INSTITUTIONALISING ENTERPRISE ARCHITECTURE IN THE PUBLIC SECTOR IN VIETNAM

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INSTITUTIONALISING ENTERPRISE ARCHITECTURE IN THE PUBLIC SECTOR IN VIETNAM

Research paper

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Abstract

Enterprise architecture (EA) is a holistic approach to aligning IT resources with business processes and strategies. EA often bridges several organisational units and departments. This aspect makes it challenging to establish EA programs as the scope, scale, level of detail, objectives, and resources need to be discussed and agreed upon by several units. In this paper, we study how EA programs are institutionalised in Vietnam’s public sector. We conduct a multiple case study by deriving qualitative data from three provinces with different experiences and backgrounds. The results show how rules, norms, and values change and influence the EA programs and their institutionalisation. Their relative importance also changes as the EA programs proceed. These results may assist researchers and practitioners in understanding EA implementation and challenges in public sector e-government initiatives, particularly in developing countries.

Keywords: Institutional theory, Public sector, Developing country.

1. Introduction

Governments today are utilising technologies for building e-government solutions due to struggles with increasing operation costs and corruption as well as the need for transparency, accountability, and better decision making (Alhujran, 2009). Many view the enterprise architecture (EA) approach to be a promising solution for planning and governing organisational IT resources. Consequently, 67% of countries were implementing EA or similar programs in 2007, and up to 93.3% of countries were planning to launch their EA initiatives within the forthcoming years (Liimatainen et al., 2007).

This trend has led to an increased number of EA programs in different countries. For example, in Finland, there are separate EA programs for universities, municipalities, and central governments (Act on Information Management Governance in Public Administration, 2011). The large number of EA programs in a single country introduces political, economic, and environmental uncertainties and complexities, affecting every participant involved in EA endeavours in governmental offices. These challenges underscore the need to understand EA implementation practises, methods, and outcomes.

There exist few studies on institutionalising enterprise architecture. The rare examples focus on barriers to EA management (EAM) (Iyamu, 2009), architectural coordination (Aier & Weiss, 2012; Weiss, Aier, & Winter, 2013), or EAM development drivers and adoption (Hjort-Madsen, 2006, 2007). However, we could find no studies providing insight into EA programs from the beginning to the end; we also found a complete dearth of research into problems faced by different stakeholders, such as top managers, CIOs, enterprise architects, EA workers, IT specialists, non-IT civil servants, and business representatives. Therefore, our study focuses on these issues through the lens of institutional theory (DiMaggio & Powell, 1991).

In this paper, we will thus answer the following research question: What are the problems different stakeholders face during EA institutionalisation in the public sector? The qualitative case study utilises interview data from three provinces and their key EA stakeholders in Vietnam. Our findings indicate that there are different problems in three EA phases: the requirement specification phase, the preparing for development phase, and the EA implementation phase. This framework represents a first step to assist practitioners and academics in identifying the root causes of problems in EA programs and their implementation.
The structure of this paper proceeds as follows. The next section presents background information before moving into a section describing the research settings and methods. The subsequent sections outline and discuss the findings. The paper draws together implications with a concluding chapter.

2. Background

2.1 Problems in EA

Enterprise architecture (EA) is a planning and governance approach that organisations use to align their resources toward a common goal (Niemi & Pekkola, 2015; Tamm et al., 2011). EA involves a holistic approach encompassing an organisation’s business capabilities, processes, information, information systems (IS), and technical infrastructure (Kaisler et al., 2005). Consequently, it is often used in managing the complexity of organisational structure and business environments as well as in facilitating the integration of strategy, personnel, business and IT (Goethals et al., 2006; Kluge, 2006). In practice, however, interpretations of EA implementation differ greatly (Lemmetti & Pekkola, 2012).

EA is infamous for its low success rate (Dang & Pekkola, 2015) due to problems related to results, costs, time, and inability to meet requirements (Janssen & Klievink, 2012). In fact, many problems are non-technical. For example, Hauder et al. (2013)’s survey on factors affecting EA management indicate that quickly changing environments represent a major challenge for stable EA practices, and these practices often exist in a separate reality from the rest of the organisation. Adding to this discussion, Chuang and Loggerenberg (2013) identify five problematic issues: communication, obtaining buy-in from the stakeholders, ownership, perceptions of the enterprise architecture, and organisational politics. Kim and Everest (1994) point out other problems in the context of EA documentation, such as being too conceptual, inflexible, or obsolescent. They also indicate issues in terms of levels of detail, misperceptions regarding EA stakeholders’ real information needs, and lack of interest from non-IT stakeholders. The implementation challenges in EAM include the lack of benefits gleaned from using EA, unclear goals for EA initiatives, and the limited participation of enterprise architects (Löhe & Legner, 2014).

To these issues, Weerakkody et al. (2007) add the legacy of rigid bureaucracy, established illogical routine tasks, and the lack of coordination between different information systems in the public sector. Isomaki and Liimatainen (2008) focus particularly on the public sector and divide the challenges into three groups: implementation ability and governance (shared understandings, implementation ability, business and IT alignment, governance), structure of state government (legislation, professionalism), and the advancement of interoperability (shared IT infrastructure, crossing administrative sectors, understanding the influences of technology and information systems). In a similar vein, Janssen and Klievink (2012) group failure factors into organisational networks, people, processes, products, and technology categories. Researchers also note problems that arise in the process of enterprise architecting: modelling, managing, and maintaining EAs (Kaisler et al., 2005); poor EA governance structures (Seppänen, 2009); and managing risks in the EA project (Janssen & Klievink, 2010).

As seen, numerous challenges and problems exist with EA, and they are not limited to technical areas. Indeed, they emphasise management issues, administrative reforms, and business aspects. While it is important to diagnose problems, we seek to go beyond the evident challenges and study the root causes of the obstacles to implementing EA activities in organisations. Prior to this analysis, the next section provides more details regarding the institutionalisation of EA.

2.2 Institutional theory in EA research

The literature remains scant regarding how EA activities are implemented in organisations (Dang & Pekkola, 2015). Some rare examples include Iyamu (2009), who presented six internal barriers to the institutionalisation of EAM, relating them to four elements in the EAM development and implementation process. These barriers include organisational structure, economic investment, administrative process, organisational politics, technical capability, and the business’ interest and understanding of EA. Along these lines, Weiss and colleagues (Aier & Weiss, 2012; Weiss et al., 2013) studied the institutionalisation of architectural coordination in organisations. More specifically, they focused on the coordination of EAM stakeholders (IT, project, and line managers) and their individual projects from the architectural perspective. The researchers identified seven institutional influences on the effectiveness of the institu-
tionalisation of architectural coordination: social legitimacy, efficiency, organisation grounding, trust, governance, goal alignment, and enforcement (Weiss et al., 2013).

While these studies focused on the micro level and on the private sector, there are indeed some studies on the macro level of institutional theory. Madsen and Gotze (2004) studied interoperability challenges at different levels of government, while Magnusson and Nilsson (2006) argued that institutional theory could be used to infuse the architectural framework with aspects of history and legitimacy. Madsen (2006, 2007) pointed out government pressures for consolidation and value preservation as well as the political motives that drive EAM development. Madsen and Pries (2009), along with Janssen and Madsen (2007), also studied the influence of EAM adoption in government agencies from the management and whole organisation perspectives. These studies just scratch the surface of the complex topic of EA institutionalisation. We will return to this research in the discussion section when we connect our own findings to the previous literature.

2.3 Theoretical lens

A number of IS researchers have used institutional theory to study IT adaptation, innovation, and IS development and implementation (Mignerat & Rivard, 2009). Institutional theory attempts to explain “how and why institutions get adopted, refused, and changed over space and time” (Weiß, 2015: 35). Here, we adopt so-called new institutional theory, which was developed from the works of Meyer and Rowan (1977) to analyse organisations (DiMaggio & Powell, 1983, 1991). Although there is no single and universally agreed upon definition of an institution (Scott, 1995), we use the definition of Mahalingam and Levitt (2007) that “institutions are a set of norms, rules, and values operating in a given environment that help generate a regularity of behaviour among actors affected by that environment”. This definition addresses EA implementation, acknowledging the fact that government agencies may initiate and expect EA, but leave it to the organisations themselves to interpret and apply. Therefore norms, rules, and values drive and may explain the problems in institutionalising EA.

Depending on the context and environmental characteristics, EA programs may experience various problems. We attempt first to identify and then to explain issues that appear throughout the entire lifecycle of EA programs in state agencies. We find neo-institutional theory to be a suitable approach because problems in EA programs are usually non-technical (Kaisler et al., 2005; Schönher, 2009). In practice, EA is actually about cooperating with several stakeholders (Jonkers et al., 2006; Shah, 2007). In institutional theory, regulative, normative, and cognitive social factors have all been identified as central elements of institutions (Scott, 1995). We utilise these elements to explore the problems that state agencies face in an EA program, from beginning to end and from the perspective of different stakeholders, thus providing an explanatory framework for analysis. Table 1 summarises this framework.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rules</td>
<td>Problems related to policies, working rules in organisations</td>
</tr>
<tr>
<td>Norms</td>
<td>Problems related to working norms, rules, duties, responsibilities, habits, and moral obligations</td>
</tr>
<tr>
<td>Values</td>
<td>Problems related to beliefs, culture, assumptions, social identity, and personal desire</td>
</tr>
</tbody>
</table>

Table 1. The study framework based on (DiMaggio & Powell, 1983, 1991); The first element – norms, normative pressures (DiMaggio & Powell, 1983), or normative pillars (Scott, 1995) – is mostly concerned with the moral and pragmatic aspects of legitimacy, assessing whether or not the organisation plays its role correctly and in a desirable manner (Scott, 1995). Norms focus on an organisation’s professionalisation, such as its educational backgrounds and mimetic behaviours (DiMaggio & Powell, 1983). The stakeholders are also likely to emphasise their immediate organisational environment rather than the more general cultural rules of society when driving an organisational change (Palthe, 2014).

The second element – rules, coercive pressures (DiMaggio & Powell, 1983), or regulative pillars (Scott, 1995) – emphasise the organisation’s legal environment through the existence of standards (DiMaggio & Powell, 1983; Palthe, 2014). Rules explain how institutions constrain and regulate stakeholder behaviour (Mignerat & Rivard, 2009). Rules are concretised through formal and informal pressures by superior organisations, such as provinces being ruled by the central government (Pishdad et al., 2014).
The third element is values. Values, mimetic pressures (DiMaggio & Powell, 1983), or cultural-cognitive pillars (Scott, 1995) stress cultural legitimacy, which is shared by the organisational stakeholders and their adopted mind-sets. Values often appear at times of uncertainty when organisations look inwards and at other organisations perceived to be more legitimate or successful (DiMaggio & Powell, 1983). The value element is thus characterised by imitation: in a context of uncertainty, organisations tend to copy organisations they consider to be leaders or models (Scott, 1995). Organisations pursue mimetic behaviour to achieve legitimacy, maintain competitive parity, or limit rivalry. Pishdad et al. (2014) argue that organisations are focusing on changes in their conceptual beliefs, mental models, and interpretations of shared meanings, stressing the importance of achieving change that is internalised by organisational members and culturally supported.

3. Research Methods

3.1 Cases and their background

To understand the challenges of EA programs, we conducted a multiple case study (Stake, 2005) in Vietnam. The government of Vietnam has initiated an EA program to be carried out comprehensively at all governmental levels, engaging all state administrative agencies, citizens, and businesses in order to computerise public services, increase transparency, and achieve systems interoperability. Vietnam’s first EA programs were established in 2007 (Decree 64/ND-CP, 2007). In this study, we chose three cases, provinces as “local governments”, because they have different capabilities, levels, and experiences with e-government initiatives. Table 2 provides in-depth information about the EA program. Following Stake (2005), the cases may “... be similar or dissimilar, redundancy and variety each important. They are chosen because it is believed that understanding them will lead to better understanding, perhaps better theorising, about a still larger collection of cases” (Stake, 2005: 446).

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of interviewees</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Province A</td>
<td>8</td>
<td>Top manager, CIO, Project manager, Enterprise architect, IT specialist, EA worker</td>
</tr>
<tr>
<td>Province B</td>
<td>6</td>
<td>CIO, Project manager, EA worker, IT specialist, EA worker</td>
</tr>
<tr>
<td>Province C</td>
<td>8</td>
<td>CIO, Project manager, Enterprise architect, IT specialist, Non-IT civil servant, EA worker</td>
</tr>
</tbody>
</table>

Table 2. Data about the three provinces from our cases.

In the first case, the province is an e-government leader in the country, ranked second out of 63 provinces. This province of about 7 million people has established EA programs with a loan from the World Bank (Nguyen, 2006; World Bank, 2005). However, in 2014, it became apparent that the results of these programs were somewhat limited because the objectives were not achieved within the allotted time (World Bank, 2014). The EA program held the primary objective of reforming administrative procedures and public services, reducing the number of information systems while improving interoperability within and between the organisations. The EA program affected four levels of state agencies: agencies, the departments, sub-departments, and local offices.

The second province (Case B) has had an average experience in e-government over the past five years. The province of 1.3 million inhabitants has deployed EA programs since 2010. Their main objectives included reducing the number of complex and incomprehensible public services, instead connecting them within the province and with others. This EA program affected three levels of state agencies.

The third province (Case C) involved about 2 million inhabitants and demonstrated much less experience with e-government. This EA program was established in 2012 with the main objective of reforming public services, connecting all of them, and increasing their interoperability. The EA program affected three levels of state agencies.
3.2 Research design, data collection, and data analysis

To investigate problems with institutionalisation in these three provinces, we used a qualitative research approach to gain in-depth understanding (Myers, 2009). We collected the data with face-to-face semi-structured interviews with people working directly in EA programs and conducted them until they stopped providing new insights (Tallon & Kraemer, 2007). At that point, the sample was found to be appropriate. We supplemented the interviews with documents, presentations, and newspaper clippings from all state agencies.

Altogether, 22 participants were interviewed, all of whom worked at various levels and positions in the EA programs of each province, including top management, chief information officers (CIO), project managers (PM), enterprise architects, IT specialists, EA workers, and non-IT civil servants. Each interview, conducted in Vietnamese, ranged from approximately 45 minutes to 60 minutes. They were tape-recorded and subsequently transcribed in their entirety.

We moved the transcripts into ATLAS.TI software for detailed analysis. Following DiMaggio’s and Powell’s (1983, 1991) approach, we also utilised neo-institutional theory and its organisational isomorphism component as a lens to code and understand the data. We began data analysis by extracting and coding all problems appropriately before categorisation. Initially, we started with sub-categories, such as “responsibility and credibility”. However, as we found and coded more problems, we were able to classify them into broader categories, such as the requirement specification phase or preparing for development phase. We also eliminated problems that did not result from problems in EA programs, such as issues related to other programs’ technical issues.

The data analysis was conducted on Vietnamese transcripts. We translated relevant selections into English for illustration. Table 3 shows examples of coding for the relevant rules, norms, and values.

<table>
<thead>
<tr>
<th>Quotation</th>
<th>Institutions</th>
<th>Phase</th>
<th>Example</th>
<th>Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>“They [top management] said that we must deploy the EA program for the agency. If we [agency] did not do it, we might lose financial support from the central government” (EA architect, Province B).</td>
<td>Rule on agency objectives and outcomes when deciding on initiatives for EA programs</td>
<td>Requirement specification</td>
<td>Province A had to choose EA because of political pressures, while Province B chose EA because they needed to speed up their business services for citizens and business communities.</td>
<td>Certain types of objectives exist when the agencies propose requirements.</td>
</tr>
<tr>
<td>“We chose an international consultant for planning EA because many agencies did it this way” (CIO, Province B).</td>
<td>Norms regarding which types of approaches are used</td>
<td>Preparing for the development</td>
<td>Outside resources are used for preparing the development EA (case B).</td>
<td>There are certain ways to choose preparing approaches like using outside resources or personnel.</td>
</tr>
<tr>
<td>“Some leaders are afraid that when EA is deployed, our roles and our gained benefits will be reduced. That is why, in some cases, we needed a year or longer to persuade the leader/staff to change their attitudes” (Enterprise architect, Province C).</td>
<td>Value for change behaviour</td>
<td>Implementation</td>
<td>Some leaders are not willing to change their status because of fear of losing their benefits or roles (case C).</td>
<td>Leaders are not willing to change their current status.</td>
</tr>
</tbody>
</table>

Table 3. Example coding in terms of rules, norms, and values on ATLAS.TI.
4. Findings

In the three provinces, we identified three groups of problems in EA programs: problems in the requirements specification phase, problems in the preparing for the development phase, which proceeds the actual development and implementation activities, and problems in the implementation phase.

4.1 Problems in the requirements specification phase

We located three major problems related to EA institutionalisation in the requirement specification phase: responsibility and credibility, objectives, and readiness and awareness.

4.1.1 Responsibility and credibility

One problem involves the responsibility of producing the required documents for EA programs. Unrealistic and unfeasible schedules and objectives became apparent in the latter phases when the responsibility for proposing requirements fell on the IT department or other agencies without appropriate credibility. In contrast, requirements tend to be more feasible and effective if the organisation has a team with members from different departments led by a top manager. Therefore, in order to improve EA programs and their efficiency, requirements should be proposed by top management or by agencies with strong credibility in terms of budget, business reform, and policies for supporting cooperation between the agencies. One CIO said,

“One of main problems in our organisation is the IT department. They are responsible for our EA requirements. Yet they focus too much on IT aspects, not paying attention to business aspects. This leads to unfeasibility in the next phase in issues such as relevance to cooperation among inter or intra-agencies, business services reform, and budget” (CIO, Province A).

4.1.2 Objectives

When the agencies carried out EA programs, they had trouble figuring out why the government had chosen EA (and not some other governance model) in the first place. Unclear objectives had an obvious negative impact on the requirements document. Some provinces chose EA because they had financial support from the central government or from the bank; EA was not their first choice for meeting their needs. In this sense, the sponsor influences the requirement documents. In the words of an EA architect,

“They [top management] said that we must deploy the EA program for the agency. If we [agency] did not do it, we might lose financial support from the central government. There are political issues in the requirement documentation” (EA architect, Province B).

4.1.3 Readiness and awareness

In our cases, top management perceived EA as being similar to a “city plan”, helping management minimise costs and save time. Management had no idea regarding human resources, infrastructures, and finance.

On the one hand, most civil servants in Vietnam have few IT skills and no knowledge of EA. In addition, they have no skills or abilities when it comes to finding successful EA cases elsewhere. To overcome these deficiencies, the agency uses consultants to create requirements documentation. They also send their staff to EA courses to learn EA fundamentals. However, there remains problems with dissimilar views, general EA awareness, and expected benefits, which makes it difficult for consultants and civil servants to reach agreement on even the simplest details. This situation causes severe delays and wasted time. In contrast, one agency used their IT employees in the requirements documentation. They were experienced in IT projects but not with EA. Then, the requirements focused too much on IT issues, and not on business services. A top manager articulated the following:

“When we propose EA requirements, we are strongly dependent on the consultants, who actually don’t have any understanding about our culture, environment, and business services. Nobody on our team has experiences with EA. All of us have IT backgrounds. We do not understand what EA is, whether it is a human resource, financial issue, and what the policies are and so on. We spend a lot of time discussing the topic. Yet it is difficult to reach an agreement. We are not ready when we should be ready” (Top manager, Province C).
On the other hand, it is difficult to collaborate with other agencies, as the leaders are usually not willing to take part in EA programs. They are afraid of losing the “lucrative benefits” associated with their position in the agency or society. Moreover, there is no law that enforces EA programs in the agencies. These issues lead to requirements usually being bound to single agencies, with minimum interventions from other agencies. Alternatively, they may focus solely on IT perspectives. One project manager had this to say:

“We do not have a law or a policy on EA programs, but it is just optional in a variety of approaches. We then have problems when working with other agencies. We then focus on IT perspectives rather than business perspectives” (PM, Province A).

The provinces seem to be jumping on the EA bandwagon: they choose EA because other provinces are adopting it. This finding parallels Swanson and Ramiller (2004) who asserted that the agencies choose innovations because others are doing it – but in a mindless way. One EA worker even stated,

“The person who does not understand EA at all proposed EA!” (EA worker, Province A).

### 4.1.4 Institutional lens in requirements documentation

As for the requirement specification phase, Table 4 presents the problems analysed and coded through the lens of institutional theory.

<table>
<thead>
<tr>
<th>Element of institutionalisation</th>
<th>Relevant institutions</th>
<th>Example</th>
<th>Regular behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule</td>
<td>The rules on agency objectives and outcomes when they decide EA programs initiatives</td>
<td>Province A chose EA because of political pressures, while Province B chose it because they needed to speed up their services for citizens and business communities. Responsibility for EA requirement documentation in Province A belongs to IT department.</td>
<td>Certain types of objectives exist when agencies propose requirements. In a province, A requirements are led by top management; in others, it is led by the IT department.</td>
</tr>
<tr>
<td></td>
<td>Local rules on agencies being responsible for the EA requirements documentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norm</td>
<td>Norms on how the provinces approach requirements documentation</td>
<td>Some use consultants to specify requirements; some use their IT department.</td>
<td>Certain approaches are used for the requirement specification phase in different provinces,</td>
</tr>
<tr>
<td>Value</td>
<td>Values on the awareness and attitudes of the role of EA, and the readiness of stakeholders</td>
<td>One province was deploying EA because the leader desired it, the other because of being knowledgeable. However, both lack EA skills for documenting requirements.</td>
<td>Initiating EA programs depends on a person’s personal values</td>
</tr>
</tbody>
</table>

*Table 4. Institutional values, norms, and rules in the requirement specification phase.*

### 4.2 Problems in the preparing for development phase

Two types of problems prevailed in the development phase: EA work, output, and stakeholders’ different views.

#### 4.2.1 EA work and output

One of the most difficult issues with the EA requirement document was its conflict with other plans and projects existing in different agencies. These conflicts made preparing for development activities extremely difficult. All provinces had problems when they tried to define EA program outputs in the preparing for the development phase. In particular, the main obstacles included gaining a shared understanding among stakeholders and other agencies, especially in terms of scope, scale, level of detail for EA products, and EA outputs. One province used EA for digitising some off-line public services to online services, but did not use EA for planning or for strategies because they had other methods for doing so. Another agency used EA as a strategy for technical interoperability, because their master plan program
conflicted with the strategy. They required thorough control of different factors as they expected troubles and inefficiencies in the implementation phase.

These problems reflect the literature in terms of the lack of a universal EA definition (Dang & Pekkola, 2015; Lemmetti & Pekkola, 2012). Also, there is no universal approach for applying EA in the public sector because some countries (e.g., the US) use EA for planning (Hjort-Madsen, 2007), some countries (e.g., Singapore) use EA for strategies (Saha, 2009), and others (e.g., Korea) use EA as a means to achieving interoperability, standardisation, and reuse within agencies’ boundaries (Lee et al., 2013). One EA architect stated the following:

“At that time, we did not have a clear definition, scope, scale, level of detail, method and output for an EA program. We did not focus appropriately on the cooperation between agencies in our EA plan” (EA architect, Province A).

Importantly, the agencies failed to identify assessment factors that required consideration. They often defined qualitative factors instead of quantitative ones, or factors that were too ambitious. In their requirements document, one agency stated that all public services would be online within 5 years (all 6000 services), and that all IT applications within the state agency projects would comply with EA principles. They all failed. Another agency focused on IT factors, such as hardware and upgrading the IT requirements. This focus led to inefficiencies in EA programs:

“Unfortunately, when we made the proposals in the preparing the development phase, we did not have criteria to assess whether the EA program was successful and its level of completeness. It was very difficult to invent and set quantitative factors, so we proposed qualitative factors. That’s why our EA program somehow failed in the end” (CIO, Province C).

4.2.2 Stakeholders’ different views

EA programs affect many agencies, each of which has its own businesses, services, and resources. This variability influences preparing for the development EA: The agencies are not able to plan well because they do not have the time, budget, or appropriate resources.

“Our 28 agencies and their 28 IT units do planning with unequal resources, different understanding about the benefits, and their own backgrounds. This makes it difficult to create plans because we have to constantly negotiate with the other agencies” (EA specialist, Province C).

The agencies also face difficulties in how to decide which approach, model, or method should be used for preparing for the development EA. In practice, no one found a suitable method:

“We are planning EA independently from other programs, because we learnt that from other agencies, and we chose an international consultant for planning EA because many agencies did it this way” (CIO, Province B).

4.2.3 Institutional lens in the preparing for the development phase

Table 5 illustrates the problems of this phase in light of institutional theory.

<table>
<thead>
<tr>
<th>Element of institutionalisation</th>
<th>Relevant institutions</th>
<th>Example</th>
<th>Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule</td>
<td>Rule on how inter- and intra-agencies cooperate</td>
<td>Province A chose to negotiate and focus on IT, while Province X, led by top management, was forced to cooperate with others.</td>
<td>Certain means for cooperation existed in some provinces, while they differed in others.</td>
</tr>
<tr>
<td>Norms</td>
<td>Norms on what types of approaches are used</td>
<td>One agency planned EA as being dependent on other programs, while another agency used EA as a supplement program for e-government initiatives.</td>
<td>There were certain reasons to choose the means for planning: planning EA independently from others, or planning EA as being dependent on other programs.</td>
</tr>
<tr>
<td>Value</td>
<td>Values for EA output</td>
<td>Province A took an IT perspective, while Province B focused on alignment between IT and business.</td>
<td>Some perceived EA as a planning approach, some as a strategy, and some as being an IT initiative.</td>
</tr>
</tbody>
</table>
Three. Consequently...

Table 5. Institutional values, norms, and rules in the preparing for the development phase.

4.3 Problems in the implementation phase
In this phase, we identified three types of problems: structure of government and services, benefits and roles, and user benefits and roles of agencies.

4.3.1 Structure of government and services
The interviews revealed that if there are no efficient tools and methods to control the quality of EA programs in the implementation phase, then the results will be very limited. Each agency usually followed their own approaches to implement EA, making it impossible for them to estimate the risks of their choices. For example, one agency chose the FEA framework because it is used in the USA, meaning it must be a good choice. Another agency chose TOGAF because they had ‘enough’ documentation about it. The third chose the Korean GEA-whole approach because it provided technically-focused means. In the words of an EA worker,

“We do not know clearly when we can begin the implementation, TOGAF seems to be too large and needs a business focus. However, in our province, this is impossible because we have a multi-level organisation and multi-owner business services, with different permissions and capabilities. If we had chosen the FEA approach instead, EA skills and capabilities in each sub-unit would be very low. They would be unable to implement EA. Then, we had to choose our own approach. We had no choice” (EA worker, Province B).

Also, because the central government’s guidance was unclear and overly general, misunderstandings of EA as a concept were evident. These misunderstandings affected EA planning and EA strategy. An IT specialist stated the following:

“Guidance from the central government is inappropriate in our agencies when it comes to practical issues (IT specialist, Province A).

4.3.2 Benefits and roles
Many agencies were involved in EA implementation. When they took part in EA programs, they needed to share information with other agencies, which proved very difficult. This challenge evidently impacted the gained and perceived EA benefits, reducing the role of EA in the organisations and reducing financial support for EA. Ultimately, this situation led to EA program failure in terms of schedules and finances. Management’s enthusiasm for EA programs seems to be critical.

“Some leaders are afraid that when EA is deployed, our roles and gained benefits will be reduced. That is why, in some cases, we needed a year or longer to persuade the leader/staff to change their attitudes”, (Enterprise architect, Province C).

Many agencies treated EA as an IT project with a focus on purchasing software and hardware. Because this interpretation is easier for successful EA programs, the managers did not emphasise the business perspective. Furthermore, the EA program lasted longer than a manager’s single term, putting EA activities at risk as the new manager may not care enough about it. In one province, the agency approved several EA sub-projects that did not belong to the EA programs team, which obviously delayed implementation.

“Our EA program is divided into several sub-projects. Some of them are not approved at all, or are approved later than as planned. In contrast, they [the managers] approved another project with the same objectives as it was seen as beneficial for themselves due to social relationships. This breaks down the whole unity of programs” (IT specialist, Province C).

4.3.3 User benefits and readiness of agencies
The provinces implemented EA in passive way because of pressures from politics or sponsors. However, it is important to note that most agencies were not ready to work on EA programs. Consequently, they acted differently in order to adapt to EA projects. For instance, the agencies did not choose inter- or intra-services, which were related to other agencies. They were afraid of increasing complexity when deploying EA. Instead, they chose services that would have impacts only within an organisation.
“Our agency chose services that affect only our own business when implementing EA; we did not choose services related to other agencies because it would increase risks” (IT specialist, Province B).

Moreover, even when they completed projects, the users, such as citizens, did not experience any personal benefits, which forced the agencies to spend time training and propagandising the job. These issues led to extra expenses in terms of time and money.

### 4.3.4 Institutional lens for the implementation phase

Table 6 illustrates the problems of the implementation phase through the lens of institutional theory.

<table>
<thead>
<tr>
<th>Element of institutionalisation</th>
<th>Relevant institutions</th>
<th>Example</th>
<th>Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule</td>
<td>Local rules on how EA projects are organised and approved</td>
<td>EA is implemented by the IT department and approved by the financial department in Province B.</td>
<td>In some provinces, EA sub-projects in the EA program need to be approved one by one by other departments. In other provinces, they were approved together.</td>
</tr>
<tr>
<td>Norm</td>
<td>Norms of work practice</td>
<td>Province A chose single services, while Province C focused more on inter-, intra-agencies services</td>
<td>A certain way to choose the focus, for instance, on hardware, or single services or inter-services.</td>
</tr>
<tr>
<td>Value</td>
<td>Value for change behaviour</td>
<td>Some managers were not willing to praise EA as they were afraid of losing their status, benefits, or roles. Understanding TOGAF framework or the agency’s own framework.</td>
<td>The managers are not willing to let go of their current status.</td>
</tr>
<tr>
<td></td>
<td>Values for understanding the EA approach</td>
<td></td>
<td>Provinces with secured funding preferred their own EA approach, while the others preferred traditional approaches like TOGAF or FEA.</td>
</tr>
</tbody>
</table>

**Table 6. Institutional values, norms, and rules in the implementation phase.**

### 5. Discussion

In this section, we will discuss the findings using the lens of institutional theory.

#### 5.1. Institutionalising at the requirement specification phase

EA programs were initiated by the law, or by political or other pressures. Institutions had to react to these pressures by proposing requirements.

The agencies saw EA as a promising solution to the apparent problems in their e-government initiatives. However, they did not pay much attention to identifying and understanding EA (Case C). Instead, when they were asked to utilise EA, they jumped on the bandwagon just because others were doing it (Case A). Then, they mindlessly proposed EA requirements and took risks in the subsequent phases. For their part, the agencies were influenced by the values of education institutions, norms of other agencies, and rules from their governments.

Governmental rules, along with their policies and regulations, had differing impacts on the requirements. First, powerful agencies, such as the financial department or agencies led by top managers, were more successful than the agencies with less power in terms of responsibility for EA programs. For example, agencies where EA programs were assigned to IT departments suffered from lack of credibility (Case A). Consequently, it is evident that the higher up the agencies responsible for EA programs are in the organisational pecking order, the more successful their EA programs will be (Cases B and C). This finding aligns with the USA Office of Management and Budget that is responsible for EA programs (Bellman & Rausch, 2004), and the National Committee on ITC application under the President of Korea (Lee & Kwon, 2013). Secondly, in terms of EA objectives, agencies focusing on concrete IT issues (Case C) may be more successful than agencies focusing on obscure business issues related to many agencies and business processes. The organisational policies in EA programs also have a positive effect on the EA
results, which is congruent with Lucke et al., (2010), who argued for the clarity of roles and responsibilities. Our research also aligns with Löhö’s and Legner’s (2014) statements regarding the importance of explicit goals for EA initiatives. However, neither study mentions when these roles, responsibilities, and goals should be set. In other words, they do not emphasise the phases of EA programs.

We used different approaches for documenting requirements in the various provinces. Norms, although organisation specific, are usually influenced by other institutions. This influence is emphasised in situations when the agencies adapt unclear concepts, such as EA. However, the absorption of other norms will not lead to similar results.

In this phase, values seem to be more important than norms and rules. Of particular importance are values related to managers’ awareness of the role of EA (Case C), and those related to the awareness of participants who participate in working on requirements (Case A). Government often intervenes to force participants to test and use new approaches and ways of working, especially in developing contexts (King et al., 1994). However, this kind of pressure does not occur in a top-down fashion (King et al., 1994). The situation is particularly challenging because the agencies have little knowledge about the benefits of IT applications and EA, there are frequent changes in government structures and governance, legal frameworks are unstable, and necessary resources are missing. Factors like legal frameworks and strong governance can be considered prerequisites for EA programs (Saha, 2008). However, they are more frequent in developed countries than in the developing world due to stable governance, sufficient resources, and high IT awareness.

5.2. Institutionalising at the preparing for the development phase

There are different kinds of collaborations within each EA program. Collaboration is influenced by the rules and policies of different agencies, provinces, and central governments. These policies affect preparing; for example, schedules can be extended for projects, or the appropriate scope can be limited just to IT instead of the whole agency (Case A). Although ignoring some of the EA program phases, previous literature also mentions these mechanisms (Kim & Everest, 1994; Weerakkody et al., 2007).

Norms also differ between EA programs: Some perceived preparing for EA development as being the planning of independent components, and not as the whole agency (Case C). This finding was stronger in agencies with top managers directing the EA programs. In contrast, sometimes EA was seen as a supplement to other programs. In both situations, preparing for the development was negatively influenced.

If the stakeholders have conflicting views, preparing for the development may be less successful because they cannot agree on EA outcomes as a concept and as an application (Case B). This finding parallels the literature, which states that EA can be understood as taxonomy (Peristeras & Tarabanis, 2000), methodology (Schöenher, 2009), or master plan (Boar, 2001). This variety in perceptions makes it difficult to control resources, align business with IT (Simon & Schmidt, 2015), increase public participation, and enhance connected government. This challenge is exposed in the form of administrative acts and orders, finance allocations, technical compliance guidelines, and project portfolios. Again, although previous studies acknowledge these issues, they are not explicitly connected with EA development phases (Löhö & Legner, 2014).

5.3. Institutionalising at the implementation phase

The rules on how to construct the organisational chart and EA teams strongly connect to the whole implementation process. For example, if top managers lead the EA programs, some issues seem easier to resolve, including interoperability (Case C). In contrast, if the programs are led by departments of relatively lesser importance, they seem to take risks in cooperating with other agencies (Case A). This kind of complex governance and organisational structure is a challenge from various viewpoints (Isomaki & Liimatainen, 2008; Janssen & Madsen, 2007). Our findings indicate that EA work should be planned in such a way that it takes existing organisational structures into consideration.

The agencies set normative pressures on each other. For example, some chose international firms for their EA implementation because other agencies were using them (Case A). The other’s behaviour was simply mimicked. Interestingly, pressures from citizens or businesses were less important, which can partly be explained by the fact that the decision-makers were not customer-oriented. This finding conflicts with Teo et al. (2003) who stated that normative pressures are usually customer-oriented.
Significant problems include lack of user benefits, lack of skills and readiness by the personnel and agencies, and insufficient resources in the agencies. Seeing agencies in different countries significantly impacted the choice of EA approach. Professional networks had a strong influence on the agencies. For example, some preferred TOGAF because they had become familiar with it through their networks. Also evident was a stubbornness and reluctance to change for the sake of the organisation while fearing the loss of personal benefits. Again, these findings confirm Kaisler et al. (2005) and Seppänen (2009) while focusing more on the implementation phase.

5.4 How institutionalisation changes over phases

Comparing the institutional elements between different phases provides another view. First, the rules are enforced by governments or organisations, which means they provide the fundamental base and ultimate motive for EA programs. Thus, they have to be considered very carefully. However, we identified two kinds of rules in the agencies: official rules and informal rules. The former refers to rules that are followed and lead to regulatory behaviour within the society. Different rules exist in different settings and can be steered toward a desired direction by educating people in EA programs. Informal rules, which are generally easier to resolve (Scott, 2005), can be replaced by rules from other settings. All cases implemented EA according to their own informal rules and policies, including rules for responsibilities for the EA program (e.g., the IT department in Case A), for objectives (e.g., Case A chose EA because of political pressure while Case B chose EA because of their need to speed up business services), for cooperation, and for project organisations. Ultimately, when the government (or agency) decides to implement EA programs, they need to consider the effects of local rules and practices. Official rules are simply insufficient for implementing EA.

Norms also are enforced by the peer group. They are usually unclearly expressed, and therefore more difficult to resolve than rules. In our cases, different approaches were used. For example, Case A used a consultant, and Case B used the IT department’s human resources.

Values are enforced by the person’s own volition. Problems in this arena are the most difficult to resolve because fixing such problems often necessitates willingness to change. In our case, this process took a long time. For instance, Case C required official policies and political pressure to change the leader’s attitude towards EA programs, and all cases organised courses and seminars for improving general awareness and understanding of EA.

Table 7 summarizes the rules, norms, and values in each EA program phase. In the requirement specification phase, provinces did not have formal rules for EA programs. Consequently, top managers and other stakeholders had to tailor other policies to the EA context in order to create legal and formalised rules for EA. This tailoring resulted in rules being considered less important. In contrast, the rules are very important in the implementation phase when the EA programs are divided into EA projects. Under the circumstances, legal rules on IT investments in the state agencies strongly influences EA work.

<table>
<thead>
<tr>
<th>Requirement specification</th>
<th>Preparing for the development</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rules</td>
<td>Rules on agency objectives and outcomes when they decide EA programs initiatives. Local rules on agencies being responsible for the EA requirements documentation</td>
<td>Rules on how inter- and intra-agencies cooperate</td>
</tr>
<tr>
<td>Norm</td>
<td>Norms on how the provinces approach requirements specification</td>
<td>Norms on what types of approaches are used</td>
</tr>
<tr>
<td>Values</td>
<td>Values on the awareness of the EA role and readiness of stakeholders</td>
<td>Values for EA output</td>
</tr>
</tbody>
</table>

Table 7. The rules, norms, and values of different phases.
The values trend opposes the rules trend. The top managers and EA team played very important roles in the requirement specification phase of EA programs. Their values affected the forthcoming phases and the entire EA program. In the developing world, with its uncertain legal frameworks and structures, EA teams needed to consider all perspectives with great flexibility in the early stages. Values in the implementation phase seem to be less important compared to the requirement specification phase, as the stakeholders have to follow organisational rules and norms.

Norms seem to be most important in the preparing for the development phase. There, the stakeholders are influenced by other organisations. Figure 1 shows the relative importance of norms, values, and rules in each phase. Values are dominant in the requirement specification phase, and norms and rules gain importance in the later phases. However, it is significant to recognise that in the preparing for the development phase, the relative importance of rules and values may differ between developing and developed countries. As Vietnam belongs to a group of countries with frequent changes in governmental structures, it faces an unstable legal framework and lacks necessary resources (UNPACS, 2014). This issue should be considered with caution, and more research on this area is definitely needed.

![Figure 1. Relative importance of norms, values, and rules in different phases.](image)

Different institutions affect groups and actors as well as their rules, norms, and values (Mahalingam & Levitt, 2007). For instance, in Case A, a set of (institutionalised) policies and approaches regularised the stakeholders’ behaviour in a certain way. They took it for granted despite its being an institutional pressure. However, Case B involved a different instance of the same institution. Consequently, as EA programs in various countries may have different institutions compared to Vietnam, their findings or relative importance may differ.

Our findings also show that if the agencies are in harmony with their institutional environment, the problems seem to be easier to solve, as in Case C. In Case A, the consultants did not follow the activities and procedures within the environment, making evident several problems. This finding parallels the literature (e.g., Singh et al., 1986). As organisations usually benefit from the procedures and policies of their environment, EA stakeholders also need to balance their rules, norms, and values between the old and new environment (Zucker, 1977). Here, Table 7 may provide some assistance in understanding this issue.

6. Conclusion

In this paper, we have studied how enterprise architecture has been institutionalised in the public sector in a developing country. Interview data from three provinces included different EA experiences, understandings, and backgrounds, thus providing us a new understanding of how the provinces and different agencies are implementing EA programs.

Institutional theory has been used as a lens for analysis. It equips us with an explanation of how rules, norms, and values influence EA programs in different implementation phases. In particular, it seems that the rules are important in the early phases of development, while norms and values become important in
the later phases. However, the rules and their interpretations significantly impact public sector EA programs throughout the phases.

This paper contributes to the field by providing an institutional theoretical perspective of EA programs and their implementation. This topic has been studied very little, yet the findings illustrate how the relative importance of institutionalisation elements vary over time. Third, although our challenges in EA programs parallel previous literature, the study can be seen as a replication study, and as a rare peek into the developing world and its EA endeavours. The paper contributes to practice by pointing out problems and their root causes so that the practitioners can design strategies to respond to each category of institutional problems.

The paper has its limitations. First, the case study is based on a single developing country. One could easily argue that its relevance is limited when it comes to the developed world. However, as our findings parallel the literature, we argue that there are no significant differences in implementing EA programs in the public sector; the location of implementation matters little. In particular, according to the UNPACS 2014 ranking, Vietnam shares similar factors in terms of incomes, limitations in ICT infrastructure, human capacity, low adult literacy rates, percentage of online services, and limitations of public resources with other “middle e-government development index” group countries, such as Thailand, India, and Indonesia. The results are thus transferrable to countries with similar conditions to Vietnam. Second, we studied three different provinces, their civil servants, and their perceptions; more research is needed in order to ascertain the nuances of the phenomena. Third, we focused on EA programs, which means the results are strictly bound within the complex phenomena. Again, we argue that EA institutionalisation resembles the institutionalisation of any socio-technical assemblage. In the future, we will be using the institutional lens with cross-nation analysis in order to understand cross-nation problems and to better generalise. We will also seek to consider all components of institutional theory.
References


