

Evaluating Benefits of Government Enterprise Architecture

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Abstract. The aim of this paper is to understand the difficulties of evaluating government enterprise architecture benefits. Today many governments have initiated a government enterprise architecture program and there is a growing interest for the evaluation of the benefits of such efforts. Currently there is a deficiency of a comprehensive model for the benefit evaluation. Governments face various problems in evaluation and measurement of costs and benefits.

Introduction

As part of the public sector modernization plan, governments seek to offer their citizens a seamless service delivery. Today, public sectors information and communication technology (ICT) initiatives can no longer be developed in silos with no regards to other parts of the government. This new kind of service delivery requires interoperability. Interoperability is defined as an ability of information systems and of the business processes they support to share and exchange information (IDABC 2004).

E-government has not been able to solve the concern many organisations have about how to utilise ICT to its fullest strategic extent. One solution has been to initiate a government enterprise architecture program. Enterprise architecture is a tool for strategic management, which helps in unifying business process development and the use ICT. Enterprise architecture (EA) is a hierarchical

approach for aligning business and ICT (Langenberg & Wegmann 2004) and it describes how the information systems, processes, organizational units and people in an organization function as a whole (Morganwalp & Sage 2004).

Governments usually have several independent e-government projects, which may have limited coherence and remain largely uncoordinated (Hjort-Madsen 2006). EA can serve as an umbrella for explaining the relationships among the projects and managing change. Compared to e-government initiatives government enterprise architecture programs are often more holistic approaches that intertwine and focus disjointed e-government projects.

The aim of this paper is to discuss the evaluation of government enterprise architecture (GEA) benefits. This is an important research area since governments world wide are investing large amounts of money and resources to the development of GEAs. Currently governments are not able to comprehensively evaluate the costs and benefits of GEA work. This might become a problem when governments need to justify the investments made and reason for new investments. This paper is based on literature and observations of the Finnish government enterprise architecture work.

The paper is organized as follows. First, the nature of government enterprise architecture work is described. Second, we present general enterprise architecture work and e-government benefits based on literature. Third, we present problems related to the measurement of government enterprise architecture benefits. Finally, we draw some conclusions.

Government Enterprise Architecture Work

Governments are simultaneously trying to improve the service delivery and efficacy in government functions, this requires rethinking the role of ICT. Because of this, governments are increasingly looking towards e-government-as-a-whole concept which refers to government agencies working across portfolio boundaries to achieve a shared goal and an integrated government response to particular issues. Within this holistic approach the government agencies and organizations share objectives across organizational boundaries. (UN 2008) This is a new way of thinking in governments. Earlier political and managerial focus was on developing electronic services within each public organization with limited consideration of cross-organizational coherency, the focus today has clearly shifted towards coordinated services offering one-stop shops to citizens and businesses (OECD 2007).

The set of processes changing different features of the public sector to accommodate different political and strategic goals is often denoted as public sector reform, modernization or transformation. The process of transformation of the public sector is a tool for achieving broader public sector objectives such as improving the quality and performance of public service delivery, or attaining a

more efficient and effective public sector. (OECD 2007) One tool for transforming the government is implementing a government enterprise architecture (GEA) program.

Policymakers initiate government enterprise architecture (GEA) programs to ensure interoperability, avoiding duplication efforts and enable government wide reuse (Janssen & Hjort-Madsen 2007). By identifying, structuring and categorizing elements, enterprise architecture (EA) can increase the potential for cross-public sector reuse and reduce duplication and hence reduce costs. Implementation of an EA offers a way forward in integrating independent ICT silos across inter-organizational agencies. This integration is seen important by the most governments of Western countries (Janssen & Kuk 2006). Interoperability and integration is becoming increasingly important when governments implement and manage EA programs and governing interoperability across organizational domains requires that public agencies take into consideration the other parts of the public sector (Hjort-Madsen 2006).

Several countries have set increasing interoperability both between administrative branches and with suppliers a central goal. This requires cooperation across administrative branches, which is often a new and different kind of work practice for hierarchically organized administration. Hence, GEA programs face challenges related to integration and interoperability within and between public agencies (Hjort-Madsen & Burkard 2006). Overcoming these challenges is found out to be difficult (Isomäki & Liimatainen 2008). GEA implementation is an essential part in ensuring the success. Particularly the role of GEA governance models becomes salient. (Liimatainen, Hoffmann & Heikkilä 2007) Architectures evolve over time and consequently governance structures and mechanisms are needed to guide and encourage desired development. Government structures often impede EA programs from succeeding (Hjort-Madsen & Gotze 2004). This requires changes in the organization of management and work practices.

According to Christiansen and Gotze (2007) 67 percent of governments already have a GEA program and added to those the countries that are planning to have a program within one or two years the percentage is 93,3. Hence, the enterprise architecture work is in the starting phase in most countries. There are some countries that are forerunners, for example, USA and Denmark. Although, implementation phase of the GEA has been problematic in these countries. One reason for the fast advancement in GEA work in the USA is because of the use of legislation for certain governance aspects. In the year 1996 USA enacted the law on public IT acquisitions (the Clinger-Cohen Act). It defines that acquisitions, planning and management of technology must be treated as a capital investment. Hjort-Madsen's (2007) study showed that the federal agencies in the USA adopting EA planning are struggling to show how information systems planning can be a driver for administrative reforms and transformation in government. At

the moment the chief information officers rarely have control over IS budget and have problems while trying to get the IS planning into the management agenda (Hjort-Madsen 2007). The Danish GEA is facing the risk of failure in the implementation phase, since the GEA is lacking a strong governance model (Janssen & Hjort-Madsen 2007).

Benefits of Government Enterprise Architecture

Through positive effects of GEA efforts, governments can justify the costs and resources it incurs (Morganwalp and Sage 2004). According to one study, 45 percent of governments that have a GEA program are measuring their program's performance. The same percentage is using key performance indicators (KPIs) in their GEA work. Only 18 percent of governments with GEA programs measure its total expenditure, the total amount gained from the GEA and the benefits to cost ratio. This indicates low maturity of GEAs and difficulty of evaluating benefits. (Christiansen and Gotze 2007)

When total expenditure and benefits of GEA work have been evaluated, the positive effects of GEA have most probably included decrease in the number of used platforms and systems, and cost savings through shared infrastructure and services. It is challenging to identify, measure and calculate the financial benefits of GEA (Rico 2005). According to Niemi (2006) there is only few academic research papers on benefits of EA. He presents a comprehensive list of EA benefits derived from literature. According to Niemi the most cited benefits are: 1) reduced costs, 2) providing a holistic view of the enterprise, 3) improved business-IT alignment, 4) improved change management, 5) improved risk management, 6) improved interoperability and integration, and 7) shortened cycle times. Above mentioned are general EA benefits and not specified for government EA.

United States Intergovernmental Advisory Board (IAB 2003, 1) has presented five categories for evaluating the benefits of e-government: 1) financial, 2) economic development, 3) reduced redundancy, 4) fostering democratic principles, and 5) improved service. Financial improvement means reducing the costs of organizations and enhancing revenue collection. Economic development signifies the growth of local, state, and federal economies. Reduced redundancy means consolidating, reducing, and integrating government systems. Fostering democracy means offering a consistent level of customer service to all stakeholders, regardless of political affiliation. Finally, improved services are needed for citizens, customers, and all other key stakeholders. A successful GEA program should cover at least one of the mentioned areas, but the most successful will probably deliver benefits in multiple areas (Rico 2005, IAB 2003)

Lau (2007) has introduced a proposed outline for assessing electronic government benefits. He states that lacking a business case governments risk

developing technology-enabled services that may not be what citizens and businesses expect. Lau describes three types of benefits: 1) direct financial costs and benefits, 2) direct nonfinancial costs and benefits and 3) indirect costs and benefits. The last type is about good governance as a public good and can be viewed as supporting legitimacy and growth. These benefit types have two kind of beneficiaries: government and nongovernment. Nongovernment beneficiaries are citizens and business. Lau's outline can be used as a conceptual guide for planners, analysts, and evaluators of e-government investments.

The above mentioned classification schemes for enterprise architecture and e-government are a good beginning, however more comprehensive and practical models are needed to be fully able to measure GEA benefits. Unfortunately, at the moment such models do not exist. There is a demand for more complete understanding of the impacts of e-government that will help governments with the development, design, and subsequent evaluation of future e-government initiatives (Lau 2007).

Overcoming the Problems of Benefit Evaluation

Describing and measuring benefits is an important task for securing the development and continuity of GEA work. Currently, measurement of the benefits of GEA work is rare (Liimatainen et al. 2007). This is because the governments are still today mostly unable to objectively quantify and show the benefits and returns of ICT investments and e-government efforts, although measuring has constantly gained momentum and attracted interest and efforts from policy makers, practitioners, industry and academic experts (OECD 2007). The prerequisite for measurement is that governments set quantitative and qualitative goals for their GEA programs and ICT projects. The achievement of these goals should be monitored through a governance model and governance structures. A governance model serves, for instance, in defining standardized description models, which every administrative branch or agency must devise. With a governance model, a national-level permission for launching certain types of projects can be mandated. This ensures that similar development projects are not underway redundantly in several locations at the same time. A governance model is one way of promoting the creation of uniform methods and practices.

Today, governments might have defined indicators for benefits evaluation, but the measurement is not done or at least the results are not available. In many countries, one crucial deficiency is shortage in measuring advantages and lack of self-evaluation in GEA work. (Liimatainen et al. 2007) These are needed since continuous evaluation is a prerequisite for improvement, which entails formulating lessons learned from work into more efficient and high-quality practices. It would be essential also for the continuity of GEA work to be able to demonstrate advantages gained from this work.

The goals set for GEA programs vary considerably and, therefore, success of a particular program is related to the goals set. If no goals have been set, or if they are left overly abstract, evaluating success is nearly impossible. Currently, in many countries the problem is that the governments have not set any measurable goals for their GEA work. Continuous assessment is a prerequisite for improvement. Evaluation of advantages is the driving force of enterprise architecture work.

After the distinct and measurable goals are set for the GEA work, they can help in defining indicators that help to gain information on, for instance, the savings brought by GEA work and the development of public services. It would also be worthwhile to measure the spread of GEA into different levels of government (for example ministries and agencies). Through GEA work, common indicators for measuring the advantages of projects could be developed for the use of governmental organizations. This would help in having the control, for example, for the development of new public service information systems in the level of state government. It would be beneficial for governments to have a model that would help in evaluating whether to finance a public service development program and to elicit if the program and individual projects are in compliance with the GEA. One of the key elements, in avoiding the previously mentioned problems, is to use a standardized way to initiate new programs for operations, service or ICT systems development in the government. (Liimatainen, Heikkilä, Seppänen 2008) For example, a government may want to enforce that the outcomes of the development project comply with national standards, and utilize the existing infrastructure and shared services. The prospective outcomes should also be set against the government's service map in order to increase interoperability and avoid yielding redundancy.

GEA can enable different things. GEA goals should be prioritized at the level of state administration and in organizations that start EA work. It must be decided which issues are taken up immediately in development and which will be taken up later. In the initial phase of GEA work, it might be useful to consider what kind of development work provides fast payoff and success stories. These would help in spreading and promoting GEA. Prioritization of goals should be done from the perspective of business, and this requires cooperation between politicians, management, operational personnel and IT function. The government should bear in mind the customers of services. They can be other government agencies, businesses or citizens. Evaluating of the benefits becomes possible after the government has stated clear and prioritized goals. After that the outcomes can be set against the evaluation criteria that is derived from the goals.

Governance structures and models have a central role in assuring the success of GEA. A governance model serves, for instance, in defining standardized description models, which every administrative branch or agency must devise and it defines the decision making roles and responsibilities. Governance model is an

essential tool in achieving the most benefits of GEA work. We give an example of importance of the GEA governance from a case in Finland. The Finnish government had an Information Society Programme from 2003 to 2007. Within this were regional Information Society projects and one of them was a project which aimed at promoting the development of online public services. This project received national and European Union (EU) financial support.

The National Audit Office of Finland (NAO) audited the project and found serious shortcomings in the implementation and governance. The report stated that the project had unrealistic and unclear objectives in relation to the timetable, available personnel resources, the governance model and allocated funds. The results achieved were fragmentary and modest compared with the original objectives. The project was implemented as small regional projects which led to overlapping and fragmented online services. This was not expedient since the goal was to develop online services in the national-level. The NAO stated that the governance of the projects should be centralized and managed in the national-level. In the future the governance of cross-public sector programs should be comprehensive and ongoing. The audit report concluded that the Information Society Program did not succeed in eliminating overlapping and competing projects. In fact, in some cases the results were reversed. (NAO 2008) To prevent undesired results and inappropriate use of national and EU funds in the future, actions should be taken. Governments should start their GEA work by stating clear and measurable goals and tasks to their GEA program. It is essential that governments set quantitative and qualitative goals for their GEA work. Setting goals is a prerequisite for the evaluation and measurement of the costs and benefits of GEA work.

Concluding Remarks

Enterprise architecture work is gaining more momentum in governments worldwide. The work is in initiation phase in many countries. Thus, the benefits evaluation in this area is also in its infancy. Since the governments have not set clear and measurable goals for their GEA programs the benefits evaluation is quite impossible to conduct. This is a serious problem for the advancement of the EA work in governments.

Governments should be able to communicate their GEA work to the different organizations in state administration and in some cases also to citizens and businesses. In governmental context, interoperability is often set as a goal for GEA. Achieving interoperability within and between government organizations is a complex and demanding task. To ensure better interoperability the governments need to have some centralized governance structures. This kind of structures will be helpful in evaluating the benefits. Since, the service development projects can, for example, be evaluated against the government's service portfolio.

Developing and implementing GEA is a multifaceted task. Different factors influence the benefits realization and implementing a GEA does not automatically guarantee long-term value (Niemi 2006). However, if the governments determine the goals for GEA work beforehand, it gives diverse opportunities for benefits evaluation.

Currently, there is a lack of studies in the area of government enterprise architecture benefits evaluation. This is somewhat surprising since benefits evaluation is an utterly important aspect of GEA work. There is a need for comprehensive studies in this area to help the governments obtain best possible results in their GEA work. More comprehensive studies are required to find out all the aspects of GEA benefits and how the government's GEA goals influence the selection of most suitable evaluation methods.

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