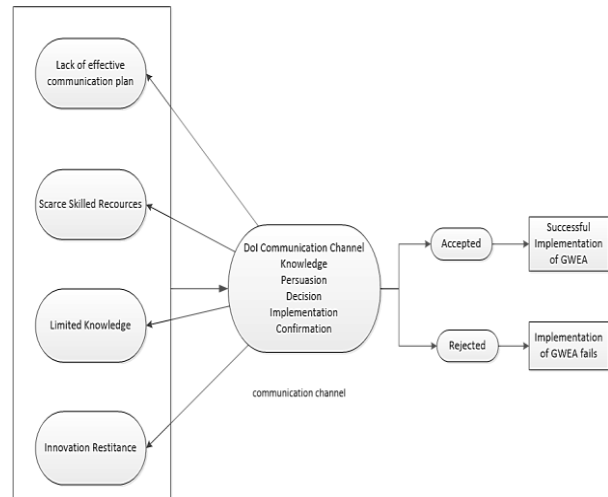


Figure 2: GWEA implementation factors

VI. FINDINGS INTERPRETATION

The empirical data was analysed using Diffusion of Innovation (DOI) theory, and the findings from this analysis were presented above in Section V. The findings are now interpreted, as depicted in Figure 3 below. The discussion that follows explains each of the components in the figure.

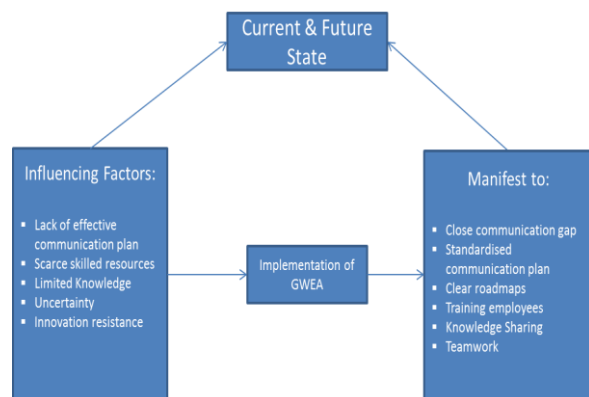


Figure 3: Conceptual factors determining the success of GWEA implementation

1) Close communication gap

Effective communication occurs when people start communicating correctly. This may be achieved only by closing the communication gap. Once the process

of closing the communication gap begins, communication between the communicator (what is meant) and the listener (what is understood) is achieved. Closing the gap, in essence, supplies a complete overview of the various elements and dimensions of effective communication.

2) Standardised communication plan

A Communications Management Plan defines the communication requirements for the project; the way in which information will be distributed, setting the communication framework for the project. Such a plan should be used as a guide for communication throughout the life of the project, requiring updating as and when communication changes.

It also includes a communications matrix which maps the communication requirements of the project. To ensure successful meetings, an in-depth guide for conducting meetings that details both the communication rules and how meeting should be conducted, is also included. Stakeholder contact information for all stakeholders who are directly involved in the project is included in the project team directory. An implementation of the GWEA cannot be successful if a standardised communication plan is not in place. This plan assists with tracking all pertinent discussions and the steps or procedures taken or to be taken.

3) Clear road maps

Every organisation needs a framework for guiding the mobilisation of its strategic plan. An organisational “roadmap” enables everyone in the business to a) clearly understand each action, and b) understand decisions which must be made for each action, c) understand who must make decisions, and d) know when each decision must be made. It is the responsibility of senior management/leadership to define and agree on the organisational strategy to be effected.

Strategy refers to making the right choices regarding products and services to be delivered and procedures to be followed in delivering such products and services. It is equally important that the top tiers of leadership translate the identified strategic objectives into operational terms. Members of the organisation must execute the strategy of the organisation; therefore the strategy must be communicated in such a manner that makes meaning to every member of the organisation. It is therefore a requirement that a business consider its total and interlinked operations (i.e. processes that are designed and linked to one another). This goes to the identity of an organisation, reaching well beyond a continuous improvement plan to eliminate inefficiencies.

4) Training

To achieve the organisation’s overall business and academic goals and objectives, employee training must be geared towards related skills that improve the

probability of achieving the goals. Most employees have experienced anxiety and/or frustration at some point in their careers. Positive training offered to employees may assist in the reduction of both emotions. It should be noted that employees who are committed to learning show a higher level of job satisfaction, which has a positive effect on their performance. Although there is no direct link revealed in the literature between training and job satisfaction, employees that are comprehensively trained will better satisfy the needs of customers and other employees.

The lack of adequate job training can result in poor performance reviews that can produce job dissatisfaction and cause conflict. Therefore, the larger the gap between the actual skills available for performing a given task and the skills required to perform such a task, the poorer the performance and the greater the increase in employee turnover within the organisation. This implies that lack of proper skills to perform a task correctly can set up employees for failure and as a result place the business at a competitive disadvantage. A high turnover from lack of job training reflects a greater need for more job training that would then positively impact the profits of any organisation.

5) Knowledge Sharing

Knowledge sharing concerns the activities through which information, skills, and expertise are exchanged among employees. Encouraging knowledge sharing would positively affect organisational excellence.

Pure trust is required in knowledge sharing. For instance, people do not readily share knowledge with others when they fear that their peers may gain more than they have (fear of losing is another valid factor). Even certain managers do not share knowledge with subordinates, for the same reasons. It is therefore imperative that employee behaviour be modified through training programmes, especially those for managers within organisations.

6) Teamwork

Teamwork in organisational settings is an important aspect of creating a well-oiled machine to accomplish tasks and projects. A single team often has a team leader, who guides all members so as to achieve the expectations of the company. In addition, each team leader must include all workers, thereby boosting motivation and workplace morale. However, the role of teams within organisations also has a practical importance.

Each organisation is made up of various departments. Such departments must work together in creating a project or task for the organisation, for instance the IT department works closely with the accounting department to create a system that caters for the accounting needs. Despite having very different functions within the organisation, these departments

must work together as a team to meet the company's goals and objectives.

CONCLUSION

This study was conducted within the broad scope of three SA government departments, as stated in the previous chapters. The findings and the analysis of the study suggest that further research relating to EA implementation in the government sector could be conducted. Some of the suggestions are:

Organisational culture – it would be an advantage for academic organisations to investigate and gain a better understanding of the way in which organisational culture impacts on the government-wide enterprise architecture implementation;
Existing organisational policies and standards – it would be of a significant contribution to establish the way in which EA frameworks influence the change to existing organisational standards and policies;
To bring awareness of EA frameworks and their capabilities to drive the organisational change in government departments.

Therefore, the conclusive finding of this research exercise affirms that EA, if well implemented in accordance with the industrial approved EA frameworks, EA may aid government departments to reduce the cost of their operation and increase service delivery efficiency through the alignment of ICT and business strategies, standards, including the cohesion of business processes.

REFERENCES

- [1] A. Strauss, J. Corbin, "Basics of qualitative research", Newbury Park, CA: Sage, 1990.
- [2] B. Flyvbjerg, "Over budget, over time, over and over again: Managing major projects", 2011.
- [3] D. Cooper, P. Schindler, "Business Research Methods", McGraw-Hill, New York, 2006.
- [4] D. D. Dang, S. Pekkola, "Root causes of enterprise architecture problems in the public sector", 2016.
- [5] D. Simon, K. Fischbach, D. Schoder, "An exploration of enterprise architecture research", Communications of the Association for Information Systems, Vol.32, no.1, pp.1-72, 2013.
- [6] E. M. Rogers, "Diffusion of innovations", New York, Dec, 1995.
- [7] E. M. Rogers, "Diffusion of innovations", 5th ed., New York, NY: Free Press, 2003.
- [8] E. M. Rogers, "Diffusion of innovations", Simon and Schuster, Jul 2010.
- [9] GITOC, "Government-wide Enterprise Architecture (GWEA) Framework Implementation Guide Revision 1.2 June 2010", Retrived, August, 2013. from www.google.co.za/webhp?sourceid=chrome-stant&ion=1&espv=2&ie=UTF-8#q=GWE
- [10] I. YUKSEL, "Rogers' Diffusion of Innovation Model in Action: Individual Innovativeness Profiles of Pre-service Teachers in Turkey", Hrvatski časopis za odgoj i obrazovanje, Vol.17, no.2, pp.507-534, 2015.
- [11] I. SAHIN, "Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory", TOJET: The Turkish Online Journal of Educational Technology, Vol.5, no.2, 2006.
- [12] J. W. Creswell, "Research design: Qualitative, quantitative, and mixed methods approaches", Sage publications, 2013.
- [13] J. W. Creswell, "Research design: Qualitative, quantitative, and mixed methods approaches", Sage publications, 2010.
- [14] J. C. Welman, S.J. Kruger, "Research Methodology: for the Business and Administrative sciences", 2nd Ed., Oxford University Press, South Africa, 2001.
- [15] L. Finlay, "Debating phenomenological methods. In: Hermeneutic Phenomenology in Education", Springer, pp.17-37, 2012.
- [16] P. Saha, "Enterprise Architecture as platform for connected Government", 2010.
- [17] R. K. Yin, "Validity and generalization in future case study evaluations", Evaluation, Vol.19, no.3, pp.321 - 332. 2013.
- [18] S. Lester, "An introduction to phenomenological research", 1999.
- [19] S. Bischoff, S. Aier, R. Winter, "Use It or Lose It? The Role of Pressure for Use and Utility of Enterprise Architecture Artifacts", 2014 IEEE 16th Conference on Business Informatics, IEEE, pp.133-140, 2014.
- [20] V. Agievich, V. Taratukhin, J. Becker, R. Gimranov, "A new approach for collaborative Enterprise Architecture development", Strategic Technology (IFOST), 2012 7th International Forum on IEEE, pp.1-5, 2012.
- [21] J. Lemmetti, S. Pekkola, "Enterprise architecture in public ICT procurement in Finland", Electronic Government and Electronic Participation: Joint Proceedings of Ongoing Research and Projects of IFIP WG 8, pp.227- 236, 19 Aug, 2014.
- [22] O. Alhujran, "Determinants of e-government services adoption in developing countries: a field survey and a case study", 2009.