TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

Duong D. Dang

Enterprise Architecture in the Public Sector

Adoption and Institutionalization

Julkaisu 1544 • Publication 1544

Tampere 2018

Tampereen teknillinen yliopisto. Julkaisu 1544
Tampere University of Technology. Publication 1544

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Enterprise Architecture in the Public Sector

Adoption and Institutionalization

Thesis for the degree of Doctor of Science in Technology to be presented with due permission for public examination and criticism in Festia Building, Auditorium Pieni Sali 1, at Tampere University of Technology, on the 13th of June 2018, at 12 noon.

Tampereen teknillinen yliopisto - Tampere University of Technology
Tampere 2018

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ISBN 978-952-15-4133-9 (printed)
ISBN 978-952-15-4138-4 (PDF)
ISSN 1459-2045

Abstract

Today's organizations are utilizing technologies for building effectiveness management and services due to struggles with the various challenges of the information and communication technology age, such as integration, interoperability, agility, and change. Many view the enterprise architecture (EA) approach as a promising solution for coping with those challenges. Organizations also see the benefits of EA in dealing with other challenges, such as effective strategic planning, improved decision-making, and better business and information technology alignment. These benefits have led to an increased number of organizations adopting EA around the world, and some countries even have a law on EA, such as Finland and the US.

Despite those EA benefits, EA practices pose a wide range of problems, from social to business to technological. Moreover, organizations that adopt EA struggle with limited signs of success, extremely slow utilization, and ineffective institutionalization. Although there are various studies on the matter, they tend to focus their efforts on working with the framework and its related issues, such as EA's layers, methodologies, and tools. As a result, a comprehensive study about how EA gets adopted into organizations seems overlooked. The few exceptions, however, focus more on the outcomes rather than on insights into EA adoption, such as issues related to the root causes of problems, strategies for effective EA adoption, and the institutionalization process.

Examining those issues would strengthen the theoretical foundation of EA adoption. It also could help practitioners improve the effectiveness of their EA adoption, as EA itself offers no value if it is not used in practice. Therefore, this research focuses on understanding insights into how EA gets adopted into organizations with dual studies. First is a study on the root causes of the problems and strategies for the effective adoption of EA in organizations. Second is a study on institutionalization processes when organizations adopt EA.

The findings indicate several issues in EA adoption and institutionalization. First, there are several root causes from organizations, project teams, users, and EA itself. Second, there are various strategies and characteristics for effective adoption of EA practices. Third, different institutional pressures influence the institutionalization process in different phases. That process is influenced by differing institutional logic, and the perceptions and assumptions of senior managers about EA play important roles in EA adoption.

The dissertation contributes to the literature by explaining what happens when organizations adopt EA. That is, it helps understand the problems, the institutional pressures in

different phases of EA adoption, and the strategies for overcoming these challenges when organizations adopt EA. It also provides insights into the institutionalization process, when EA functionalities and features become the norms in practice. In addition, the research has implications for practice by providing several root causes of the problems and the different institutional features related to the stakeholders involved in the different phases of EA adoption. Furthermore, the study provides various legitimacy strategies that practitioners need to consider when they adopt EA. Even though there are similar strategies in organizations, they appear differently in practice. Finally, the study also identifies the importance of cognitive-cultural legitimacy for EA initiatives, meaning that EA practices depend on the stakeholders' backgrounds, cultures, and characteristics.

This dissertation is article-based and contains six peer-reviewed articles. The interpretive case study approach is used, and the empirical part of the study is based on four case studies at local government and ministerial levels within a country.

Keywords: enterprise architecture, enterprise architecture adoption, institutional theory, institutionalization, legitimacy strategy

For my late grandmother, Doai T. Luu

Acknowledgements

It has been my tremendous fortune to be taught and supervised by Prof. Samuli Pekkola, who, although extremely busy, was always available to me. I doubt any student ever received more support from their supervisor than I have experienced. I am grateful to you for always believing in me, pushing me to my limits, and guiding me as I work on making the dissertation the best it can be. I am sure that this will impact me throughout my career and my life.

I am honored to have Prof. Maung Sein at the University of Agder in the role of opponent in the process. I am thankful to the reviewers of the dissertation. In particular, I appreciate the very candid critical insights of Prof. Robert Davison at City University of Hong Kong and the constructive criticism of Prof. Jan Mendling at the Vienna University of Economics and Business regarding the manuscript.

I wish to thank to the funders and scholarships for supporting several research activities, including the Young Leaders Scholarship, the Finnish Funding Agency for Technology and Innovation, the Academy of Finland, and Tampere University of Technology. I am enormously grateful to Dr. Phuc T. Nguyen and the senior managers of the four cases for helping me throughout the data collection process. Also, I am grateful to the more than 34 informants who participated in the interviews, without whom I would not have a dissertation.

I appreciate the guidance of many lecturers from my time at Tampere University of Technology, particularly Prof. Janis L. Gogan at Bentley University, Prof. Shirley Gregor at the Australian National University, and Prof. Anol Bhattacherjee at the University of South Florida. I also would like to thank my mentors and peers from the ECIS 2017 Doctoral Consortium at Braga, Portugal.

I am also grateful to my colleagues at Tampere University of Technology, who always reminded me that there is a whole world outside. I especially thank Juha Lemmetti for the always enthusiastic willingness to help me when I needed it and for allowing me to experience the atmosphere of the ice hockey matches, as well as the beautiful and historic landscapes in Finland.

Last but not least, I would like to express my sincerest thanks to all of my family members and loved ones. It would take an additional volume in my dissertation to express how thankful I am for your love, support, and understanding. I am amazed and humbled by your presence in my life.

Duong D. Dang

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List of Abbreviations

EA	Enterprise Architecture
IS	Information System
ISD	Information System Development
EIS	Enterprise Information System
ERP	Enterprise Resource Planning
CIO	Chief Information Office
IT	Information Technology
ICT	Information and Communications Technology
ICT4D	Information and Communications Technologies for Development
ET	Empirical to Theory
SLR	Systematic Literature Review
EAM	Enterprise Architecture Management

List of Publications

I. **Article 1**. Dang, D. D., & Pekkola, S. (2017). Systematic Literature Review on Enterprise Architecture in the Public Sector. *Electronic Journal of e-Government*, 15(2).

II. **Article 2**. Dang, D. D., & Pekkola, S. (2017b). Problems of Enterprise Architecture Adoption in the Public Sector: Root Causes and Some Solutions. In L. Rusu & G. Viscusi (Eds.), *Information Technology Governance in Public Organizations. Integrated Series in Information Systems*, vol 38. Springer, Cham.

III. **Article 3**. Dang, D. D., & Pekkola, S. (2016). Institutionalising Enterprise Architecture in the Public Sector in Vietnam, *Proceedings of the 24th European Conference on Information Systems (ECIS)*. Research paper 139, Association for Information Systems (AIS).

IV. **Article 4**. Dang, D. D., & Pekkola, S. (*Submitted* to a leading IS Journal). Legitimacy Strategies in Enterprise Architecture Initiatives.

V. **Article 5**. Dang, D. D. (*2017*). Enterprise Architecture Institutionalization: A Tale of Two Cases, *Proceedings of the 25th European Conference on Information Systems (ECIS)*. Research paper 55, Association for Information Systems (AIS).

VI. **Article 6**. Dang, D. D., & Pekkola, S. (*2017*). Enterprise Architecture and Organizational Reform: A Debrief of the Project. *Proceedings of the 21st Pacific-Asia Conference on Information Systems (PACIS)*. Research paper 71, Association for Information Systems (AIS).

1 Introduction

Today's organizations are utilizing technologies for building effectiveness management and services due to struggles with the various challenges of the information and communication technology (ICT) age, such as high-demand customers, integration, interoperability, agility, and change (Banaeianjahromi & Smolander, 2016; Kim, Kwon, Kim, et al., 2006). Many view the enterprise architecture (EA) approach as a promising solution for coping with those challenges (Bradley, Pratt, Byrd, Outlay, & Wynn, 2012; Luftman & Ben-Zvi, 2011; Luftman, Zadeh, Derksen, et al., 2012).

Organizations also see the benefits of EA in dealing with other challenges, such as effective strategic planning, improving decision making, and better business and information technology (IT) alignment (Bradley et al., 2012; Gregor, Hart, & Martin, 2007; Ross, Weill, & Robertson, 2006; Simon, Fischbach, & Schoder, 2014; Torre & Zee, 2017). These benefits have led to an increased number of organizations adopting EA around the world (Liimatainen, Hoffmann, & Heikkilä, 2007; Luftman et al., 2012; Rai, Venkatesh, Lewisenkatesh, & Bala, 2010). Therefore, EA has gained attention and become a key information technology and management issue (Luftman & Ben-Zvi, 2011; Luftman et al., 2012).

Despite the EA benefits indicated in the literature, EA practices pose a wide range of problems, from social to business to technological (Dwivedi, Wastell, Laumer, et al., 2014; Kim & Everest, 1994; Lucke, Krell, & Lechner, 2010; Zink, 2009). Moreover, organizations that adopt EA struggle with limited signs of success (Hope, Chew, & Sharma, 2017; Rai et al., 2010), extremely slow utilization (Lemmetti & Pekkola, 2014), and ineffective adoption (Alwadain, Fielt, Korthaus, & Rosemann, 2015; Bloomberg, 2014; Bui, 2015). One of the reasons for these struggles is that when EA is adopted into organizations, it may introduce holistic changes in management ranging from business to technology (Ross & Quaadgras, 2012; Ross et al., 2006). Thus, it influences economics, environmental uncertainties, complexities, and even politics in the organizations. This affects

every stakeholder involved in EA endeavors in the organizations (Dietz, 2008; Hoogervorst, 2009).

EA adoption can be understood as how organizations actually use or adopt EA, or how EA works in organizations (Dang & Pekkola, 2017c). In addition, when EA is adopted into organizations, EA programs, schemes, or projects develop and operationalize EA features and functionalities to real-life practices. The process of bringing EA features and functionalities to real-life practices is called the EA adoption process. Although there are different terms and taxonomy for the EA adoption process (Armour & Kaisler, 2001; Armour, Kaisler, & Liu, 1999; Banaeianjahromi & Smolander, 2017; Seppänen, 2014), this research views this process as comprising three phases, including the initiation, development, and implementation phases. The research also considers the institutionalization process as "the process whereby social activity becomes institutionalized and eventually is more or less taken for granted" (Nielsen, Mathiassen, & Newell, 2014, p. 167). In other words, the institutionalization process in the context of EA adoption is the process by which EA becomes a practice in organizations (Iyamu, 2009; Weiss, Aier, & Winter, 2013).

Although there are various studies on EA adoption, they tend to focus their efforts on working with the framework and its related issues, such as EA layers, methodologies, and tools (Banaeianjahromi & Smolander, 2016; Kotusev, 2017; Simon, Fischbach, & Schoder, 2013). As a result, a comprehensive study about how EA is adopted into organizations seems overlooked. The few exceptions, however, focus more on the outcomes (e.g., problems, EA framework itself) rather than on the insights of EA adoption (Bloomberg, 2014; Seppänen, 2014), such as the root causes of problems, strategies for effective EA adoption, and the institutionalization process (e.g., its stages, factors influencing the process, and the impact on organizations when they adopt EA).

This can be explained by the fact that EA adoption is "knowledge intensive and, thus, more susceptible to knowledge barriers" (Bui, 2017, p. 6). Moreover, EA is about theoretical principles and abstract concepts, and it constitutes very few technical and material items. This leads to its adopters having to involve their own interpretations, which requires knowledge in many disciplines and time to accumulate the basic know-how for carrying out the adoption (Bui, 2017). Another reason is that the EA adoption process can unfold over years (Bui, 2017; Ross et al., 2006), which can obstruct the researchers involved.

Consequently, those challenges underscore the need to understand EA adoption in depth. This includes the root causes of the problems in EA adoption, strategies for the effective adoption of EA in organizations (e.g., how EA practices are legitimized, how to

handle problems, the characteristics of different phases), and the institutionalization process in EA adoption, that is, the factors that influence the EA adoption process (Seppänen, 2014), the stages of institutionalization (Chung, Song, Song, & Subramanian, 2009; Weiss et al., 2013), and how EA enables organizational changes or reforms (Hoogervorst, 2004; Huysmans & Verelst, 2013; Ross, 2009).

Understanding insights into these issues is important and necessary in EA adoption. First, several problems in EA adoption have been identified in recent studies. For example, insufficient resources (Hauder, Roth, Schulz, & Matthes, 2013; Isomäki & Liimatainen, 2008; Kaisler, Armour, & Valivullah, 2005; Seppanen, Heikkila, & Liimatainen, 2009), misconceptions about EA, wide ranges of scopes and frameworks, difficulties in standards and modeling (Bellman & Rausch, 2004; Lemmetti & Pekkola, 2012; Roth, Hauder, Farwick, Breu, & Matthes, 2013; Zink, 2009), lack of EA skills, commitment, and communication in EA teams (Bernard, 2012; Hjort-Madsen & Pries-Heje, 2009), and structures, culture, and politics in organizations (Armour & Kaisler, 2001; Sumner, 2000; Tarabanis, 2001). Although these problems are important, the answer to the remaining question about possible root causes of the problems in EA adoption is not clear.

Second, the importance of strategies in seeking support from stakeholders (e.g., commitments, acceptance, and use) for new information systems (IS) (e.g., practices, procedures, or project activities) has been recognized in the literature (Deephouse, Bundy, Tost, & Suchman, 2017; Flynn & Du, 2012; Suchman, 1995), and seeking stakeholders' support is one of the major challenges in achieving a successful IS adoption (Brown, Massey, Montoya-Weiss, & Burkman, 2002; Flynn & Du, 2012). This is because failing to gain their support could lead to project failure. Moreover, while seeking support is a challenge in situations where using or taking part in new information systems is mandated (Brown et al., 2002; Jasperson, Carte, Saunders, et al., 2002; Myers & Young, 1997), it is even more difficult when it is not mandated (Flynn & Du, 2012). For that reason, seeking support from the affected stakeholders in following the new practices, procedures, or project activities or to legitimate EA activities would improve the effectiveness of EA adoption, especially from those in individual, group, and organizational units (Weiss et al., 2013). This raises the questions of how to gain this support from stakeholders and which legitimacy strategies can be considered appropriate in EA adoption. Therefore, this research examines different strategies that would be useful for different stakeholders involved in or affected by the process of EA adoption in organizations.

Moreover, different phases of EA adoption have different project activities and stakeholders that bring EA features and functionalities into practice. The interactions between stakeholders, organizations, and project activities within certain environments, settings, cultures, and backgrounds may help to identify the characteristics of each phase in EA

adoption. In this dissertation, I use an institutional analysis lens to examine the critical issues associated with the situation.

Third, the institutionalization process helps in understanding the insights into the cultures, traditions, history, and the like in organizational environments (Eisenhardt, 1988; Zucker, 1977). However, there is a lack of research on the institutionalization of EA in organizations (Weiss et al., 2013). There are a few examples of research that does consider the institutionalization of EA include a study on problems of the institutionalization of EA, that is, organizational structure, economic investment, administrative process, organizational politics, technical capability, and the business's interest in and understanding of EA (Iyamu, 2009). Others studied the factors that influence the effectiveness of institutionalization, including social legitimacy, efficiency, organization grounding, trust, governance, goal alignment, and enforcement (Aier & Weiss, 2012a; Weiss et al., 2013). Similarly, certain institutional factors influence EA adoption, such as organizational structures (Hjort-Madsen & Pries-Heje, 2009; Janssen & Hjort-Madsen, 2007), government pressures, and political motives (Hjort-Madsen, 2006, 2007).

In addition, one of the main reasons that organizations decide to adopt EA is that they believe that EA can assist them in changing in a positive way (Banaeianjahromi & Smolander, 2017; Hjort-Madsen & Pries-Heje, 2009; Huysmans & Verelst, 2013; Syynimaa, 2015). For example, EA adoption could allow organizations to innovate and change (Armour & Kaisler, 2001; Banaeianjahromi & Smolander, 2017; Hjort-Madsen & Pries-Heje, 2009; Rouhani, Mahrin, Nikpay, & Rouhani, 2014; Valtonen, Korhonen, Rekonen, & Leppänen, 2010). In other words, changes may occur when EA is introduced to organizations. However, the relation between EA adoption and organizational changes is not clear (Rouhani et al., 2014; Seppänen, 2014).

In contrast, several studies focus on the contexts, outcomes at different levels, and different areas of changes in the IS field (Forman, King, & Lyytinen, 2014; Kuipers, Kickert, Tummers, et al., 2014; Orlikowski & Yates, 2006; Volkoff, Strong, & Elmes, 2007), for example, the impact of information systems on the changing nature of work (Aanestad, Jolliffe, Mukherjee, & Sahay, 2014; Leonardi, 2014), the relation between IS and innovation (Mani, Srikanth, & Bharadwaj, 2014), the drive of IS change in organizations (Nordheim & Päivärinta, 2006; Rukanova, Stijn, Henriksen, Baida, & Tan, 2009), and many others (Volkoff & Strong, 2013; Volkoff et al., 2007). Those studies focused on the motor of change (e.g., life cycle, teleology, dialectic, and evolution) (Van de Ven & Poole, 1995). In other words, they aimed at explaining the process of change in organizations.

This research seeks to understand the institutionalization process, including how stakeholders are involved in the EA adoption process, how each stage of the process occurs,

and how it impacts the organizations when they adopt EA. In other words, this study seeks to complement and extend the existing works by focusing on this relation and the process-oriented perspective to understand both business- and IT-centric EA adoption on the individual, project, and organizational levels. The institutional analysis is used, as it allows a close examination of the processes, behavior, and activities that may help to better understand the multi-layers, from the external (e.g., fields, sectors, and societies) to the internal levels (e.g., individuals, groups) of phenomena in certain environments and their management (Kuipers et al., 2014). It also helps to understand in depth the roles, activities, and behaviors of stakeholders involved in the process (Kuipers et al., 2014).

As seen from those studies, beyond the lack of research on those issues mentioned, it seems that prior research has hardly shed light on the generative process from the decision to adopt EA to its full institutionalization. The main questions that have been discussed, if answered, would be grounding theories on EA adoption and strengthening the theoretical foundation on EA adoption, as is addressed in the literature (Seppänen, 2014; Simon et al., 2013). It would be considered as a first step toward theorizing the EA adoption process in organizations. Moreover, it is noteworthy that EA itself offers no value if it is not used in practice (Foorthuis, Steenbergen, Brinkkemper, & Bruls, 2016; Wagter, Berg, Luijpers, & Steenbergen, 2005). Therefore, understanding EA in practice is also worth studying (Boh & Yellin, 2006; Foorthuis et al., 2016; Tamm, Seddon, Shanks, & Reynolds, 2011).

As a result, this research answers this need and studies EA adoption, including the root causes of the problems, the strategies for the effective adoption of EA, and the institutionalization process of EA. The goal of this thesis is to add to the existing literature by investigating EA adoption from a process-oriented perspective to understand what happens when EA is adopted into organizations. Therefore, the initial research question of the dissertation is:

How does enterprise architecture get adopted into organizations?

The starting point is to look at the stakeholders' activities and behaviors who take part directly or indirectly in the EA project activities throughout the process and analyze different factors, activities, and relations that emerge among different stakeholders and institutions.

Therefore, it is appropriate to use the institutional approach as a lens to study the issue, as this approach examines "the processes and mechanisms by which structures, sche-

mas, rules, and routines become established as authoritative guidelines for social behavior," (Scott, 2005, p. 408). Moreover, the institutional approach helps to gain significant insights into environments and organizational structures and activities (Teo, Wei, & Benbasat, 2003) and understand how different institutions influence each other, either within or across organizations (Orlikowski & Barley, 2001), when they adopt EA. Furthermore, this also offers a lens for analyzing individual levels within and between institutions (Friedland & Alford, 1991) and helps us to understand the social perspectives of stakeholders and, consequently, understand their actions (Cloutier & Langley, 2013).

In addition, an interpretive approach was chosen for this research (c.f., Walsham, 1995; Stake, 2005). This approach is suitable for this study because interpretive research helps to understand a phenomenon that cannot be studied outside of its context and where "the boundaries of the phenomenon are not clearly evident at the outset of the research" (Benbasat et al., 1987, p. 370). Moreover, the empirical part of this study is based on a multiple case study. Multiple cases may help to better investigate the phenomena, population, or general conditions of EA adoption. As Stake stated,

> Individual cases in the collection [of cases] may or may not be known in advance to manifest some common characteristic. They 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 theorizing, about a still larger collection of cases. Stake (2005, p. 446)

The dissertation is article-based and contains six peer-reviewed articles. The following section is chapter two, which presents the background and related research, including EA, EA adoption, institutional theory, and the relation between institutional theory and EA. Next, chapter three presents the research approach, aiming at showing the research questions, methods, and process. The research highlights section is presented in chapter four with a summary of the six peer-reviewed articles. Chapter five illustrates the discussions related to the findings and their relations to the research questions. Finally, chapter six presents the conclusion with a focus on implications, limitations, and future research.

2 Background and related research

2.1 Enterprise Architecture

2.1.1 Definitions and concepts

Enterprise architecture (EA) has been used in both the private and public sectors over the past three decades for various purposes (Bui, 2015; Gregor et al., 2007). Those range from business to technology in organizations (Bui, 2017; Winter, Buckl, Matthes, & Schweda, 2010). For example, it has been used in organizations as an approach for strategic management (Ross et al., 2006; Simon et al., 2014), decision making (Torre & Zee, 2017), IT–business alignment (Bradley et al., 2012; Gregor et al., 2007; Winter et al., 2010) and IT consolidation (Hjort-Madsen, 2007; Magoulas, Hadzic, Saarikko, & Pessi, 2012).

Therefore, it has several definitions, depending on views and purposes (Rahimi, Gøtze, & Møller, 2017). For example, in the US government's view, EA focuses more on strategic planning as "a strategic information asset base, which defines the mission; the information necessary to perform the mission, the technologies necessary to perform the mission, and the transitional processes for implementing new technologies in response to changing mission needs; and includes a baseline architecture, a target architecture, and a sequencing plan" (US OMB, 2012, p. 45), while in Tamm and colleagues' (2011) view, EA focuses more on business and IT system alignment, as "EA is the definition and representation of a high level view of an enterprise's business processes and IT systems, their interrelationships, and the extent to which these processes and systems are shared by different parts of the enterprise" (Tamm et al., 2011, p. 142).

For the purpose of this dissertation, in order to stay neutral, the dissertation uses a definition: *EA* is "a term that practitioners and researchers have applied to a range of technical and managerial 'best practices' to logically organize IT infrastructure and business process capabilities" (Bui, 2017, p. 124). In this definition, EA ranges from technical perspectives (e.g., setting IT standards, choosing applications, and defining software procedures) to managerial perspectives (e.g., aligning business and IT strategies, procurements, strategic planning). This definition views EA as a neutral and generic approach that constitutes organizing logic between business processes and IT infrastructure, strategic planning, and aligning business and IT systems (Bradley et al., 2012; Ross et al., 2006; Tamm et al., 2011).

Moreover, EA is adopted into organizations through EA programs, schemes, or projects that develop and operationalize EA features and functionalities into real-life practices. In particular, the organizations in this study adopted EA through EA projects. Therefore, in order to understand EA adoption, this dissertation seeks to understand EA project processes from the decision to adopt EA to its full institutionalization, as well as the stakeholders involved or influenced by this process. It is noteworthy that the literature also uses the term *enterprise architecture management (EAM)* to describe "the management activities conducted in an organization to install, maintain and purposefully develop an organization's EA" (Lange, Mendling, & Recker, 2015, p. 1). However, similar to the term *EA*, the meaning of *EAM* is ambiguous, and there is no common understanding in the literature (Rahimi et al., 2017). Another example indicates that *EAM* is "a management approach that helps organizations plan, develop, and control their enterprise architecture in a coordinated and purposeful manner by providing a holistic understanding of the EA … and ensuring that the organization adheres to EA principles" (Rahimi et al., 2017, p. 125). Therefore, as shown from the two examples of *EAM* definitions, the term *EA project* and its activities can be understood to be a part of *EAM*.

EA stakeholders are defined as persons producing, using, or facilitating EA artifacts (Niemi, 2007); therefore, they range from users to project members to managers (Boh & Yellin, 2006). EA artifacts can be understood as models, principles, strategies, enterprise architecture layers (e.g., business architecture, data architecture, and technology architecture), and many other things (Boh & Yellin, 2006; Lange, Mendling, & Recker, 2012; Winter & Fischer, 2006).

2.1.2 Enterprise architecture and information systems

Although there is no precise definition of EA's boundaries due to its conceptual character (Simon et al., 2013), it seems that EA discipline and IS discipline share various similarities. For example, the ideas and concepts of EA are based on the ideas and concepts developed in the IS discipline (Sowa & Zachman, 1992; Zachman, 1987). EA frameworks are also based on several concepts and ideas from IS discipline, such as systems and technology architecture modeling, portfolio analysis, and architecture evaluation (Bernard, 2012).

EA's scope can also be viewed as ranging from technology (Bernard, 2012; Burnes, 2004; Spewak & Hill, 1993) to business processes (Gregor et al., 2007; Ross et al., 2006). In that sense, it seems that the EA discipline has an extensive scope that covers many perspectives, such as processes, business, technology, and points of view (Bernard, 2012; Luftman et al., 2012). For example, IS could be viewed as a part of EA (Kasemsap, 2015), or EA could provide the context for IS, such as enterprise information

systems (EIS), and influence or prescribe EIS adoption (Lapalme, 2012; Lapalme, Gerber, Merwe et al., 2016).

However, EA can also be viewed as an IS practice, as its covers both business and technology perspectives (Luftman et al., 2012; Simon et al., 2013; Tamm et al., 2011). In fact, there are several discussions about the relations between EA and IS practices (Kotusev, 2017), for example, the relations between EA and business process management (BPM) (Dumas, Mendling, Rosa, & Reijers, 2013; Jensen, 2011; Rosing, Hove, Rao, & Preston, 2011), EA and cloud computing (Ebneter, Grivas, Kumar, & Wache, 2010; Farwick, Agreiter, Breu et al., 2010; Mahmood, 2011), EA and service, and IT infrastructure (Luftman et al., 2012; Randone, 2012; Vicente, Gama, & Silva, 2013).

For that reason, this study's view is that EA stands on the principles and concepts of the IS discipline. However, whether EA is embedded in IS discipline or EA is a discipline of its own, the findings of this dissertation will contribute to the EA as well as the IS disciplines.

2.2 Institutional theory

2.2.1 The concept of *institution* and institutional pressures

Different stakeholders will take part in and be affected by the project activities when EA is introduced into an organization. As a result, different relations, settings, environments, cultures, and routines will establish and help generate behaviors and activities among stakeholders and institutions during the process of adoption. Therefore, in order to fully understand EA adoption and its processes, the research needs to focus on stakeholders' behaviors and activities. One of the approaches that helps to understand those issues is the institutional approach. This is because institutional approach allows the examination of the "processes and mechanisms by which structures, schemas, rules, and routines become established as authoritative guidelines for social behavior" (Scott, 2005, p. 408). This approach also offers a lens for analyzing insights into environments and organizational structures and activities (Teo et al., 2003). It also allows an understanding how different institutions influence each other in organizations (Orlikowski & Barley, 2001), in different levels ranging from individual to societal (Friedland & Alford, 1991), and different social perspectives of stakeholders of their actions (Cloutier & Langley, 2013).

Institutional theory has been used by IS scholars to study several aspects in information systems, such as adoption, innovation, and development (Mignerat & Rivard, 2009). This

is because it helps us understand “how institutions influence the design, use, and consequences of technologies, either within or across organizations” (Orlikowski & Barley, 2001, p. 153) and provides “frameworks for judging which behavior, organizing, discursive, and interaction patterns are appropriate” (Nielsen et al., 2014, p. 167).

(New) institutional theory has started emerging since 1977 (Meyer & Rowan, 1977; Zucker, 1977). *Institution* refers to an established social order (Deephouse et al., 2017; Meyer & Rowan, 1977). It is defined as “a set of norms, rules, and values operating in a given environment that help generate a regularity of behavior among actors affected by that environment” (Mahalingam & Levitt, 2007, p. 523). Those rules, norms, and values drive social activities that actors (e.g., individuals, groups, fields, organizations, and societal) are involved in (Mahalingam & Levitt, 2007). Actors tend to adopt procedures and structures that are valued by them in order to secure the resources and achieve the legitimacy that are vital for them to survive (Ribeiro & Scapens, 2006; Scott, 2005). The search for legitimacy and resources leads to a diffusion of procedures and structures in similar settings, such as fields, societies, and environments (DiMaggio & Powell, 1983; Scott, 1995). The traffic rules introduced by governments that people drive on the right side in some countries but the left side in others are one example of this (Mahalingam & Levitt, 2007). This indicates that rules influence the regularity of behaviors among actors that are involved in certain environments. This also indicates that EA adoption would present certain types of behaviors under rules, norms, and values, which this dissertation used to analyze the data.

There are three main institutional pressures: rules or regulative pressure, norms or normative pressures, and values or cognitive-cultural pressures (DiMaggio & Powell, 1983; Mignerat & Rivard, 2009; Scott, 1995). Those pressures lead to organizational forms, procedures, and activities becoming more similar to others in similar settings (DiMaggio & Powell, 1983; Scott, 1995). In particular, rules, both in formal and informal forms, include policies and legal environments that explain how institutions constrain and regulate stakeholder activities and behaviors (Mignerat & Rivard, 2009), as in the case of local governments (e.g., provinces, autonomies, state agencies levels) ruled by central government (DiMaggio & Powell, 1983; Palthe, 2014). *Norms* refer to how an organization’s approach to professionalization—for example, educational background or mimetic behaviors—informs its members’ activities (DiMaggio & Powell, 1983). *Values* refers to the institutional culture (DiMaggio & Powell, 1983); organizations and groups tend to conform to pressures to achieve legitimacy and to secure resources that are important for their survival (Ribeiro & Scapens, 2006; Scott, 2005). As a result, this helps to explain why organizations appear isomorphic with other institutionalized organizations in their similar settings during the institutionalization process (DiMaggio & Powell, 1983).

Therefore, scholars have used the institutional approach to study how actors strategically respond to institutional pressures and processes (Oliver, 1991). In this sense, this research examines how different stakeholders, who are directly or indirectly involved in EA adoption processes, strategically respond to different pressures (rules, norms, and values) when organizations adopt EA.

2.2.2 Institutionalization

The IS literature that has used institutional theory as a lens for its studies can be classified in various streams (Nielsen et al., 2014): studies on how organizational decisions are affected by institutions when they adopt IS (e.g., Jepperson, 1991; Teo et al., 2003), institutionalization processes (e.g., Baptista, Newella, & Curriea, 2010; Lyytinen, Newman, & Al-Muharfi, 2009; Mignerat & Rivard, 2009), how institutions and IS interact (e.g., Cho & Mathiassen, 2007; Soh & Sia, 2004), and discourse in institutionalization processes (e.g., Kaganer, Pawlowski, & Wiley-Patton, 2010; Swanson & Ramiller, 1997).

Institutionalization refers to “the process whereby social activity becomes institutionalized and eventually is more or less taken for granted” (Nielsen et al., 2014, p. 167). The process of institutionalization can happen as “institutions emerge, diffuse, change, die, and are replaced by new institutions” (Haunschild & Chandler, 2008, p. 630). In other words, it is “organizational action” that “reflects a pattern of doing things that evolves over time and becomes legitimated within an organization and an environment” (Eisenhardt, 1988, p. 492). Therefore, institutionalization can be used to explain how the cultures, traditions, histories, and the like within organizational environments can influence how EA is adopted in certain ways (Eisenhardt, 1988; Zucker, 1977). Consequently, this dissertation uses this approach to understand the institutionalization processes of organizations adopting EA.

Moreover, the majority of IS literature focuses on the institutional effects, while few study the institutionalization process (Mignerat & Rivard, 2009), especially at the micro level (e.g., individuals, groups, departments, and the process) (Mignerat & Rivard, 2009; Weiss et al., 2013). In a similar vein, some studies focused on the institutionalization of organizations when they adopt EA (c.f., Iyamu, 2009, 2011; Aier & Weiss, 2012a, 2012b; Weiss et al., 2013). Those studies focused on barriers to institutionalization (Iyamu, 2009, 2011) or success factors in EA adoption (Aier & Weiss, 2012a, 2012b). Despite these studies’ efforts, the existing literature on EA adoption processes remains incomplete and fragmented. This study seeks to complement and extend the existing works.

It is noteworthy that the EA literature uses different terms to indicate similar concepts relating to the term *institutionalization*. For example, Iyamu (2009) used *institutionalization of enterprise architecture* to mean "the process where a practice is assimilated into the norm" (ibid., p. 221), while Weiss and colleagues (2013) used *institutionalization of enterprise architecture management* to mean "the process of establishing a practice as a norm thus giving it a 'rule like status in social thought and action'" (ibid., p. 2). Moreover, the literature also seems to use the terms *institutionalization* and *institutionalization process* interchangeably (c.f., Greenwood, Suddaby, & Hinings, 2002; Mignerat & Rivard, 2009; Tolbert & Zucker, 1996).

In addition, although there are many approaches for studying the institutionalization process, two approaches are dominant. Tolbert and Zucker's (1996) approach proposed three main stages of the process of institutionalization: pre-institutionalization (e.g., new approaches, procedures, or structures are introduced in response to organizational problems), semi-institutionalization (e.g., new structures are now legitimated and diffused), and full institutionalization (structures are now taken for granted over a lengthy period of time) (Tolbert & Zucker, 1996).

Similarly, Greenwood and colleagues (2002) introduced six stages of institutionalization. They include precipitating jolts (e.g., destabilizing established practices), deinstitutionalization (e.g., problems appear with the emergence of new players, ascendance of actors), pre-institutionalization (e.g., seeking viable solutions to deal with problems), theorization (e.g., bringing legitimacy to new structures), diffusion (e.g., successful theorization is followed by diffusion stage that new structures are more appropriate than existing practices), and full institutionalization (e.g., structures themselves become taken for granted as the natural and appropriate arrangement) (Greenwood et al., 2002).

Although the two approaches have different phases, the phases correspond to each other. For example, the semi-institutionalization phase in Tolbert and Zucker's (1996) approach corresponds to the theorization and diffusion phases of Greenwood and colleagues (Greenwood et al., 2002). The main difference between those approaches is that Tolbert and Zucker's model presents how new structures become institutionalized, while Greenwood and colleagues' model focuses on the deinstitutionalization of old structures.

Mignerat and Rivard (2009) suggested that the process of institutionalization in IS includes five phases, based on the work of Tolbert and Zucker (1996) and Greenwood and colleagues (2002): innovation, theorization, diffusion, full institutionalization, and deinstitutionalization. Specifically, *innovation* starts with the disruption of society, technology,

or policy; *theorization* means the activities for identifying problems, proposing appropriate solutions in response to those identified problems, and then bringing legitimacy to new structures; *diffusion* indicates that the new structures that have been legitimized are diffused. *Full institutionalization* is when structures are considered taken for granted and is the beginning of *deinstitutionalization* (Greenwood et al., 2002; Mignerat & Rivard, 2009; Tolbert & Zucker, 1996).

Furthermore, when EA is adopted into organizations, different stakeholders will be involved or affected directly or indirectly by the EA project activities. This leads to different responses and activities among different stakeholders and organizations. As a result, the outcomes of the project or process of institutionalization may be influenced by those activities. Therefore, this dissertation closely examines the activities within each phase to understand how the institutionalization process progresses when organizations adopt EA. The analysis focuses on individuals, groups, and department levels (Mignerat & Rivard, 2009; Weiss et al., 2013).

2.2.3 Institutional logic

Several IS scholars have used institutional theory to focus on the industry, sector, and field levels (e.g., macro level) of analysis, of which organizations are smallest level (Berente & Yoo, 2012; DiMaggio & Powell, 1983). This approach, however, may ignore the roles of individuals, groups, or units in organizations (e.g., micro level), which may help to understand deeper phenomena (Berente & Yoo, 2012; Qiu, Gopal, & Hann, 2017). Moreover, macro-level phenomena can find their roots in the activities and behaviors of individuals, groups, or units in organizations (Berente & Yoo, 2012). As a result, institutional logic supports a lens to analyze micro-level phenomena in organizations.

Institutional logic offers a lens for analyzing individual levels within and between institutions (Friedland & Alford, 1991) and can be understood as “a set of goals, values, and prescriptions associated with a specific institution” that “form a rationale, or institutional logic” (Berente & Yoo, 2012, p. 378). Further, institutional logic is “socially constructed, historical patterns of material practices, assumptions, values, beliefs and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality” (Thornton & Ocasio, 2008, p. 101).

Scholars have also used institutional logic to analyze the processes and behaviors of the everyday actions of the individuals and groups involved in the process (Berente & Yoo, 2012; Powell & Colyvas, 2008). Thus, it provides the link between individuals, groups and the world around them and the assumptions, values, beliefs, and rules that legitimize

and underlie their behaviors, which can explain their actions (Berente & Yoo, 2012; Cloutier & Langley, 2013).

There are four features of institutional logic: multilevel logic, institutional pluralism, embedded agency, and situationism (Qiu et al., 2017). Different levels have different logic, and they influence each other. For example, societal-level logic influences field-level logic or industry logic (Qiu et al., 2017; Thornton & Ocasio, 2008). *Institutional pluralism* refers to institutional logics that "are subject to multiple, often contradictory" (Berente & Yoo, 2012, p. 378). *Embedded agency* links individual behaviors to higher-level logics pluralism to understand how individuals respond to multiple logics and to understand the role of individuals (Berente & Yoo, 2012; Qiu et al., 2017; Volkoff et al., 2007). *Situationism* "helps explain when and which of the logics are likely to be triggered" (Qiu et al., 2017, p. 4).

Moreover, four key dimensions of institutional logic have been identified (Berente & Yoo, 2012). They are the *principles* that guide activities and embody the institution's goals and values, the *assumptions* that underlie these principles, the *identities* of individuals that are formed by institutional logics, and the *domains* in which the individuals practice (Berente & Yoo, 2012; Friedland & Alford, 1991; Jepperson, 1991; Thornton & Ocasio, 2008).

Therefore, this research uses institutional logic's features and its dimensions as lenses to study the behaviors of the stakeholders involved in EA adoption. For example, multiple logics, institutional pluralism, and embedded agency help to explain why different organizations get different results or follow different directions in terms of approaches for adopting EA though they have similar objectives at the beginning of the projects. Moreover, the dimensions of institutional logics help to explain the characteristics of different logics that emerge during the process of EA adoption in organizations.

2.2.4 Legitimacy and institutional theory

Although there are various definitions of *legitimacy*, the majority of the literature uses Suchman's definition for their studies (Deephouse et al., 2017; Flynn & Du, 2012): "Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs and definitions" (Suchman, 1995, p. 574). Sources of legitimacy can range from society as a whole to particular social systems within it and to individuals, investors, social movements, and other stakeholders (Deephouse, 1996; Deephouse et al., 2017; Tost, 2011). Legitimacy "influences how organizations behave and has been shown to

affect their performance and survival" (Deephouse et al., 2017, p. 2). Therefore, legitimacy is identified as one of the central concepts of organizational institutionalism (Deephouse et al., 2017; Deephouse & Suchman, 2008).

Organizations seek legitimacy for various reasons. For example, it can help improve the stability and comprehensibility of their activities since the stakeholders are most likely to support an organization's activities if they appear proper, desirable, or appropriate (Suchman, 1995). Legitimizing organizational activities and behaviors in order to secure their resources protects their interests that are essential for their survival (Deephouse & Suchman, 2008; Flynn & Du, 2012; Hsu, Lin, & Wang, 2015). Moreover, gaining legitimacy can help new organizations to become established (Aldrich & Fiol, 1994; Deephouse et al., 2017).

Gaining legitimacy in organizations is important and has been identified as a major challenge in IS (Brown et al., 2002; Flynn & Du, 2012). This is because when new functions, structures, or procedures are introduced, they initiate changes in an organization (Markus, 2004), which influences the stakeholders affected by these changes. However, the affected stakeholders have the power to refuse or resist the changes (Flynn & Du, 2012). As a result, new organizational functions, structures, or procedures need to gain legitimacy in order to be established (Chakravarthy & Gargiulo, 1998; Deephouse et al., 2017).

Scholars in the IS field focus on legitimacy studies on IS adoption with two dominant trends (Scheepers et al., 2006; Flynn & Du, 2012): user acceptance of technologies (e.g., Technology Acceptance Model, Unified Theory for the Acceptance and Use of Technology, and Task-Technology Fit) (c.f., Davis, 1989; Goodhue & Thompson, 1995; Venkatesh, Morris, Davis, & Davis, 2003) and user satisfaction (e.g., user participant behavior, the meanings of user behaviors and attitudes, and user resistance) (c.f., Bhattacherjee & Hikmet, 2007; Boudreau & Robey, 2005; Keable, Landry, & Banville, 1998).

Moreover, legitimacy has a major impact on gaining the acceptance, support, commitment, and use of stakeholders in information systems development (Flynn & Du, 2012) and the success of IS projects (Brown, 1995; Kohli & Kettinger, 2004). It is even more important to legitimate EA activities if the affected stakeholders' use of IS is optional (Brown et al., 2002; Zhang, Lee, Zhang, & Banerjee, 2002). In addition, there are two main actors involved in the legitimation process (Flynn & Hussain, 2004)—legitimacy providers (e.g., users) and legitimacy seekers (e.g., project managers)—and several legitimacy strategies that stakeholders have used during IS adoption (Du & Flynn, 2010; Flynn & Du, 2012; Flynn & Puarungroj, 2006). Those studies identified legitimacy strategies in IS adoption through the interactions between legitimacy providers and legitimacy

seekers in certain domains, sections, or whole project lifecycles, for example, how project team members gained approval from users during the process (Klein & Hirschheim, 1989; Salancik & Pfeffer, 1978) and what factors influenced those processes (Flynn & Du, 2012). Therefore, this research uses a similar approach and focuses more on individual activities to determine “which conditions bring which legitimation” (Suchman, 1995, p. 603) and understand how EA adoption activities can be legitimized when they are first introduced to an organization.

2.3 Enterprise architecture adoption

2.3.1 EA adoption and its problems

EA adoption can be understood as how organizations actually use or adopt EA or how EA works in organizations (Dang & Pekkola, 2017c). The public and private sectors adopt EA for several reasons, such as improving business and IT alignment, strategic planning, reducing complexities, and decision making (Bradley et al., 2012; Dang & Pekkola, 2017c; Gregor et al., 2007; Peristeras & Tarabanis, 2000; Ross & Beath, 2006). Hence, EA adoption aims at organizational changes for better outcomes. Moreover, there is no common agreement in terms of differences between EA adoption in the public and private sectors. For example, several scholars indicate that EA adoption is similar in the public and private sectors, as both conduct their businesses in similar processes (Gregor et al., 2007), or they share main drivers for why they adopt EA (e.g., changing business services, models) (Hjort-Madsen, 2007; Iyamu, 2011).

However, there are also several scholars who argue that EA adoption in the public and private sectors is different (Kaisler et al., 2005; Scholl, Kubicek, & Cimander, 2011). For instance, they are different in governance structures and contexts. They also may differ in initiating EA adoption, as evidenced in the role of politics in the public sector (Kaisler et al., 2005). They also may differ in competition and profit-orientation when organizations decide to adopt EA initiatives between the public sector and the private sector (Hjort-Madsen & Gøtze, 2004). The present research conducted data collection in the public sector. Therefore, the EA literature on the public sector and relevant fields is taken into consideration. However, the findings of this study reflect the existing body of knowledge on EA adoption in both the public and private sectors.

The literature on EA adoption mainly focuses on the problems and frameworks of EA and how EA is used (Dang & Pekkola, 2017c; Seppänen, 2014); few studies have focused on solving problems or insight into the process of adoption (e.g., its stages, factors

influencing the process, and the impact on organizations when they adopt EA) (Bloomberg, 2014; Seppänen, 2014). In particular, Seppänen (2014) did literature reviews on EA problems and concluded that there are few studies on EA adoption. He also identified seven problems in EA adoption, including competence, EA methods and tools, governance, managerial support, operational personnel involvement, organizational issues, resources, and strategy linkage.

Moreover, Syynimaa (2015) conducted a systematic literature review (SLR) on EA adoption. The findings indicated that of the 20 articles, 12 articles conducted research in the public sector, seven conducted research in the private sector, and one in the line of business. Among those articles, he identified 25 problems influencing EA adoption and classified them into three categories: organizational factors (e.g., communication, organizational culture, and conformance in change), EA-related factors (e.g., vague definition of EA and selection of the EA framework), and environmental factors (e.g., interoperability issues related to EA and initiator of the EA adoption).

In addition, Dang and Pekkola (2017c) did a systematic literature review of EA research in the public sector. They identified 19 articles (out of 71) studying EA adoption, the majority focusing on how organizations were using EA and its problems (13 articles), and the others focusing on interoperability and integration (two articles), EA maturity (two articles), EA modeling (one article), and the role of EA (one article). Their findings also showed that around 80% of the articles (56 out of 71) focused on the developed world, while approximately 20% (15 out of 71 articles) focused on developing countries.

As seen, these SLRs of studies on EA adoption indicate that the literature focuses on diagnosing problems. Therefore, the literature on EA adoption from the process-oriented perspective seems incomplete and fragmented. While it is important to identify problems, this dissertation seeks to go beyond the evident problems and study their root causes during the process of EA adoption.

2.3.2 EA adoption process

When EA is adopted into organizations, EA programs, schemes, or projects develop and operationalize EA features and functionalities to real-life practices. The process of bringing EA features and functionalities to real-life practices is called the EA adoption process. Moreover, there are different terms and taxonomy for the EA adoption process, both in the literature and in practice (Armour & Kaisler, 2001; Armour, Kaisler, & Liu, 1999; Banaeianjahromi & Smolander, 2017; Seppänen, 2014). For example, it could contain five phases (initiating the process, characterizing the baseline architecture, developing the target architecture, planning the architecture transition, and planning the architecture

implementation) (Armour & Kaisler, 2001; Armour et al., 1999), three phases (initiation, development, and institutionalization) (Seppänen, 2014), or three other phases (pre-development, development, and post-development) (Banaeianjahromi & Smolander, 2017). This research views this process as comprising three phases, including the initiation, development, and implementation phases. The research also considers the institutionalization process as "the process whereby social activity becomes institutionalized and eventually is more or less taken for granted" (Nielsen, Mathiassen, & Newell, 2014, p. 167). In other words, the institutionalization process in the context of EA adoption is the process by which EA becomes a practice in organizations (Iyamu, 2009; Weiss, Aier, & Winter, 2013).

The literature has included studies on the different phases, for example, development (Aier, 2014; Bruls, Steenbergen, Foorthuis, Bos, & Brinkkemper, 2010), implementation (Löhe & Legner, 2014), and post-implementation (Lange et al., 2015). In particular, Aier (2014) indicated that principle EA mechanisms (e.g., grounding, management, and guidance and their effects on EA consistency and utility) were moderated by organizational culture, while Bruls and colleagues (2010) focused on conceptual domain architectures for EA design. Moreover, Löhe and Legner (2014) developed a design theory for EA implementation, while Lange and colleagues (2015) focused on success factors in post-implementation. Despite these research efforts, comprehensive research on the process of establishing practices in EA adoption at the individual, project, and organizational levels remains incomplete and fragmented.

This dissertation seeks to complement and extend the existing literature and covers the process from initiation (e.g., starting a project) to the implementation phase (e.g., EA functionalities and features being in use in reality). It comprises three phases: initiation, development, and implementation.

2.3.3 EA adoption in the public sector in the developed world

Besides the EA adoption problems discussed in the previous section, one third of the articles (18 out of 56) focusing on the developed world discussed EA adoption and its relevant issues (Dang & Pekkola, 2017c). In particular, the majority of the studies focused on how EA has been used or its frameworks (e.g., conceptual, model, and architectural). For example, in the US public sector, there are three approaches for EA adoption, including the maturing, refreshing, and bundling approaches (c.f., Bui, 2015). In a similar vein, there are four types of EA design in the US, including technical EA design, technical-operational EA design, operational EA design, and strategic EA design (c.f., Bui, Markus, & Newell, 2015). This means that the uses of EA in the US public sector are various, from strategy planning to standards development to system integration. This

is similar to the usage of EA in other countries, such as Finland and Australia (c.f., Hiekkanen, 2013; Lynch, 2006).

Furthermore, the literature also discussed the misunderstanding of EA, as different stakeholders have different understandings of EA regarding EA proposals and EA itself, and so do the authorities. This may lead to inefficiency in EA adoption in state agencies (Penttinen & Isomäki, 2010; Lemmetti & Pekkola, 2014; Lemmetti & Pekkola, 2012). Regarding EA frameworks, several countries have national policies or frameworks. For instance, the US has the Federal Enterprise Architecture Framework (FEA). Similarly, the Finnish government has government EA, which is loosely based on TOGAF and the "EA Management Grid," while Denmark's government has published the Danish public sector EA framework, which guides state agencies in deploying EA, based on the FEA and TOGAF ADM (c.f., OMB, 2012; US CIO, 1999, 2013; OIO, 2017; Seppänen, 2014). Moreover, Finland and the US have laws on using EA in the public sector (c.f., Act on Information Management Governance in Public Administration, 2011 in Finland; the E-Government Act, 2002 in the US).

In addition, there are some discussions about local governments' adoptions of EA, for example, the importance of policies for effective EA adoption in local government in Greece and Italy (c.f. Anthopoulos, Gerogiannis, & Fitsilis, 2010; Carota, Corradini, & Re, 2010) and the immature EA framework in Sweden leading to the implementation of EA based on individuals' knowledge (c.f. Ask & Hedström, 2011). Further, the literature focused on more than two countries, including the comparison of EA adoption between Norway and the Netherlands, and the authors concluded that Norway developed Business Process Management at the national level, while the Netherlands' local governments composed and integrated the building blocks with implementation support from national level (Aagesen, van Veenstra, Janssen, & Krogstie, 2011). Other comparisons between Denmark and the Netherlands about government EA found that EA programs are significantly affected by actors, structures, and political vision (Janssen & Hjort-Madsen, 2007), while political barriers and the lack of top management support were major challenges for cross-nation interoperability collaborations in 13 EU nations (Gøtze, Christiansen, Mortensen, & Paszkowski, 2009).

In summary, literature indicated a wide range of issues in EA adoption in the public sector in the developed world. EA has been adopted for decades in developed countries; they usually have laws or national programs or frameworks that guide state agencies in adoption. Scholars have, therefore, discussed the real issues that state agencies have experienced, such as the factors that effect EA adoption or how EA has been used in agencies.

In other words, the literature has focused on post-implementation or problems of adoption. There is a lack of study focusing on the "black box," or the process-oriented perspective of organizations adopting EA. This research seeks to understand this issue.

2.3.4 EA adoption in the public sector in developing countries

There are a limited number of studies on EA adoption in the developing world (Dang & Pekkola, 2017c; Bakar, Selamat, & Kama, 2017; Zheng & Zheng, 2013). Among those few studies, the main focus is on conceptual frameworks, such as EA benchmarking models, frameworks for interoperability, and business models (c.f., Dang & Pekkola, 2017c; Zheng & Zheng, 2013; Suchaiya & Keretho, 2014). For example, architecture frameworks, methodologies, and advocates of EA dominate the Chinese literature on EA (Zheng & Zheng, 2013), and a study on EA adoption in the Bangladesh government focused on the basic concept of EA and predictions of the benefits of EA adoption (e.g., reducing the software development cost, improving ICT resources, and improving security) (Azad, Khan, & Alam, 2008).

In another study on the success factors of effective establishment and management of EA adoption based on secondary data in Syria and Egypt, the authors offered several success factors, including sufficient planning, localized framework, change culture, agile development, and evaluation (Mohamed, Galal-Edeen, & Has-san, 2013). Similarly, there were several influencing factors in EA adoption in the Namibian government, including process, communication, lack of awareness, roles and responsibilities, actors' relationships, policies, and people (Shaanika & Iyamu, 2015).

Moreover, studies in the context of the Malaysian public sector focused on readiness in EA adoption and assessing the capability criteria that new EA adoption should consider. The readiness factors included enterprise environment, process, people, and technology (Hussein, Mahrin, & Maarop, 2017), and the capability criteria included internal process, cost, technology, talent management, learning and growth, and authority support (Bakar, Selamat, & Kama, 2017). Furthermore, the importance of policy in effective healthcare information management based on new data-driven EA approaches has been noted in the healthcare sector in Tamil Nadu state, India (Kaushik & Raman, 2014).

As seen, there are not many studies on EA in the context of the developing world. Some examples focused on the frameworks (e.g., conceptual, model, and architectural) or problems, and some were exploratory, based on secondary data. There is very little research on adoption in real projects in order to understand the phenomenon in-depth when organizations adopt EA.

2.3.5 EA adoption in the developed and developing worlds

There are several factors impacting the differences between developing and developed countries. For example, there are differences in economies and incomes (Bell & Pavitt, 1993), technological infrastructures, practices, and usage of ICT (Chen, Chen, Huang, & Ching, 2006), and resources (UNCTAD, 2017). These factors result in differences in the adoption of IS, such as a high rate of IT projects failing to achieve objectives or the "solutions" brought from the developed world not fitting with local sociocultural contexts in the developing countries (Avgerou & Walsham, 2017; Dada, 2006).

Although there are several characteristics shared by studies on EA adoption in both developing and developed countries, such as the majority focusing on frameworks (e.g., conceptual, model, and architectural) and challenges or problems, there is one important difference. While EA has been adopted in the developed world for decades, developing countries have just started their EA programs (Bakar, Selamat, & Kama, 2017; Bui, 2017; Lapalme, Gerber, Merwe et al., 2016). Therefore, EA studies done in the developed world were able to actually examine how EA was adopted or has affected organizations, while scholars in the developing world focused more on concepts or frameworks or predicting phenomena, as not many EA programs or projects have been implemented in organizations.

2.3.6 EA adoption in Vietnam

In order to understand EA adoption in Vietnam, the author conducted a literature review of both the EA and IS fields, focusing only on the Vietnamese context (English databases: AISLib, IS basket of eight senior journals, Web of Science, Google Scholar, e-Gov Reference Library, the Electronic Journal of Information Systems in Developing Countries, Asia Pacific Journal of Information Systems, and Australasian Journal of Information Systems; Vietnamese databases: National Library of Vietnam, Social Science Library, and Google Scholar). Not surprisingly, it seems that there is very little peer-reviewed scientific literature in either the English or Vietnamese languages. This finding confirms that there are not many scientific publications on social science study in the context of Vietnam (c.f., Manh, 2015; Ho et al., 2017; Ngoc, 2017).

There were only two articles on EA in the Vietnamese context, and they focused on exploratory frameworks or modeling (Nguyễn, 2010; Nguyễn & Lê, 2015). In addition, there were about 26 articles on IS study in the Vietnamese context, which covered a wide range of fields in both the private and public sectors, such as outsourcing, knowledge management, ERP, healthcare, and e-government (Nguyen & Braa, 2016;

Huang et al., 2016; Obi & Nguyen, 2010; Shepherdson, Tan, & Nam, 2009; Tsai, Purbokusumo, Cheng, & Tuan, 2009; Gallaugher & Stoller, 2004).

For the purpose of this research and given the nature of the cases chosen for this study, this section discusses the characteristics of adoption or implementation of IS in organizations in Vietnam (e.g., projects, programs, strategies, and plans). Therefore, this section does not discuss the issues related to users' behaviors or topics not relevant to this research, for example, Facebook's users' behaviors (c.f. Pham, Pittayachawan, & Nkhoma, 2015), customers' choices in banking (c.f., Lin & Nguyen, 2011; Pham & Doan, 2014), and offshore outsourcing (c.f., Gallaugher & Stoller, 2004; Nguyen, Umemoto, & Dam, 2014).

First, there are several studies that focused on problems in IS adoption in e-government. For example, the main challenges for the implementation of the IT master plan (e.g., IT-2000 Program) in Vietnam included skilled professionals, IT infrastructure, socio-economic environment for IT development, and private sector participants in IT development (Phan & Nguyen, 1995). Moreover, the reasons behind the national-level IT project's failure were the wide scope of the project, the complexity of public administrative procedures, and a lack of human resource and ICT training for users (Obi & Nguyen, 2010). Similarly, one of the challenges for effective online services in the public sector in Vietnam was users' skills, including Internet or IT literacy (Nguyen & Schauder, 2007).

Second, several studies focused on the effective adoption of IS. For example, establishing training programs (e.g., management training, technical training, trainer training programs) and data communication networks may help overcome challenges in implementing the master plan in IT programs (Phan & Nguyen, 1995). Moreover, the first steps for improving the healthcare communications network in Vietnam are training and investment in hardware at all healthcare levels (Tran, Seldon, Chu, & Nguyen, 2006).

Finally, when it comes to adoption processes, a previous study in the Vietnamese context showed that the government had influence in the initial decision for adoption of e-procurement in construction enterprises, while its role was less important in decisions on the institutionalization of e-procurement (Huang, Tran, Nguyen, & Nazir, 2016).

In summary, although studies on EA in the Vietnamese context are very rare, there are some studies in the IS field. The majority of the studies focused on general issues or adoption problems, including lack of human resources, ICT training, complexity of public administrative procedures, and the project's scope being too large. The strategies for improving adoption included training and buying facilities. The government has influence on initiative adoption processes in e-procurement in construction businesses. However,

it is evident that research on adoption processes remains incomplete and fragmented. As a result, this study seeks to extend and complement the existing literature by focusing on the adoption process in depth, including strategies for effective EA adoption and the institutionalization processes organizations use when they adopt EA.

2.4 Enterprise architecture and institutional theory

Researchers of EA have used institutional theory to examine various issues from macro to micro levels of analysis. The studies include those of Hjort-Madsen and his colleagues, which focused on EA adoption in state agencies across Europe (e.g., Denmark and the Netherlands) and in the US by using a qualitative case study interpretive approach. They concluded that EA adoption in state agencies is strongly influenced by institutions and the environmental surroundings, such as ministries, political vision, and policies (Hjort-Madsen, 2006, 2007; Hjort-Madsen & Gøtze, 2004).

In particular, government pressures drive organizations to adopt EA for consolidation and preservation (Hjort-Madsen, 2006), and there are three types of EA adopter, which include accepters (e.g., they adopt EA to get funding for their IT-projects), improvers (e.g., they adopt EA because EA is a good tool, and they see its benefits and that EA is a new way of planning IT-investments), and transformers (e.g., they adopt EA because EA is the perfect tool for changing the way government works) (Hjort-Madsen, 2007). Moreover, EA frameworks could be influenced by institutional pressures through legitimacy and history (Magnusson & Nilsson, 2006). Furthermore, EA adoption is affected by structures and political visions. State agencies often spontaneously enact, resist, and reject the adoption of EA (Janssen & Hjort-Madsen, 2007). Along this line, the institutional forces at the macro level and their macro environments influence organizational changes that drive EA adoption, rather than the organizations themselves (Hjort-Madsen & Pries-Heje, 2009).

Regarding these issues, some studies focused on the institutionalization of organizations when they adopt EA. Iyamu (2009) studied the factors influencing the institutionalization of EA in an organization and identified several barriers to institutionalization, such as organizational structure, administrative process, organizational politics, and technical capability. Those barriers influence four elements when an organization adopts EA, that is, adaptiveness, innovation, uniformity, and alignment. Moreover, Iyamu (2011) stated that the design and development of EA has proven to be easier than its institutionalization. In addition, Aier and Weiss (2012a, 2012b) analyzed institutional factors in intra-organizational contexts when organizations adopt EA. The authors used a typology of strategy

that was developed by Oliver (1991) and concluded that legitimacy is one of the vital factors for successful enterprise transformation. The authors also proposed several factors that adopters should consider when building effective enterprise transformation approaches in organizations (e.g., cause, constituents, content, control, and context). Similarly, Weiss and colleagues (2013) identified factors influencing the institutionalization process: social legitimacy, efficiency, organization grounding, trust, governance, goal alignment, and enforcement.

As seen from those studies, many issues have been identified when organizations adopt EA (Aier & Weiss, 2012a, 2012b; Weiss et al., 2013). Although some of those studies indicated the importance of legitimacy strategies (c.f. Aier & Weiss, 2012a, 2012b), they did not state particular insights into legitimacy strategies for the effective adoption of EA, such as which legitimacy strategies could be used to convince users to participate or the characteristics of legitimacy strategies in EA initiatives. The answers could be beneficial for practitioners, as practitioners should consider the results of those studies for gaining support from the crucial stakeholders, which is important for successful projects in the fields (Flynn & Du, 2012; Harmon, Green, & Goodnight, 2015; Zimmerman & Zeitz, 2002). On the other hand, the answers also could benefit literature as it helps understanding in-depth legitimacy strategies in EA adoption context. It thus provide empirical research in order to complement and enhance the existing body of knowledge on IS legitimacy (Du, 2011). Moreover, scholars also do not yet consider in comprehensive view in both macro and micro views of different stakeholders on EA adoption. Therefore, the dissertation focuses on those range of analysis because each stakeholder exhibits distinct behaviors, activities, and logics, they will respond differently to a given problem.

3 Research approach

3.1 Research aims and developing the research questions

This research aims at explaining what happens when EA is adopted into organizations. Therefore, the main research question is formed: How does enterprise architecture get adopted into organizations?

EA adoption, as discussed in the previous section, struggles with practices that show limited signs of success (Hope et al., 2017; Rai et al., 2010). In addition, the literature is limited on EA adoption, with a few exceptions that focus on problems, frameworks, and how EA is being used (Dang & Pekkola, 2017c; Seppänen, 2014). While it is important to diagnose problems, this dissertation goes beyond those issues and focuses on the prior conditions cause the main problems (e.g., the root causes of the problems) when organizations adopt EA. This is because understanding the root causes of problems may help organizations to prevent the problems for emerging in the first place in EA adoption. Thus, it may help to improve EA adoption success. Therefore, the following research sub-question is formulated:

- RQ1. What prior conditions cause the main problems in EA adoption?

Moreover, one of the key challenges for a successful IS project is seeking the support of the stakeholders involved in or affected by the project (Brown, 1995; Flynn & Du, 2012; Kohli & Kettinger, 2004). Seeking support is still a challenge in situations where using or taking part in the project is mandated (Jasperson et al., 2002; Myers & Young, 1997). In other words, failing to gain the support, commitment, and use of the stakeholders for the project activities could lead to project failure. This situation is similar to when EA is first introduced into an organization; it may trigger changes in organizational structures, procedures, and operations (Jahani, Javadein, & Jafari, 2010; Rouhani et al., 2014). Those changes influence the stakeholders' benefits and behaviors, and they tend to be uncomfortable or resist the change (Flynn & Du, 2012; Suchman, 1995). As a result, understanding the strategies for overcoming the issues related to seeking the support of the stakeholders may help to improve the effectiveness of EA adoption in organizations. However, the research on this matter seems scant and incomplete in the EA field (Weiss et al., 2013).

Furthermore, certain perspectives related to the strategies for EA adoption have not been given attention in the literature. For example, it is unclear which approaches are appropriate to handle the root causes of problems that organization face in EA adoption, or which characteristics of stakeholders appear in the different phases of EA adoption, such as imitation, development, and implementation (Löhe & Legner, 2014; Lange et al., 2015; Seppänen, 2014; Banaeianjahromi & Smolander, 2016; Syynimaa, 2015). Studying these issues would generate insights into EA adoption, thus improving EA adoption in practice.

Consequently, this underlines the need to examine the strategy-related issues in order to understand the more comprehensive picture of EA adoption. Therefore, the following research sub-question is posed:

- RQ2. What strategies are in use for the effective adoption of EA in organizations?

In particular, the dissertation focuses on the legitimacy strategies used when EA is first introduced to an organization. The analysis includes different stakeholders who are directly or indirectly involved in or affected by the EA adoption processes, including management groups (e.g., senior managers, CIOs), project teams (e.g., PM, enterprise architects), and users. By doing so, it helps us understand the role of individuals in organizations and society (Berente & Yoo, 2012; Volkoff et al., 2007), which is important in EA adoption (Weiss et al., 2013). In this view, individuals, agencies, and groups within the organization form the internal actors, while society and central government are external. Both are equally important in shaping stakeholders' activities and behaviors, leading to different responses to issues arising in EA adoption. Furthermore, different strategies for responding to different institutional pressures related to rules, norms, and values are considered to fully understand the phenomena in different phases of the EA adoption process.

Answering the first two research sub-questions helps us understand the root causes of the problems in EA adoption and the approaches for handling the challenges related to them. Moreover, it provides understanding on how different institutional pressures emerge in different phases of the EA adoption process. This also helps us understand the legitimacy strategies and their characteristics that organizations should consider when they seek commitment and support from stakeholders in EA initiatives. As a result, it enables organizations to speed up EA adoption, which is often time consuming and costly (Bui, 2017; Ross et al., 2006).

However, there are important issues that have not yet been covered in the first two research sub-questions. In particular, the institutionalization processes of organizations

adopting EA are not clear (Iyamu, 2009, 2011; Weiss et al., 2013). For example, what factors influence the institutionalization process in EA adoption, how does EA adoption affect the organizations, and how do organizations start to change during the EA project? Examining those issues would provide an extensive understanding of the EA adoption process in organizations, as it would give insight into the process of EA functionalities and features becoming practiced as norms or being taken for granted in organizations. Hence, an additional research sub-question is needed:

- RQ3. How does the institutionalization process occur when organizations adopt EA?

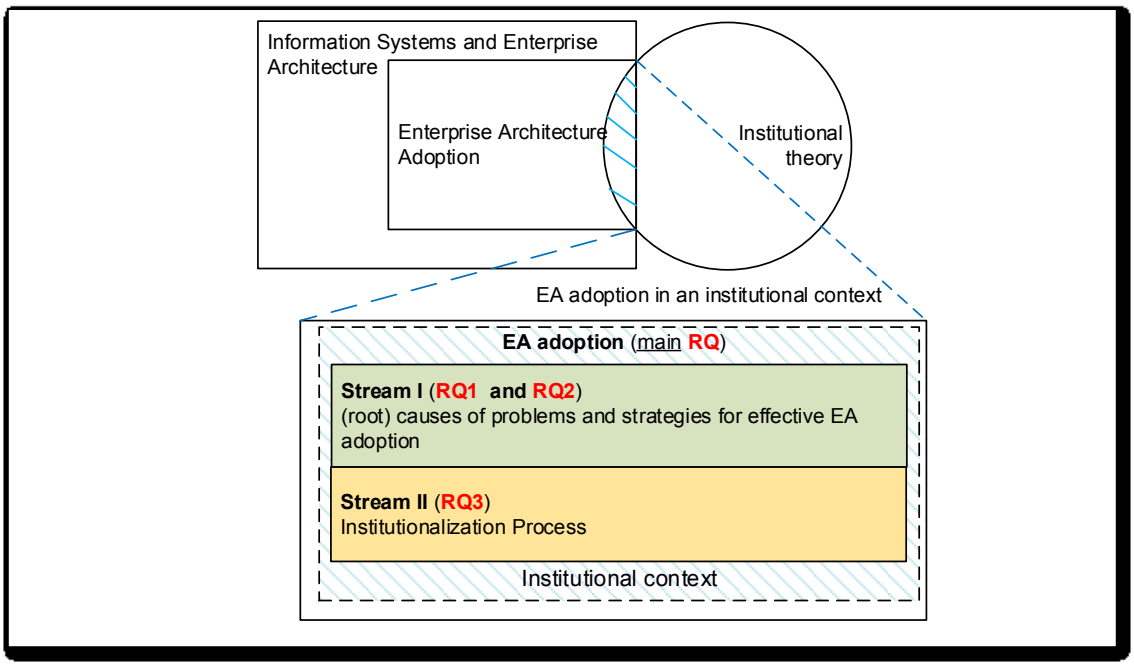

FIGURE 1 Diagrammatic representation of the research

In sum, this research involves in two streams (Figure 1): (1) a study on the root causes of the problems and strategies for effective EA adoption and (2) a study on the institutionalization process. The first two sub-research questions correspond to the first stream, and the third sub-research question corresponds to the second stream. Together, they help us understand what happens when EA is adopted into organizations.

3.2 Research Methods

The research approach and methods were chosen based on several factors, such as the research objective and the nature of EA discipline. First, the main research objective is understanding in-depth the complex phenomena of EA adoption, rather than building a new theory in this area. In particular, the research attempts to understand the EA adoption phenomena (e.g., problems, strategies, and institutionalization processes) in certain contexts of the study. Second, EA is considered an immature discipline, and it lacks well-established theories (Bui, 2017; Saint-Louis & Lapalme, 2016; Lapalme et al., 2016). As a result, it is appropriate to choose an interpretive research approach (c.f., Walsham, 1995). The research draws from well-established disciplines, including information systems and organizational management.

The research started by conducting a systematic literature review. This helped gain an overall understanding of the topic and a grounding theoretical foundation for the research (Webster & Watson, 2002; Walsham, 1995). This step resulted in adopting the institutional theory from organizational management discipline along with EA adoption as prior theoretical foundations for the study. The theories were used only very loosely for initial guidance in shaping the data collection and analysis. Thus, data collection was not affected by the initial chosen theory (c.f., Walsham, 1995). This step also helped to reflect the study's findings from the empirical data analysis to the previous literature for validation, thus providing an understanding of the phenomena of the research (Eisenhardt, 1989; Miles & Huberman, 1994).

The empirical part of this study was based on a multiple case study. A multiple interpretive case study was conducted to understand EA adoption in organizations (Stake, 2010; Walsham, 1995, 2006, 2009). A case study can provide an in-depth understanding of a phenomenon in its natural setting (Benbasat, Goldstein, & Mead, 1987). It is also suitable for the study of a phenomenon that cannot be studied outside its context and where "the boundaries of the phenomenon are not clearly evident at the outset of the research" (Benbasat et al., 1987, p. 370).

Moreover, the case study approach was chosen because it helps us "understand how members of a social group, through their participation in social processes, enact their particular realities and endow them with meaning, and to show how these meanings, beliefs and intentions of the members help to constitute their social action" (Orlikowski & Baroudi, 1991, p. 14). When EA is adopted into organizations, there are stakeholders involved in the process of the adoption, such as senior managers, project members, and users. The interaction among the stakeholders will help us understand the phenomenon

of EA adoption over time, as it aims to "… understand the intersubjective meanings embedded in social life ... [and] to explain why people act the way they do" (Gibbons, 1987, p. 3; cited Orlikowski & Baroudi, 1991, p. 14). Therefore, the case study method is appropriate as an approach for the study.

Furthermore, multiple cases were chosen because the findings from individual cases can be compared to others (Myers, 2009; Stake, 2010); in particular, 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 theorizing, about a still larger collection of cases" (Stake, 2005, p. 446). Besides, this study chooses four Cases because several reasons. First, they had just adopted their EA projects, so they had appropriate data available. Second, the procedures in adoptions was different as Case A and B used both international and local procedures and policies, while Case C and Case D used local procedures and policies. Third, the authorities in the cases granted permission to the researcher to collect the secondary data and select and interview informants involved in the EA projects. Finally, the cases were suitable for the research's objectives.

Figure 2 illustrates the research design of the dissertation. The two theoretical foundations of the study are enterprise architecture and institutional theory. The research approach section presented how I conducted the research, including the cases, methods, empirical data collection, data analysis, and validity techniques. The following section shows the publications of the thesis and the findings of the six peer-reviewed articles (mainly published in information systems outlets) the dissertation is based on. The final section of the dissertation illustrates the contributions of the research to practice and to the existing body of knowledge that focuses on the theory grounding of the research, that is, enterprise architecture and institutional theory. This section also presents the limitations of the study and suggestions for future research.

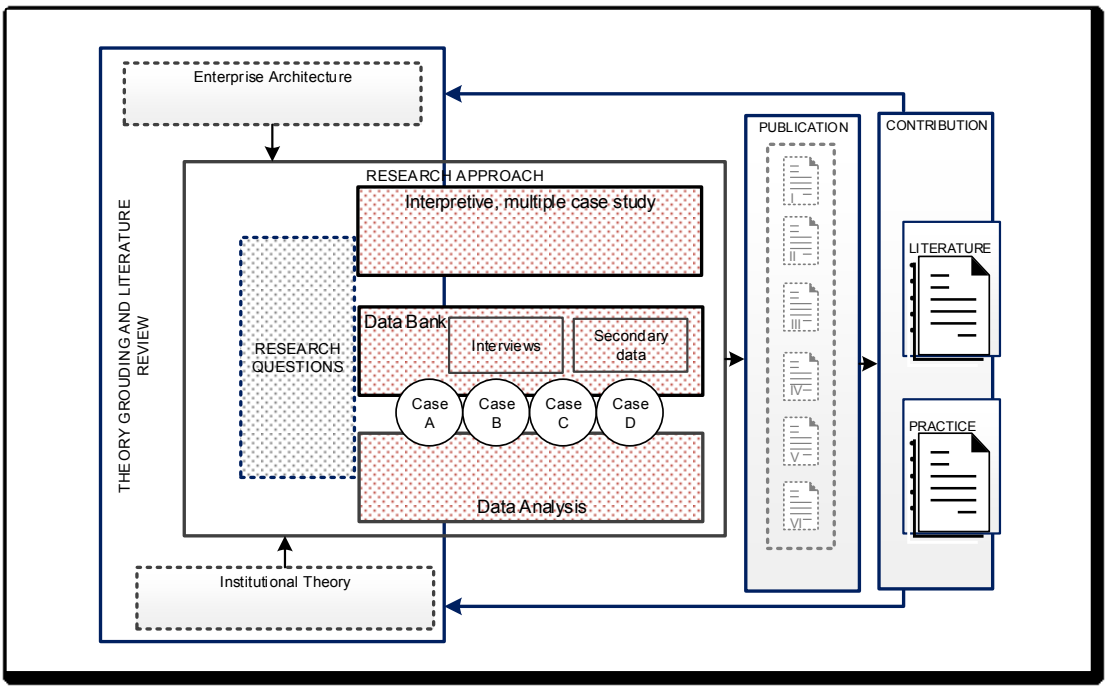

FIGURE 2 Overview of research process

3.3 The Cases

This section describes the context of the research, this helps to understand the background of the thesis and the articles.

3.3.1 National context

This research was conducted in Vietnam. Vietnam is a country of about 90 million people and is categorized by the World Bank as a lower-middle income economy (there are about 50 countries in the lower-middle income economy category) (World Bank, 2017a). Vietnam is considered one of the fastest growing economies in Asia (World Bank, 2017b). Some information about ICT in the country in 2016 is illustrated in Table 1.

TABLE 1 Major information about ICT in Vietnam in 2016 (Source: MIC, 2017)

Indicator	2016
GDP per capita	2,215 USD
Mobile-cellular subscriptions generated voice, SMS, data traffic (2G and 3G) per 100 inhabitants	139.2%
Mobile broadband subscriptions generated voice, SMS, data traffic (3G) per 100 inhabitants	39%

Indicator	2016
Number of Internet users	~ 50 million
Ratio of computers with Internet access in state agencies	94–97%
Households with computers per inhabitants	21.3%

The government of Vietnam (GoV) uses ITC (e.g., IT applications, online-applications, expanding the Web presence of services) as an approach for administrative reform, improving decision making, efficiency, effectiveness, and transparency in government. To achieve those objectives, the GoV has established several master plans, strategies, and projects for state agencies (Phan & Nguyen, 1995; Obi & Nguyen, 2010). In particular, there are three main periods of IT adoption in state agencies in Vietnam so far, including:

- The national IT master plan (IT-2000 Program), period 1993–2000 (Resolution No. 49/CP, dated August 4, 1993 by the government);
- The "State Public Administration Management Computerization" mega project (112 Project), period 2001–2007 (Decision No.112/2001/QD-TTg by the Premier Minister, dated July 25, 2001);
- Vietnam's national plan on IT applications in state agencies, period 2008–2015 (Decision No. 43/2008/QD-TTg, dated March 24, 2008; Decision No. 48/2009/QD-TTg, dated March 31, 2009; and Decision No. 1605/QD-TTg, dated August 27, 2010 by the Premier Minister).

EA initiatives were considered a part of the third period master plan (e.g., 2008–2015 period) and were one of the key approaches in state agencies for implementing the national plan on IT applications in state agencies of the GoV (Decree 64/ND-CP by the government, dated April 10, 2007). The case studies in this research belonged to the third phase of IT adoption in the country. Although some policies mentioned using EA in state agencies (c.f., Decree 64/ND-CP by the government), they did not state or support any hint of what EA is or any clear guidance for adopting EA in state agencies. Moreover, a nation-wide government EA framework was released by the Ministry of Information and Communications (MIC). However, the content of the guidance was very conceptual, and local governments and state agencies may or may not have to follow the guidance, as there were no compulsory policies that state agencies have to adopt EA. This means that several state agencies started their own EA projects before this policy. In that sense, state agencies have chosen EA freely, and they get almost no support from the central government. As a result, different agencies may have different approaches in practice, and agencies have proposed their own EA for their businesses. For example, some EA projects were partly guided and funded by the sponsors (e.g., in finance, approaches, human resources, and technical assistance), while others used their own way to adopt EA, including resources and finance. Although the EA adoption in agencies may have

different approaches, objectives, or resources, the adoption processes are similar; EA is deployed as a project in which they have to propose EA features/functions in the early stage and then plan and implement those proposals.

In summary, the adoption of EA in the public sector in Vietnam can be considered a new means for administrative reform, improving efficiency, effectiveness, and transparency in organizations. This provides a rich research context in which to explore how new approaches are adopted and the problems that emerge during the adoption process.

3.3.2 Case selection

The process for how the case sample decisions were made is as follows: First, in the spring of 2015, after conducting the literature review and setting up the initial research objectives and design, I contacted a leader of Authority of Information Technology Application (CI) with whom I have a good relationship. The CI is the government agency responsible for IT applications in state agencies in the country. Due to the CI's unique position and reputation, it has data and information related to IT applications, projects, and policies of all state agencies, including EA adoption. Therefore, if the CI introduced me to agencies that they oversee, it will likely give me an advantage in research activities (e.g., getting preliminary information about EA adoption, easily accessing the projects' data, and organizing and conducting the interviews, including the highest person-in-charge for EA adoption in agencies). From basic information that I received from the CI, I initially chose one ministry (Case A) and five provinces (Cases B, C, D, E, and F) as candidates for further consideration. It is noteworthy that at the time of this study, there were two ministries and six provinces in total in the country that had finished their EA projects.

In particular, Cases A and B were considered opportunistic and reputational samples (Miles & Huberman, 1994; Scott, 2000), as those EA projects were two of the first agencies in the country to adopt EA. Moreover, their EA projects were managed under procedures and policies of both the international organizations (e.g., the World Bank) and the local, with the help of international institutions that deployed the projects. Cases C, D, E, and F adopted EA using their own capabilities, resources, policies, and procedures. Moreover, Cases C and F have average e-government ranking, while Cases D and E are much advanced in the ranking (Table 2) (this ranking of state agencies is based on criteria including IT infrastructures, IT applications within agencies, online services, human resources, policies for IT applications, and portal/websites) (Decision No. 2342/QD-BTTTT, dated December 18, 2017 by the Minister for Information and Communications). As such, Cases C, D, E, and F can be considered as purpose sampling, thus helping replication of the findings (Stake, 2005; Ritchie, Lewis, Nicholls, & Ormston, 2013).

Second, I decided to eliminate Cases E and F after studying the cases and contacting the persons responsible for the EA project in each Case. In particular, Case E was eliminated because the Deputy Director of the ITC Department, who was in charge of the EA project, only agreed to he and his colleagues being interviewed via email. Due to the research's objectives and approaches, it is appropriate to conduct face-to-face interviews or via telecommunications application software for an in-depth understanding of the phenomena. Case F was eliminated because it seemed that the information about its EA project was not enough at that time and might thus get risks for the study if this case were chosen.

TABLE 2 EA adoption features and their capability in chosen cases

Factor	Case A	Case B	Case C	Case D
e-government ranking (2009–2013)	Good	Excellent	Fair	Good
Adoption approach	joint team by international institution(s) and Case A	joint team by institution(s) and Case B	joint team by Case C and a local company	in-house
Framework	Based on suggestion by the institution	Based on FEA (loosely) suggested by the institution	Based on their own proposal with some features from other institutions/countries	Based on their own proposal
Adoption type (main)	Strategy	Strategy, planning	Strategy, planning, IT (hardware and software)	Planning
Governance	Project-based	Project-based	Project-based	Project-based
Evaluation EA project	Independent institution	Independent institution	No official evaluation yet. However, the model was approved and diffused around the country	No official evaluation yet.

As a result, four cases in the country were chosen, one at the ministerial level and three at the provincial level, to understand EA adoption in organizations. All of them had different experience, capabilities with electronic government initiatives, and administrative levels (e.g., the structures and the number of agencies within the Cases, Figure 3). Those factors indicate that the selected Cases represent a population of cases within the country, thus helping to understand the phenomena of EA adoption writ large (Stake, 2005).

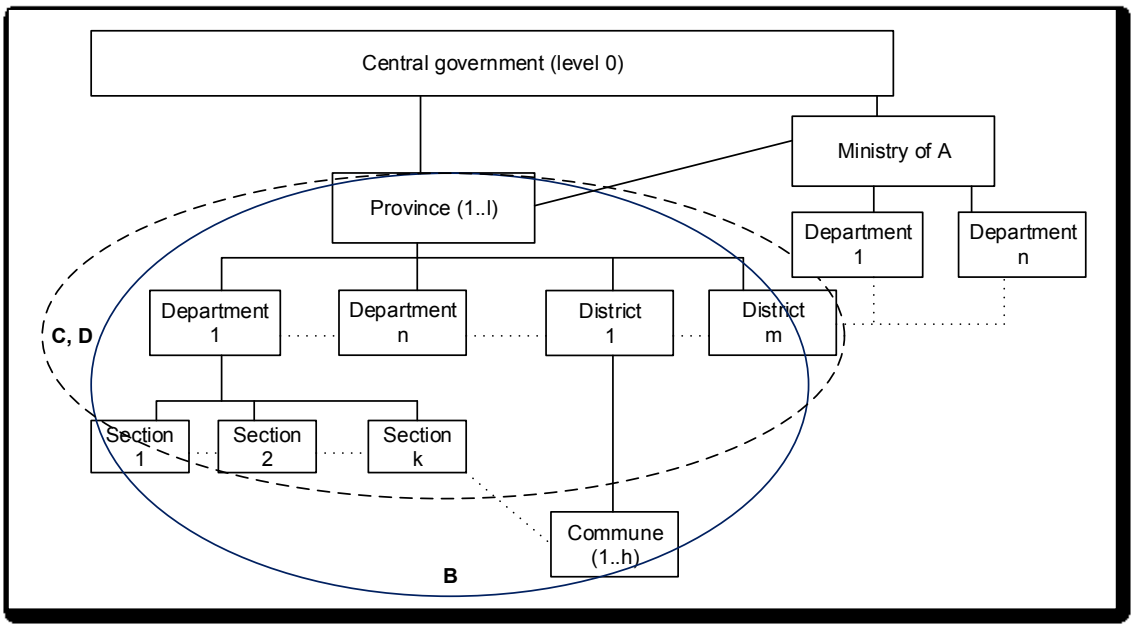

FIGURE 3 Organizational structures of the cases and EA project scopes

3.3.3 Case contexts

3.3.3.1 Case A

The first case (Case A) was a ministry in the country. Their EA project was partly funded by the World Bank and was also financed by Case A. Due to this situation, the project's procedures (e.g., financial, auditing, bidding, project management) had to comply with the policies and practical guidance of both Case A and the World Bank.

The initiation of EA adoption was proposed by Case A, which was then reviewed by the World Bank consultant(s) and/or expert(s). Case A did not know those consultant(s) and/or expert(s). The borrower (Case A) had to revise/negotiate the EA features with the World Bank based on its comments. The proposal was then approved by the World Bank if there were no objections (e.g., identification, preparation, appraisal, and negotiation/approval steps; details of steps 1–8 in Appendix D). The institutions taking part in the project were required to have international experiences with equivalent projects that would be implemented in Case A, and those institutions could not be state-owned organizations. Due to this regulation, an institution from a developed country established a joint alliance with a local company that was chosen for deploying the project through an international bidding process.

The project's management was established with the people from Case A and the joint alliance for deployment project. This step was supported and supervised by the World

Bank. There were also several units established for supporting the project's implementation, such as Project Co-ordination Unit and Project Implementation Unit. Each task of the project was implemented by the joint alliance and then approved by the authority through the Units' suggestions (see steps 9–12 in Appendix D). If those Units did not agree with the products or wanted to change the features, etc., they had to stick strictly to both local and World Bank policies and procedures, like new requests having to follow the same procedures as when the project started (e.g., reviews, blinded reviews, negotiations, and approval). This meant that if the changes happened, it would be slow and time consuming.

As described, three main groups of stakeholders were involved or influenced by the project, including management members (e.g., senior managers, CIOs), project team members (e.g., project managers, enterprise architects, EA workers), and users (e.g., IT specialists, civil servants). This research covered the project from February of 2012 to April of 2015. The scope of their EA project covered all the agencies and their services (Figure 3). The main products of the project were a list of standards and frameworks that would act as the strategy planning for IT investment in state agencies, as well as suggestions for key IT flagship projects, plans, and action plans. However, the products were very conceptual and did not indicate how to use those strategies or how those standards and frameworks would help agencies achieve their objectives.

3.3.3.2 Case B

The second case (Case B) was a province with approximately seven million inhabitants. Case B was a leader in e-government in the country. The basic information about IT applications and their capabilities is illustrated in Table 2. The project was similar to Case A's project, as it was funded by the World Bank and Case B itself. The primary objective was to reform administrative procedures and public services and to improve interoperability within and between the agencies in Case B and other provinces or ministries. The scope of their EA project covered four levels of state agencies: central administration agencies and their departments, sub-departments, and communes (Figure 3 illustrates this hierarchy and administrative structure). Three main groups of stakeholders were involved in the project: senior management members, project team members, and users. This research covered the project from January of 2010 to June of 2014. The products were frameworks to describe strategies and planning for inter- and intra-organizational business and IT alignment. These included architectures (e.g., business architecture, application architecture, data architecture, and technology architecture), Case B's e-government model, suggested flagship projects, plans, and an action plan. However, the products could not be used in reality, as they were not officially approved by the authority.

3.3.3.3 Case C

The third case (Case C) was a province with about two million citizens and demonstrated much less experience with e-government at the time the study was conducted. This project was funded by Case C. The main objectives of the project were to reform public services and increase operation effectiveness, transparency, and interoperability. The scope of the EA project ranged from level 1 to level 3 in the administrative hierarchy (Figure 3): administration (e.g., central administration agencies), about 34 departments and districts (hereafter Dept.), 168 sections (e.g., sub departments, sub districts, and communes), and around 1,300 services.

This was one of the key projects in terms of budget and potential impact on the province. Because it covered several agencies and their services, the project could affect up to 2 million inhabitants, directly or indirectly communicating with the government. Once implemented, it was predicted that the changes would influence the way both service providers (e.g., the government) and customers (e.g., citizens and enterprises) would act and behave toward services. Three main groups of stakeholders were involved in the project: senior management members, project team members, and users. This research covered the project from February of 2012 to October of 2015. The products included strategy, planning for IT–business alignment, a new model for administrative services, and IT (hardware and software to support the new proposed model).

Figure 4a shows the services model in Case C before the EA project was started. To get services, the customers (e.g., citizens, enterprises) had to approach different agencies, fill out numerous forms on paper, and possibly had to physically visit agencies multiple times, causing inconvenience and even increasing corruption. Figure 4b depicts the proposed model when Case C deployed the project. This model helped align business and IT for better services (e.g., including standardized business services and protocol among agencies, creating a new model for services, and implementing the model in real life). Their approaches, models, and products were approved not only by Case C's authority but also the Prime Minister, and it has become a model for the county.

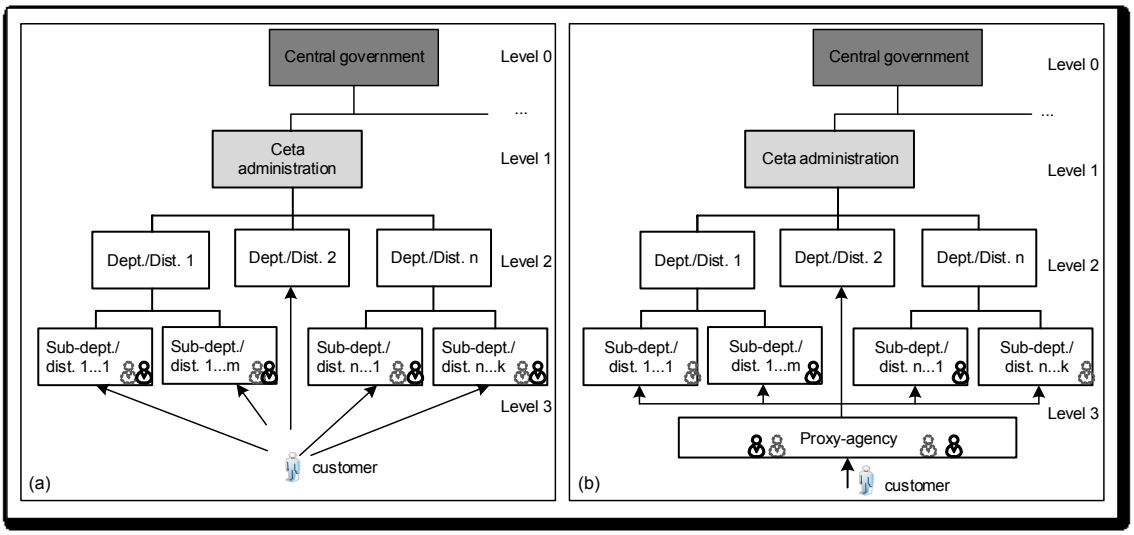

FIGURE 4 The services model before (a) and after (b) EA adoption

3.3.3.4 Case D

The fourth case (Case D) was a province of more than one million people with average experience in e-government in the country over the past five years. The scope of their EA project and the stakeholders were similar to Case C (Figure 3). Three main groups of stakeholders were involved in the project: senior management members, project team members, and users. Its EA program was established in 2010, but the deployment of EA started in 2011. Their main objectives included reducing the number of complex and incomprehensible public services, not interoperability, per se. This research covered the EA project from December of 2011 to December of 2014. The project's products were approved by Case D as planning guidance, but it had very little impact in practice.

3.4 Data collection and analysis

3.4.1 Data collection

The research data collection focused on qualitative data. It consisted of two main sources: interviews and secondary data. The interviewees were different stakeholders who were directly or indirectly involved in the EA projects in the organizations. They included top management (e.g., senior managers, CIOs), project teams (e.g., project managers, enterprise architects), and users (e.g., IT specialists, civil servants). The list of interviewees is summarized in Table 3 (the number of interviews is indicated in brackets). The informants had to participate through the projects' life cycles so that they could support proper

information, activities, and events of the project. Altogether, 42 interviews were conducted from June to August of 2015 and from July to August of 2016: 14 interviews in Case A, 10 in Case B, 10 in Case C, and eight in Case D. Eight interviews took place in 2016 with the same informants as in 2015 but were focused only on CIOs and PMs; the main tasks for the second interviews were discussing the primary analysis findings, confusing issues, the timeline, and collecting new data for interesting issues (e.g., role of studying trips, extended time for the projects, the resources used). This is also considered an approach for validity (c.f., Klein & Myers, 1999).

The secondary data was used to better understand the organizational contexts, the insight of the interviews, and as an approach to triangulate the data sources. More than one thousand pages of different project documentation were produced during the organizations' adoptions of EA, including the projects' terms of reference, inception reports, project plans, project proposals, project reports, human resources assignments, requests for proposals, international best practices reports, deliverables reports, memos, and official news. This amount of documentation helped to triangulate for data collection. In other words, multiple sources help one statement or issue from an informant to be verified or supported by other informants or secondary data (Walsham, 1995).

TABLE 3 List of interviewees in the four cases

#	Case A	Case B	Case C	Case D
1	CIO (2)	CIO (2)	CIO (2)	CIO (2)
2	Project manager (2)	Project manager (2)	Project manager (2)	Project manager (2)
3	Senior manager (1)	Senior manager (1)	Enterprise architect (1)	Enterprise architect (1)
4	Senior manager (1)	Enterprise architect (1)	Enterprise architect (1)	EA worker (1)
5	Enterprise architect (1)	Enterprise architect (1)	EA worker (1)	IT specialist (1)
6	Enterprise architect (1)	EA worker (1)	IT specialist (1)	Civil servant (1)
7	Enterprise architect (1)	IT specialist (1)	Civil servant (1)	
8	Enterprise architect (1)	IT specialist (1)	Civil servant (1)	
9	IT specialist (1)			
10	IT specialist (1)			
11	Civil servant (1)			
12	Civil servant (1)			

The interview procedures were based on the guidance of Stake (2006) and Walsham (2009). Before the interviews, the interviewees were informed of the objectives of the research, the scope of the interviews, the procedures of the interviews, the places the interviews would be conducted, the rights of interviewees (e.g., terms of anonymity and confidentiality), and the estimated time it would take to conduct the interviews. This work was done with the help of senior managers in each case.

The open-ended questions technique was used, and face-to-face interviews were conducted (Myers & Newman, 2007). Notes were taken during the interviews to support a better understanding of the data and transcription works. The interviews normally ranged from 45 to 60 minutes. They were recorded and subsequently transcribed for data analysis. The interviews were ended when theoretical saturation was reached (Eisenhardt, 1989). Along with interviews, several informal discussions and observations were also used. Moreover, the interviews were conducted in the Vietnamese language because the languages of the projects in Cases A and B were Vietnamese and English, while Cases C and D used only Vietnamese. Further, the author is familiar with the Vietnamese context and culture (Appendix A: Example of note-taking; Appendix B: Example of open-ended questions).

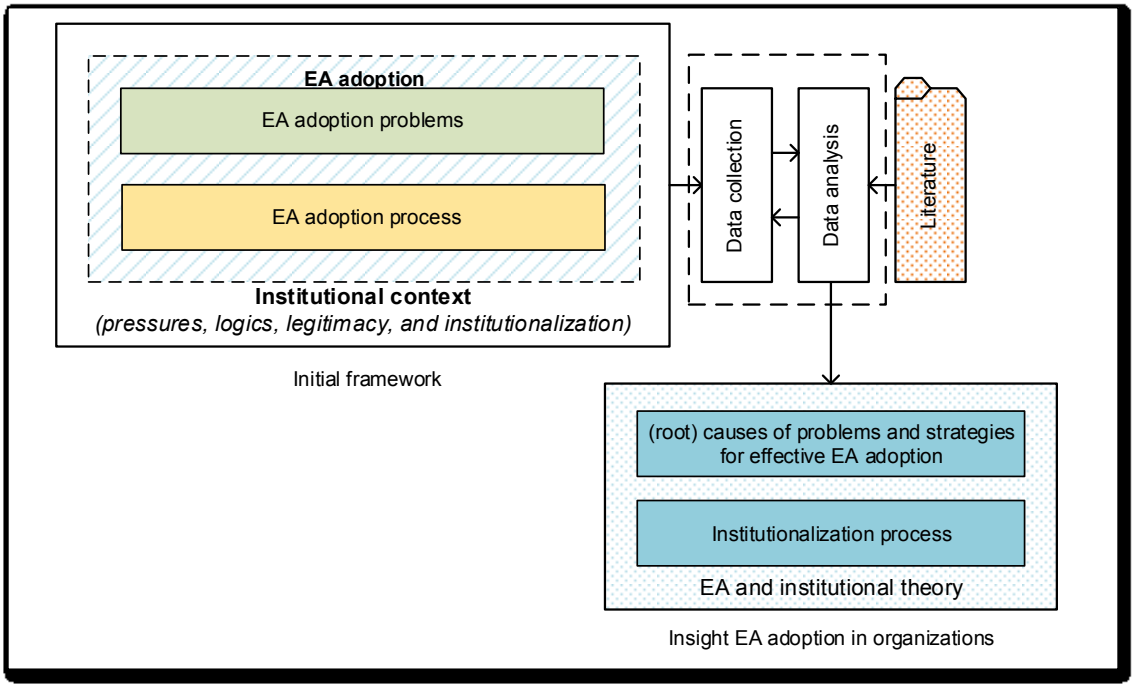

FIGURE 5 The process from initial framework to insights into EA adoption

The interviews focused on the processes of EA adoption that the interviewees had taken part in. During the interviews, the researcher focused on the meaning of the data without

preliminary assumptions (Walsham, 1995). The interviews' theme-guided data collection was formed based on the initial interview framework (Figure 5). This framework was used very loosely (Walsham, 1995) and helped the interviewer and informants feel free to discuss the issues or important incidents of the adoption process that emerged during the interviews. This technique allowed an in-depth understanding of the phenomena. In addition, although the interviews were guided by themes, they were inspired by the narrative interview approach (c.f., Pentland, 1999; Jovchelovitch & Bauer, 2000). This approach was used because EA is an immature discipline and there is a lack of previous literature on EA adoption (c.f., Seppänen, 2014; Simon et al., 2013; Dang & Pekkola, 2017c). The approach helped uncover the real issues that emerge during the EA adoption process. Moreover, because the data collection was influenced by prior theory, this study is not considered to have a pure grounded theory approach (Glaser & Strauss, 1967; Strauss & Corbin, 1998).

It is noteworthy that some planned questions were revised or eliminated when the data collections were taking place (Klein & Myers, 1999). For example, an evaluation of the project was planned; however, it was eliminated because the answers likely depended on who was asked, and the senior managers and project members were not comfortable with discussing this matter. Moreover, it turned out that the evaluation works were conducted by independent parties right after the projects were closed, as in Cases A and B. In addition, their views on evaluation works differed from the study's objectives. For instance, the evaluation used project-based criteria (e.g., financial performance, contract criteria, or bank performance), while this research focused more on social perspectives or impacts of projects. The themes and questions can be seen in Appendix C.

3.4.2 Data analysis

The data analysis was mainly based on the guidance of Walsham (1995, 2006, 2009). Iterative processes were adopted for data analysis, and theory was a part of those processes with the aim of the initial theory being expanded from certain phenomena (Eisenhardt, 1989; Walsham, 1995). ATLAS.ti software was used as an assistance tool for the data analysis process. This was first done by using dimensions or themes in the initial theory as lenses, such as the concepts of institutional pressure (c.f., DiMaggio & Powell, 1983; Scott, 1995), institutional logic (c.f., Friedland & Alford, 1991; Thornton & Ocasio, 2008), institutionalization (c.f., Greenwood et al., 2002; Mignerat & Rivard, 2009; Tolbert & Zucker, 1996), and legitimacy strategy (c.f., Suchman, 1995). This also helped to initially eliminate data irrelevant to the research objectives and questions. For example, if the coding process aimed at identifying problems influenced by regulative pressures in EA adoption, the data related to EA definitions may not have been taken into consideration.

The dissertation also used other techniques for data analysis. For example, open coding was used to identify the phenomena that emerged in interviews and secondary data; axial coding was then used to group open codes by identifying the relationships among them, and selective coding helped identify the core phenomena that was representative of all the data (Eisenhardt, 1989; Stake, 2010). In particular, during the coding protocols, the author was constantly crosschecking between interview transcripts, secondary data sources, and codes. A coding unit was defined as a text piece no bigger than a paragraph and no smaller than a sentence. Single text pieces could be assigned with multiple codes. During this phase, the author tried to understand the meaning of the data (e.g., what the data was about, what things/events/activities the interviewees referred to, and what did it mean in light of the theory?). This step was supplemented by secondary data and crosschecking among the data sources. As a result, all incidents or anecdotes that emerged were considered and coded. Moreover, concerning theoretical saturation, two issues are taken into consideration: the cases and the iteration between theory and data (c.f., Eisenhardt, 1989). The coding process was finished when no new patterns emerged from the data. Appendix E illustrates the examples of the coding techniques.

The final stage of data analysis was finishing and writing the reports of the case studies. The research followed the guidance of Eisenhardt (1989, p. 353), including activities such as “comparison with conflicting literature,” “comparison with similar literature,” and “theoretical saturation when possible” as the enfolding literature and reaching closure step. For example, in order to understand the role of the senior managers in the context of EA adoption and its relation the outcome of projects (c.f., Dang and Pekkola, 2017a), several pieces of literature were referred to, such as in EA adoption (c.f., Hjort-Madsen, 2007) and information systems adoption (c.f., Teo & Pian, 2003; Yoon & George, 2013; Krell et al., 2009; Liang et al., 2007). This approach was used for all parts of the research: problems, strategies for effective adoption of EA, and institutional processes. The findings were reported on in the published articles, and those articles indicated the main outcomes of the research, which was understanding EA adoption in organizations, especially in the context of Vietnam (Figure 5). In addition, Table 4 describes the data collection and data analysis in relation to the cases and the articles.

TABLE 4 Data collection and analysis in relation to the articles

Article	Case A	Case B	Case C	Case D
1				
2		x	x	x
3		x	x	x
4		x	x	x
5	x		x	

Article	Case A	Case B	Case C	Case D
6			x	

3.5 Research process

This section illustrates how the dissertation answers the main research question in relation to research approaches and the articles that have been published. As discussed, the research can be divided into two streams: (1) a study on root causes of problems and strategies for effective EA adoption and (2) a study on the institutionalization process.

To study these streams, three sub-questions have been posed. The first two research sub-questions help handle the first stream (RQ1: What prior conditions cause the main problems in EA adoption? and RQ2: What strategies are in use for the effective adoption of EA in organizations?). Finally, the third research sub-question provides insight for the second stream (RQ3: How does the institutionalization process occur when organizations adopt EA?).

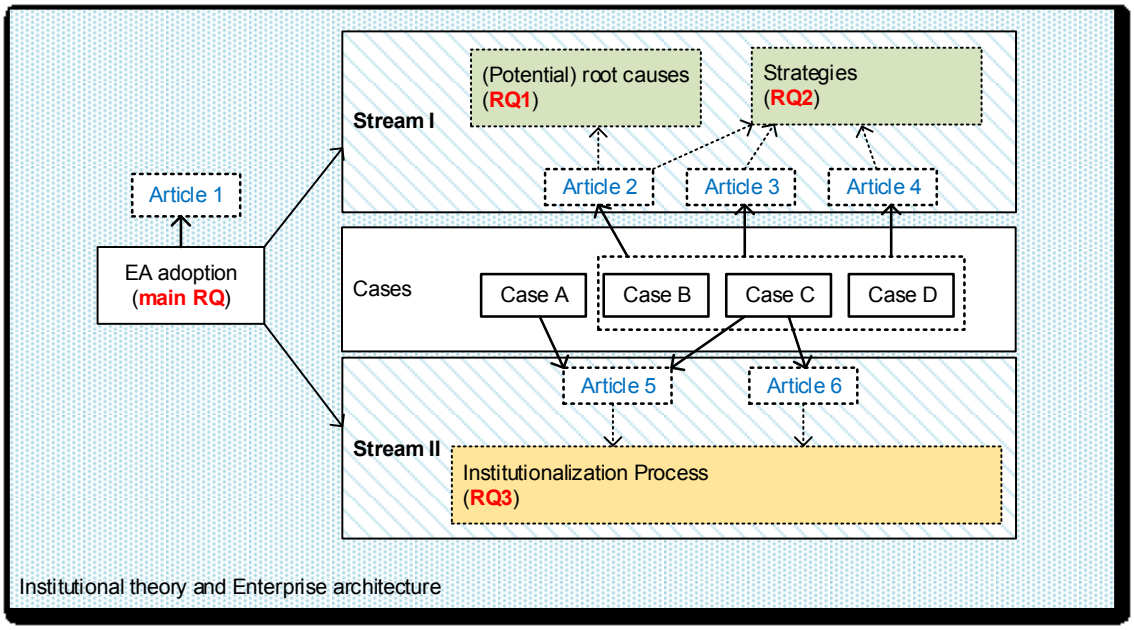

FIGURE 6 Overview of articles and research problems

The research process is shown in Figure 6. It illustrates the relations between the research streams, research questions, Cases, and the articles included in the dissertation. The first article conducted a systematic literature review on EA adoption, along with other literature reviews on EA adoption and EA research (c.f., Banaeianjahromi & Smolander,

2016; Dang & Pekkola, 2017c; Nikpay, Ahmad, Rouhani, & Shamshirband, 2016; Simon et al., 2013; Syynimaa, 2015), contributed to the dissertation by identifying research problems and posing the main research question and possible theory and research approaches to use in the research.

The three articles involved in the first stream focused on identifying the root causes of the problems and strategies for the effective adoption of EA. In particular, the second article identified problems and root causes in EA adoption, while the second, third, and the fourth articles identified strategies for effective EA adoption. They included different rules, norms, and values and their characteristics in different phases of EA adoption, as well as strategies that stakeholders directly or indirectly involved in the EA adoption process have employed. The empirical data for the second, third, and fourth articles came from Case B, Case C, and Case D.

The two articles involved in the second stream focused on the institutionalization process. Specifically, the fifth article identified institutional factors and logics that influence the EA adoption process and how EA adoption begins via the lens of institutionalism. The final article indicated that when organizations adopt EA, they start to change their business services, procedures, and strategies. Those changes are influenced by different institutional factors, external and internal institutional pressures, and the assumptions of senior managers about EA. It also indicates the characteristics of EA adoption, such as technical issues seem not to play an important role in EA adoption. Case A and Case C provided empirical data for article five, while article six contained empirical data from Case C.

3.6 Validity

The research followed practical guidance in order to reduce bias and improve reliability and validity (Creswell & Miller, 2000; Golafshani, 2003; Maxwell, 1992).

First, *descriptive validity* refers to the accuracy of the data collection. To deal with this issue, this dissertation follows the research code of conduct for the guidance of data collection. For example, interviewees were informed of the objectives of the study. They also were informed about the procedures before the interviews. Note-taking was used during the interviews, and secondary data were used for cross-checking with the transcribed interviews as triangulation for accurate data collection (Maxwell, 1992). Moreover, in certain situations, discussions between the researcher and interviewees were established to verify or clarify the findings, for example, verifying and clarifying time frames

of projects' activities or phases, discussing legitimacy strategies related to political or sponsor-related issues, and presenting the findings to key informants.

Second, *interpretive validity* refers to how the interviewees' statements about the issues were interpreted. The researcher may misunderstand the actual meaning of what interviewees said about the events. To deal with this issue, this study conducted face-to-face interviews that helped the researcher to become familiar with the research settings, as well as understand the informants' environments, events, behaviors, and body languages (Maxwell, 1992). Besides focusing on the meaning of what interviewees said, the research settings were crosschecked. It is noted that the author had years of past experience with the Cases in the role of a senior official on electronic government and IT applications in state agencies before the study took place, which helped improve the validity.

Third, *theoretical validity* refers to the presentation of the validity of the findings (Maxwell, 1992). This issue was handled by various means. For example, the research settings and methods were presented as transparently and in as much detail as possible. Also, various data sources were used to support the evidence, and comparing the findings with the literature and revisiting the coding multiple times helped reduce bias. Discussion with other authors about reporting the findings also helped to improve the validation of the research, and using a neutral tone during the interview process helped to reduce the influence on the matter.

Four, *generalizability* refers to whether the findings can be generalized to a larger population (Maxwell, 1992). The present study aimed at explaining what happens in certain contexts of phenomena, to "*explain how and why events happened as they did in some particular real-world situation*" (Gregor, 2006, p. 625). Therefore, the dissertation involved generalizable to specific implications and rich insight (Walsham, 1995). Hence, the research can be categorized as analytic generalizability (Lee & Baskerville, 2003) and grouped as Gregor's Type II (e.g., theory for explaining) (Gregor, 2006, 2017), as "explanations are given for how and why things happened in some particular real-world situation" (Gregor, 2006, p. 614).

Similarly, it can be categorized as Lee and Baskerville's ET taxonomy (i.e., generalizing from description to theory), as "… beginning with the facts or the rich description of a case, the researcher can generalize to concepts, to a theory, to specific implications, or to rich insight" (Lee & Baskerville, 2003, p. 236). This means that this dissertation involved generalizing from empirical statements (e.g., evidence observations made in the case studies) to theoretical statements (e.g., specific implications and rich insight) (Lee & Baskerville, 2003; Walsham, 1995). The dissertation did not involve generalizing to the

development of concepts or the generation of theory. It is noted that the term *generalizability* can be interchangeable with the term *transferability* in this context (Kemper, Stringfield, & Teddlie, 2003).

4 Research highlights

4.1 Publication 1

Dang, D. D., & Pekkola, S. (2017). Systematic Literature Review on Enterprise Architecture in the Public Sector. *Electronic Journal of e-Government*, 15(2).

The article was planned and written by Duong D. Dang and Samuli Pekkola. The literature review, data collection, and analysis were conducted by Duong D. Dang.

4.1.1 Findings

The article used the systematic literature review approach, guided by Kitchenham and Charters (2007). The data was gathered from different sources, including AIS Electronic Library, ACM Digital Library, IEEE Xplore, Science Direct – Elsevier, Springer, Taylor and Francis, the E-Government Reference Library version 10.5, and Google Scholar. The results indicate that EA research in the public sector is dominated by frameworks and their related issues, with less attention on EA adoption, such as how frameworks are used and their impact when organizations adopt EA, what the challenges are, and how different stakeholders and organizations react when EA is adopted.

The article, along with other literature reviews on EA adoption and EA research (c.f., Banaeianjahromi & Smolander, 2016; Nikpay et al., 2016; Seppänen, 2014; Simon et al., 2013; Syynimaa, 2015), helped formulate the direction of the research's scope, methods, and possible approaches for data analysis. Particularly, Simon and colleagues indicated that the majority of EA research focuses on EA framework issues, such as methods, layers, and tasks (Simon et al., 2013). They also stated that researchers need to focus on the lifecycle phases, practical challenges, and strategies for effective EA adoption (Simon et al., 2013), which ultimately was covered in this dissertation. Moreover, the literature identified that EA adoption and its impact on organizational changes need to be consider for study in the future (Banaeianjahromi & Smolander, 2016; Nikpay et al., 2016; Syynimaa, 2015), which this dissertation also focuses on.

4.1.2 Relation to the whole

This research aimed to identify the research problems, form the main research question, lay out the research approach, form the research plan, and determine the possible areas of contribution. This research also helped to understand the status of EA adoption in

developing counties. Studies in the literature review on EA (including Vietnam's EA) may also help situate the findings and contextualize the data (Klein & Myers, 1999).

4.2 Publication 2

Dang, D. D., & Pekkola, S. (2017b). Problems of Enterprise Architecture Adoption in the Public Sector: Root Causes and Some Solutions. In L. Rusu & G. Viscusi (Eds.), *Information Technology Governance in Public Organizations. Integrated Series in Information Systems*, vol 38. Springer, Cham.

The article was planned and written by Duong D. Dang and Samuli Pekkola. The literature review, data collection, and analysis were conducted by Duong D. Dang. A previous version of this article was presented at the Pacific-Asia Conference on Information Systems (PACIS 2016).

4.2.1 Findings

This article aimed at identifying the root causes of problems organizations have when adopting EA and institutional strategies to handle those root causes for effective EA adoption. An interpretive multiple qualitative case study (three cases) was used. The findings provided sixteen problems that are summarized in Table 5.

TABLE 5 Problems identified in EA adoption, adapted from Dang and Pekkola (2017b), Table 8.3

Identified problems	Groups
Organization Structure Legislation and Regulation EA Objective Politics and Sponsors Agency Cooperation Inactive Implementation	***Organization*** Problems relating to the organization and its adoption of EA in its business.
EA Team Formation EA Team Capability and Skill Emphasis on IT EA Product EA Planning	***EA Team*** Problems relating to the EA project team responsible for building the EA.
User Capability and Skill Conflicting Benefits	***EA User***

Identified problems	Groups
Willingness to Use EA	Problems relating to users, those using EA products
EA Fundamentals	***EA itself***
Shared EA understanding	Problems relating to the EA itself

Eight root causes were found for the problems shown in Table 6, including root causes related to organization groups (e.g., organization structure, legislation, and regulation, politics, and sponsors), the EA team (e.g., EA team formation, EA team capability and skill), EA users (e.g., user capability and skill and conflicting benefits), and the EA itself (e.g., EA fundamentals). For example, organization structure (#2) is sourced to many problems related to planning EA in practice, cooperation among agencies, or choosing EA products. Similarly, EA team formation (#4) may lead to several problems related to the objectives or outcomes of EA projects.

TABLE 6 Root causes of problems in EA adoptions, adapted from Dang and Pekkola (2017b), Table 8.4

Group	#	Root causes
Organization	1	Organization Structure
	2	Legislation and Regulation
	3	Politics and Sponsors
EA team	4	EA Team Formation
	5	EA Team Capability and Skill
EA User	6	User Capability and Skill
	7	Conflicting Benefits
EA itself	8	EA Fundamentals

The article also identified some strategies that organizations have used for handling those root causes. This is a step toward the effective adoption of EA and dealing with those root causes in the light of institutional theory. First, *institutional rule* is about formal and informal policies from institutions or superior stakeholders that enforce others. Organizations can use rules to deal with challenges that emerge when they adopt EA. For example, the findings indicate that organizations used political pressures as informal rules for dealing with challenges from inter- and intra-organizations and policies from sponsors (c.f., #2 legislation and regulation and #3 politics and sponsors).

Second, *institutional norm* is about education and social networks in the organization. Organizations have used reputation and professional and official forums, such as CIO

forums and ICT committees, to deal with challenges such as EA team capability and skill (#5), user capability and skills (#6), and EA fundamentals (#8).

Finally, *institutional value* represents the cognitive-culture in organizations. The findings show that organizations imitated each other or sent key stakeholders to successful cases for on-job training. By doing so, they tried to cope with the challenges that they faced during the EA adoption process, such as challenges related to organization structure (#1), EA team formation (#4), and conflicting benefits (#7).

4.2.2 Relation to the whole

This article indicated root causes of problems in EA adoption and strategies for the effective adoption of EA through the view of institutional pressures (norms, rules, and values). Thus, it helps to answer a part of research sub-question 1 (e.g., about challenges, root causes) and research sub-question 2 (e.g., about strategies). It is noteworthy that, although the majority of the problems in EA adoption found in this article aligned with the other literature, some problems appeared that seem unique in the context of the study. This issue is discussed in detail in sections 5 and 6.

4.3 Publication 3

Dang, D. D., & Pekkola, S. (2016). Institutionalising Enterprise Architecture in the Public Sector in Vietnam, *Proceedings of the 24th European Conference on Information Systems (ECIS)*, İstanbul, Turkey. Research papers 139, Association for Information Systems (AIS).

The article was planned and written by Duong D. Dang and Samuli Pekkola. The literature review, data collection, and analysis were conducted by Duong D. Dang.

4.3.1 Findings

This study presents the characteristics of institutional pressures in three phases of EA adoption: requirements specification (initiation phase), development, and implementation. The qualitative, interpretive, multiple cases (three cases), semi-structured interviews, and secondary data were used.

The summary of rules, norms, and values in each EA adoption phase is illustrated in Table 7. Different institutional pressures correspond to different phases in EA adoption.

For example, local rules (e.g., policies related to ICT project managements), as regulative pressures on the implementation phase, influence the EA adoption process, while values impact it by changing behaviors, such as how users' respond to EA products and frameworks, how stakeholders understand the EA approach, and how stakeholders respond when switching from traditional to new approaches, as in EA practices.

TABLE 7 Example of rules, norms, and values in different phases, adapted from Dang and Pekkola (2016), Table 7

	Initiation	Development	Implementation
Rules	Rules on agency objectives and outcomes when they decide EA programs initiatives. (Internal) rules on agencies being responsible for the EA requirements documentation.	Rules on how inter- and intra-agencies cooperate in EA projects.	Local rules on how EA projects are organized and approved.
Norm	Norms on how the provinces approach requirements specifications.	Norms on what types of approaches are used in other institutions.	Norms on work practices (e.g., project management professionals).
Values	Values on the awareness of the EA role and readiness of stakeholders.	Values for perception of EA output.	Values for changed behavior of users' responses to EA products. Values for understanding the EA approach.

The findings show that practitioners in the initiation phase (e.g., senior managers, CIOs) had to tailor policies from other fields to the EA context, as the Cases did not have official policies for EA programs. As a result, *rule* pressures in the initiation phase are considered less important in EA adoption. In contrast, empirical data indicated that rules are vital in the implementation phase. This is because when EA was deployed and became projects, legal rules and procedures for IT investment were applied and significantly influenced EA practices.

Norm pressures in the development phase play key roles in comparison to other pressures because practitioners tend to mimic successful cases or follow the guidance of

popular frameworks or methods. It also important to note that different institutions have different impacts on actors (e.g., individuals, groups, and organizations) depending on rules, norms, and values (Mahalingam & Levitt, 2007). Moreover, organizations adopt EA, and EA becomes the organizational functionality. The environment within and around start to change from the old environment to the new environment, and different rules, norms, and values emerge. As a result, practitioners have to balance between the old and the new and harmony to institutional environment for helping affected stakeholders to familiar with the new ones (Zucker, 1977).

4.3.2 Relation to the whole

This article presents each phase of EA adoption having certain dominating characteristics of institutional pressures. Different institutional characteristics in different phases have been identified. It also indicates that institutional values dominate the initiation phase, while rules dominate in the implementation phase of EA adoption. Thus, it helps to answer a part of research sub-question 2 (e.g., about strategies for the effective adoption of EA).

4.4 Publication 4

Dang, D. D., & Pekkola, S. (Submitted to a leading IS Journal). Legitimacy Strategies in Enterprise Architecture Initiatives.

The article was planned and written by Duong D. Dang and Samuli Pekkola. The literature review, data collection, and analysis were conducted by Duong D. Dang.

4.4.1 Findings

This study involved three cases in which the interpretive approach was used. The aim of this study was to identify legitimacy strategies (characteristics) that are considered during EA initiatives.

The findings present several issues related to legitimacy providers and legitimacy seekers, as well as the relationship of legitimacy strategies to the outcomes of EA adoption in the initiation phase. It is also important to note that the literature has paid very little attention to the initiation phase of EA projects (Banaeianjahromi & Smolander, 2017). As a result, this research focuses on the initiation phase and may help subsequent phases and the whole process, as some fundamental challenges may be resolved in this early stage of EA adoption.

Table 8 illustrates a list of ten legitimacy strategies that have been used in EA initiatives. First, cognitive and pragmatic legitimacy strategies dominate the EA initiation phase. This indicates that individual cognitive-cultural backgrounds play important roles for seeking legitimacy in the early phases (Suchman, 1995). EA is a new concept lacking established practices and standards; it requires more cooperation than traditional IS practices (Ewusi-Mensah, 1997; Hussain & Cornelius, 2009).

Second, there is no common legitimacy strategy that would be appropriate in every case. Even though legitimacy strategies are similar, their instantiations differ. As a result, practitioners may face difficulty in mimicking others in EA practices. This presents the importance of management groups (e.g., senior managers, CIO) in seeking legitimacy in EA adoption. Moreover, due to the difficulty of mimicking others, practitioners themselves need to prepare carefully for better outcomes in EA adoption, rather than referring to outside knowledge, models, or approaches.

TABLE 8 List of legitimacy strategies in EA initiatives

Legitimacy#	Legitimacy strategy name	Legitimacy form
1	Referring to others' experiences	Cognitive
2	Acquiring skills, experiences, and knowledge from others	
3	Formalizing procedures	
4	Acquiring certificates as a means for learning and gaining support from the stakeholders	
5	Persistency at work	
6	Revising the requirements	Pragmatic
7	Co-opting committees for consulting with their work	
8	Obtaining support from enthusiastic stakeholders	
9	Using early adaptors to influence procedures	
10	Promotions to enhance the project team's power	Normative

Third, legitimacy strategies in the initiation phase can be classified into three types of use: legitimacy strategies for providers, legitimacy for seekers, and legitimacy use by seekers to enforce and convince providers. It will benefit practitioners to consider those legitimacy strategies, depending on their roles in EA practices. For example, legitimacy

strategies for providers include L1 (Referring to others' experiences) and L2 (Acquiring skills, experiences, and knowledge from others); legitimacy for seekers comprises L4 (Acquiring certificates as a means for learning and gaining support from the stakeholders), L7 (Co-opting committees for consulting with their work), and L8 (Obtaining support from enthusiastic stakeholders); and legitimacy use by seekers to enforce and convince providers includes L3 (Formalizing procedures), L5 (Persistency at work), L6 (Revising the requirements), L9 (Using early adaptors to influence procedures), and L10 (Promotions to enhance the project team's power).

TABLE 9 Summary of activities in EA initiative and legitimacy efforts

Task#	Activities	legitimacy strategies effort
1	Defining the scope	moderate challenge
2	Building the team	moderate challenge
3	Identifying the stakeholders	moderate challenge
4	Establishing the EA baseline	moderate challenge
5	Establishing the EA target state	moderate challenge
6	Identifying the EA products and frameworks	high challenge

Finally, it seems that seeking agreement from stakeholders for appropriate EA products and frameworks faces the most challenges in EA initiation, and more effort is needed to take some legitimacy strategies than others. For example, as illustrated in Table 9, the majority of the tasks in the initiation phase need moderate legitimacy strategies; only identifying the EA products and frameworks seems stand out. This can be explained in that frameworks and products influence many agencies, their services, and stakeholders in different level in organizations, making it very challenging to define appropriate products and frameworks (c.f. Kotusev, Singh, & Storey, 2015; Simon et al., 2013). Another reasons is that, despite the large number of EA frameworks, there is no appropriate framework that can be useful for certain circumstances, environments, and particular settings (Bischoff, Aier, & Winter, 2014; Löhe & Legner, 2014).

It is noted that the legitimacy strategies that seem the least used are those is that use political pressure to fulfill the will of the legitimacy seekers at the cost of others.

4.4.2 Relation to the whole

This study shows that there are certain legitimacy strategies to help organizations dealing with challenges in EA adoption in the initiation phase, and, ultimately, those strategies

may help organizations effectively adopt EA. It also shows that there are certain characteristics related to legitimacy strategies in EA adoption, such as cognitive-culture dominating the early phases, but there are no common legitimacy strategies. Thus, it helps answer research sub-question 3 (e.g., strategies for effective EA adoption)

4.5 Publication 5

Dang, D. D. (2017). Enterprise Architecture Institutionalization: A Tale of Two Cases, *Proceedings of the 25th European Conference on Information Systems (ECIS)*, Guimarães, Portugal. Research paper 55, Association for Information Systems (AIS).

This is a single-author article.

4.5.1 Findings

This research involved two cases. The qualitative interpretive approach was used to conduct the research. The aim of this research was to identify institutional factors that influence the EA adoption process. The findings suggest that different institutional logics, that is, managerialism logic, professionalism logic, users' logic, and EA itself, are involved in the institutionalization process. Moreover, the study also indicated that even when organizations had similar ideas at the beginning of the adoption (e.g., EA was used for gaining effectiveness, efficiency, and productiveness in organizational businesses), the results may differ due to the managerial expectations and assumptions about EA. It is noted that previous literature indicated the importance of top management commitment, support, and participation in the project (Zheng, Chen, Huang, & Zhang, 2013; Teo & Pian, 2003; Yoon & George, 2013; Krell, Matook, & Matook, 2009; Liang, Saraf, Hu, & Xue, 2007). Therefore, the study supports others' views on the role of senior managers in the context of EA adoption.

The findings also show that the institutionalization process in EA adoption does not seem to begin with jolts that make social, technological, or legal upheavals (Greenwood et al., 2002; Mignerat & Rivard, 2009). Instead, sources of the innovation phase come from senior managers. Moreover, the process of institutionalization did not appear as linear. Instead, different phases appeared at the same time with different instantiations. Specifically, organizations that have not yet achieved institutionalization may switch to a deinstitutionalized status because the product may not be able to be used or approved and operated. This finding indicates that the practice is not consistent with the theory that deinstitutionalization happens when a structure is being institutionalized, and it may be

followed by a deinstitutionalization when it survives over a certain period of time (Greenwood et al., 2002; Zucker, 1987; Mignerat & Rivard, 2009).

4.5.2 Relation to the whole

This article presents the different stages of the institutionalization process. Different stages of this process happen simultaneously, and organizations begin deinstitutionalization even though they have not yet achieved institutionalization. Moreover, it seems that innovation comes from senior managers rather than beginning with jolts that make social, technological, or legal upheavals (Greenwood et al., 2002; Mignerat & Rivard, 2009). The findings of this article will be discussed in relation to other findings and other contexts in section 5. The findings also state that institutional logics are involved and influence the institutionalization process and the impact of managerial expectations and assumptions on the outcomes of EA adoption. Together, it helps to answer a part of research sub-question 3 (e.g., institutionalization process).

4.6 Publication 6

Dang, D. D., & Pekkola, S. (2017). Enterprise Architecture and Organizational Reform: A Debrief of the Project. *Proceedings of the 21st Pacific-Asia Conference on Information Systems (PACIS)*, Langkawi, Malaysia. Research paper 71, Association for Information Systems (AIS).

The article was planned and written by Duong D. Dang and Samuli Pekkola. The literature review, data collection, and analysis were conducted by Duong D. Dang.

4.6.1 Findings

This article used the interpretive case study approach. The article aimed to examining (a) the impact of institutional pressures on EA adoption and (b) the process of institutionalization under EA projects in organizations.

The changes will start within and among organizations when they adopt EA (Armour & Kaisler, 2001; Banaeianjahromi & Smolander, 2017; Hjort-Madsen & Pries-Heje, 2009; Rouhani et al., 2014; Valtonen et al., 2010). The findings indicated that institutional pressures are seen as sources of change. Regulative pressures from formal and informal policies influenced and drove the changes (Powell & DiMaggio, 1991). They chose EA as an approach to reform administrative procedures and business services. This change came from senior managers, who acted as forms of regulative pressures.

Moreover, normative pressures originated from professional groups who initiated changes through the EA project. For instance, they came from consultants and professional associations (e.g., CIO committee, ICT association) who promoted certain approaches and frameworks. Those normative pressures played important roles on how EA adoption approaches were approved and how they became legitimated, as professional associations that constantly interact with the organizations or organization normally consult them for advice. The professional associations could also benefit the organizations by increasing their compliance with (pragmatic) standards, activities, and behaviors by training, granting, or obtaining certificates. As a result, their reputation and credibility increased, and their activities were taken for granted and spread to others (Tolbert & Zucker, 1996). It is interesting to note that technical issues do not seem important in EA adoption. This contrasts with the literature, which indicated that technical issues played a very important role in legitimating change (Greenwood et al., 2002).

Furthermore, the findings also indicated that EA adoption will cause changes in cultures and values in organizations as cognitive-cultures pressures. For example, the interplay among institutions and stakeholders (senior managers, projects' members, users) creates cognitive-cultural pressures and influences the behaviors and activities of stakeholders who are involved in or influenced by, directly or indirectly, the EA adoption process. As a result, cognitive-cultural pressures help or hinder the changes in organizations and individuals.

4.6.2 Relation to the whole

This article indicated how internal and external institutional pressures influence the process of institutionalization under EA projects, leading to organizational changes. It thus helps to answer research sub-question 3 (e.g., institutional process and how institutional pressure affects organizational change).

5 Discussion

This section provides a brief discussion related to the three research sub-questions in the dissertation. In particular, section 5.1 discusses the issues related to RQ1 and the second article. Section 5.2 discusses issues related to RQ2 (sections 5.2.1, 5.2.2, and 5.2.3 correspond to the second, third, and fourth articles, respectively). Section 5.3 discusses issues related to RQ3, and articles five and six are covered in sections 5.3.1 and 5.3.2, respectively.

5.1 Problems in EA adoption (RQ1)

5.1.1 The root causes of problems in EA adoption

Many problems in EA adoption have been identified in the literature (Chuang & van Loggerenberg, 2013; Hauder, Roth, Matthes, & Schulz, 2013; Janssen & Klievink, 2012; Kaisler & Armour, 2017; Kotusev, Singh, & Storey, 2016; Löhe & Legner, 2014; Zink, 2009). For example, they range from the scope of the EA project to the lack of resources, standards, and modeling tools, to misconceptions about EA. The dissertation goes beyond identifying problems and seeks the root causes of the problems that occur when organizations adopt EA.

Eight root causes were identified, which were also discussed in the second article (Dang & Pekkola, 2017b). They can be categorized into four groups: root causes related to organizations adopt EA; root causes related to the EA teams who deploy EA features and functions into real-life practices; root causes related to the EA users who use EA products or are affected by EA projects; and root causes related to EA itself.

In particular, root causes related to organizations include organization structure (#1, Table 6), legislation and regulation (#2, Table 6), and politics and sponsors (# 3, Table 6). For example, politics and sponsors may lead to problems related to planning or outcomes of the projects, as evident from Case B. Moreover, there are root causes related to EA team groups, that is, EA team formation (#4, Table 6), and EA team capability and skill (#5, Table 6). For instance, if an EA team is formed of people with technical-oriented skills, it could lead to problems, as they may focus more on technology, while paying less attention to business perspectives, which is important in EA adoption (Bui, 2017; Gregor et al., 2007).

Previous studies in the Vietnamese context (e.g., Obi and Nguyen, 2010) have stated that one of the reasons behind project failure is the complexity of the administrative procedures. This research confirms that finding, as organizational structures (#3) played an important role in the problems in EA adoption. Moreover, Phan and Nguyen (1995) indicated that a lack of skilled professionals was a challenge in IT development. This dissertation shows findings that the projects' team capabilities and skills, as well as their formations, affect the results of the projects.

Furthermore, two root causes belong to the EA user groups (e.g., root causes related to #6 user capability and skill and #7 conflicting benefits in Table 6) and root causes related to EA itself (e.g., #8 EA fundamentals in Table 6). For example, due to the immaturity of EA discipline (Kotusev, 2017), EA lacks common understandings, standards, frameworks, and approaches (Kotusev, 2017; Nili, Tate, & Johnstone, 2017; Rahimi et al., 2017). This leads to practitioners interpreting EA depending on their backgrounds and knowledge from real life practices. As a result, it may cause several problems, such as in products, measurement, and appropriate frameworks for building EA in organizations.

Previous studies have pointed out problems related to a lack of skilled professionals, users' skill, human resources, and ICT training (Phan & Nguyen, 1995; Nguyen & Schauder, 2007; Obi & Nguyen, 2010). However, while several findings of this research confirmed the previous literature, it also indicated that not only skills but issues related to users' abilities to learn or adapt new approaches is also important. Particularly, users resisting using or learning new approaches is another factor in EA adoption problems.

In addition, in the study in the Malaysian public sector, Bakar and colleagues (2017) indicated that cost and technology are factors that need to be considered for implementing EA. However, this research did not find that those factors were challenges for organizations adopting EA in Vietnam. Similarly, even though several problems in this research aligned with other contexts in the developed world (c.f., Dang & Pekkola, 2016), problems related to the influence of the sponsors, users' conflicting benefits, and users' capabilities and skills seem unique to this study's context.

5.1.2 The relation between root causes and success factors in EA adoption

Several studies have focused on the success factors in EA adoption (c.f., Jusuf & Kurnia, 2017; Lange, Mendling, & Recker, 2015; Niemi & Pekkola, 2016; Schmidt & Buxmann, 2011). Those studies aimed at identifying the factors that help organizations successfully adopt EA. For example, to achieve the IT flexibility and efficiency in the implementation

phase, organizations should consider several significant success factors, including a clear definition of the overall architecture goals, the measurement and communication of the EAM success, methodology, and implementation issues (Schmidt & Buxmann, 2011). Moreover, there are several success factors for the post-implementation phase, including product quality, infrastructure, service delivery quality (Lange et al., 2015). Furthermore, social legitimacy, efficiency, organizational grounding, trust, governance, goal alignment, and enforcement are success factors for the institutionalization of EA (Weiss, Aier, & Winter, 2013).

However, those studies have shed hardly any light on the generative process, from the decision of adopting EA to its full institutionalization. The findings in this research help fill this gap. In particular, it can be argued that if more attention is given to the root causes of the problems when EA is adopted, it may help prevent the problems for emerging in the first place and help to improve the success of the EA adoption. In that sense, those root causes can be categorized as success factors for EA adoption processes.

Furthermore, previous research has focused on the project level (Lange et al., 2015) or the organizational level in EA adoption success (Lange et al., 2015; Schmidt & Buxmann, 2011). This research covers factors ranging from the individual (capability and skill, conflicting benefits of stakeholders) to the project (c.f., EA team formulation) to the organizational level (c.f., organizational policies, politics, and sponsors). In addition, previous literature has focused on the IT perspective (Schmidt & Buxmann, 2011). This research examines both IT and business perspectives from individual to project to organizational levels.

5.2 Strategies for the effective adoption of EA in organizations (RQ2)

There are several strategies for the effective adoption of EA. Details of those discussions are given in articles two, three, and four.

5.2.1 Strategies for overcoming the root causes of problems

Several solutions have been proposed for dealing with the eight root causes of problems that occur when organizations adopt EA (Dang & Pekkola, 2017b). In particular, there are certain formal and informal rules that can help to overcome root causes related to legislation and regulation (#2, Table 6) and politics and sponsors (#3, Table 6). As political pressures or sponsor constraints may lead to several consequences in the adoption process, organizations can establish task forces to solve inter- and intra-organizational

boundary problems. Similarly, rules also can be used to overcome legislation and regulation challenges, as they may affect it in negative ways.

Furthermore, *norm* is about the education and social networks in organizations and their environments. This can be used for overcoming root causes such as those related to EA team capability and skills (#5, Table 6), user capability and skills (#6, Table 6), and EA fundamentals (#8, Table 6). For example, official forums (e.g., CIO forum, professional forum), workshops, and conferences with different parties participating (e.g., experts, stakeholders) can be used in order to gain reputation, skills, and common understandings about the matters (Deephouse & Suchman, 2008; Suchman, 1995).

The training issue has also been indicated in previous studies on the projects or programs in the Vietnamese context: one of the first steps for improving the healthcare communications network in Vietnam was training (Tran, Seldon, Chu, & Nguyen, 2006), while training programs (e.g., management training, technical training, trainer training programs) were one of the suggestions for overcoming challenges in IT master plans (Phan & Nguyen, 1995). The findings of this research indicated that practitioners recognized those issues. For example, Cases A and B invested resources for training at both the management and technical levels, while Case C trained their management and users.

Moreover, *value* is about the cognitive-culture in the organizational environment and can be used to cope with issues related to organization structure (#1, Table 6), EA team formation (#4, Table 6), and conflicting benefits (#7, Table 6). For example, organizations can imitate successful cases, and they then become familiar with matters and overcome them by adopting methods and approaches from others. It is noted that values cannot be changed easily, as they relate to background, culture, and personal characteristics.

5.2.2 Institutional characteristics in different phases of EA adoption

Although studies in the IS literature have discussed the role of institutional pressures (cf. Khalifa & Davison, 2006; Krell et al., 2009; Liang et al., 2007; Teo & Pian, 2003; Yoon & George, 2013; Zheng et al., 2013), this dissertation focuses more on phases across the project to understand how the institutions shape the project's directions and the importance of the different pressures on the EA adoption process.

The findings in this research indicate that there are certain strategies and features that appear in different phases of EA adoption. The details of those strategies are shown in Table 7. The findings also indicate that values seem more emergent and important than rules and norms in the initiation phase, while rules play an important role in the implementation phase (Dang & Pekkola, 2016). This means that senior managers' backgrounds and their understandings about EA, as well as individual stakeholders'

knowledge (e.g., project managers, enterprise architects) about EA and its requirements, are more important when organizations start to adopt EA. This is because in the context of this study, there are no official law or regulations about EA that lead to EA initiatives activated by the senior managers themselves. However, the importance of values is also indicated in contexts where EA is mandated by law, as in the US (Bellman & Rausch, 2004; Bui & Levy, 2017; Hjort-Madsen, 2007). Furthermore, it is noted that it seems that the higher up the agencies responsible for EA projects are in the organizational pecking order, the more successful their EA projects will be, as is evidenced in the findings. This aligns with the literature, as the National Committee on ICT application under the president is responsible for EA projects in Korea (Lee & Kwon, 2013) or the corresponding Office of Management and Budget in the US (Bellman & Rausch, 2004).

On the contrary, rules emerged strongly in the implementation phase. This is because when EA is adopted into organizations, they split it into sub-projects, and those projects' activities have to obey the formal regulation policies, such as procedural and financial policies, and sponsors' protocols and instructions. Moreover, they also have to consider informal rules that originate from senior managers and power institutions. However, informal rules can be replaced by others if those rules are in question. As a result, the implementation phase needs to take into consideration the effects of formal and informal rules in their practices, as sole reliance on official rules is inadequate for EA implementation.

This research had different findings on this issue. For example, the government influenced the initial decision for adoption, but its role in later phases seemed less important in e-procurement in construction organizations in Vietnam (Huang et. al., 2016). There are several reasons that might explain those differences. First, the organizations had strong motivations and pressures when they adopted e-procurement. If they did not take part in this process, they may not have gotten new contracts, risking their survival. Second, e-procurement can be considered as just one service, while EA adoption may affect a number of services (e.g., hundreds of services, as in Case C). Moreover, traditional procurement services already have a mature legacy in terms of standards, procedures, and policies, while EA has none of those. This leads to easier adoption when the government transforms from paper-based procurement to e-procurement by just focusing on investment in technology.

The evidence of the importance of values in early adoption in this study might be valuable for other newly emerging approaches, such as the Internet of Things or smart city for e-government. This is because such new approaches are similar to EA in that they are immature disciplines; they have a wide scope when implemented, bridging from business to technology; and they do not yet have international standards, frameworks, or software,

both in academic and industrial areas (Hollands, 2008; Neirotti, Marco, Cagliano, Mangano, & Scorrano, 2014). As a result, practitioners could see the findings of this study as a precaution or a lesson learned for better preparation before deciding to adopt those approaches for their businesses. They should especially focus on stakeholders' values (e.g., personal backgrounds, experiences, and capabilities) in the early stages of adoption.

5.2.3 Legitimacy strategies for EA initiatives

This research stresses the importance of cognitive and pragmatic characteristics when EA is first introduced to the organization (Table 8). It means that EA initiatives are influenced by the backgrounds, cultures, and beliefs of those involved in the EA adoption. It also indicates that EA adoption in the early stages involves more social perspectives and institutional environments, as Suchman (1995, p. 603) pointed out that "the stronger the institutional environment, the greater the need for cognitive legitimacy of all kinds and for moral legitimacy based on procedures and structures." As a result, many factors need to be taken into consideration for better adoption, such as the gap between IT professionals and users (Keable et al., 1998), and within professional groups (Deephouse & Suchman, 2008). Stakeholders' awareness and commitment is consequently one of the main factors for successful EA projects (Lange et al., 2015). Furthermore, there is no common legitimacy strategy that would be appropriate in every case. Even though there are similar strategies, they appear differently in the cases. This indicates that mimicking each other is very difficult and emphasizes the roles of legitimacy seekers (Parr, Shanks, & Darke, 1999; Somers & Nelson, 2001).

Moreover, it seems that legitimacy strategies used in EA initiatives consist of three groups, that is, legitimacy strategies for legitimacy providers, legitimacy strategies for legitimacy seekers, and legitimacy strategies used by legitimacy seekers to enforce and convince the legitimacy providers. For example, empirical evidence indicates that organizations can use the *L2* - "Acquiring skills, experiences, and knowledge from others" strategy for helping legitimacy seekers fulfill the users' needs and gain their support. Similarly, legitimacy seekers use *L4* - *"*Acquiring certificates" for improving their credibility and reputation and persuading legitimacy providers to support their activities toward EA projects. It also helps them conform to current standards and reduce management challenges. Moreover, *L3* - *"*Formalizing procedures" was used for enforcing and convincing the legitimacy providers to follow legitimacy seekers. These activities create new activities, making it easier to enforce the seekers (Scott, 1995). It is interesting to note that training is one of the factors that scholars suggested for better results in ICT adoption in Vietnam (c.f., Phan & Nguyen, 1995; Tran, Seldon, Chu, & Nguyen, 2006). This study

thus supports the details of how and for what objectives organizations take part in training during the adoption process.

Furthermore, there are certain relations between strategies and tasks in EA initiation. It seems that some tasks need more effort for gaining legitimacy than others. In particular, “identifying the EA products and frameworks” seems to face the most challenges in EA activities. This can be explained in that, despite the large number of EA frameworks (Kotusev, Singh, & Storey, 2015a, b; Schekkerman, 2004), there is no common understanding or appropriate approach in certain circumstances, settings, and political climates (Bischoff et al., 2014; Chuang & van Loggerenberg, 2013; Löhe & Legner, 2014).

5.3 Institutionalization process in EA adoption (RQ3)

5.3.1 Institutionalization process stages in EA adoption

The institutionalization process includes the innovation, theorization, diffusion, full institutionalization, and deinstitutionalization phases. Innovation in the institutionalization process takes place at the individual and organizational level, starting with social, technological, or legal upheaval (Greenwood & Hinings, 1996; Mignerat & Rivard, 2009). In the context of this study (e.g., Vietnam), however, the evidence from the empirical research states that they are not the source of innovation, as there are no legal, policy, or regulation pressures that organizations must use to deploy EA in their agencies. Instead, managerial expectations and assumptions from senior managers about EA drive the choices. Senior managers also affect other stakeholders’ behavior and activities in multi-level organizations. This is important because in other contexts, the decision for using EA in organizations could be different. For example, EA adoption in the US government context was influenced by the laws on EA adoption in state agencies (e.g., the E-Government Act 2002) (Hjort-Madsen, 2007). In that sense, the role of senior managers in the Vietnamese context of EA adoption seems more important than in the US context.

Theorization in institutionalization indicates how organizations specify problems and then justify and legitimize new ideas or structures (Mignerat & Rivard, 2009; Tolbert & Zucker, 1996). Different settings have different approaches for theorizing, as it is based on the problems that organizations face when they adopt EA. For example, common problems in the research are organizations struggling with seeking appropriate frameworks or products of EA. They also find it difficult to cope with problems related to inter- and intra-agencies, as EA projects usually cover a wide range of scopes and areas. Furthermore,

organizations face challenges when it comes to the measurement of their products or frameworks. Those problems may influence the projects' activities, plans, and results. To deal with those issues, the roles of managers are important. It also noted that if organizations with technical-orientations adopt EA, they may face fewer challenges than organizations with EA projects objectives that focus more on business-orientation or administrative procedures.

New structures that are legitimized are then diffused (Mignerat & Rivard, 2009). The diffusion first happens locally, when new structures, practices, or procedures are legitimized. After new structures, practices, or procedures are legitimized locally, they are diffused to other agencies and, later, diffused to organizations, as the advantages of its products have been proven, in comparison to the old one. For example, the products of the EA project in Case B are a collection of "documents" for which the ability to use or apply the ideas and their proposals in reality is in question. This shows that they are used locally in some agencies within an organization but are not yet diffused to organization as a whole. This is because the advantages of their products have not been proven, in comparison to the old approach. In contrast, as products in Case C proved the advantages, they were first used within an administrative agency and then diffused to organization as whole.

When structures are taken for granted, this is considered as the full institutionalization phase. For example, Case C achieved this situation. Their products were legitimized by the government as a reference model for the whole country. It indicates that the EA products were institutionalized, including structures (of the administrator), processes (of business services), and management tasks (control and reporting). However, it is noted that some cases have not yet achieved institutionalization, as the products may not be able to be used, as in Case B. Deinstitutionalization occurs when structures survive over a certain period of time (Greenwood et al., 2002; Zucker, 1987; Mignerat & Rivard, 2009).

Moreover, it is noted that there are four different institutional logics involved in the process of institutionalization: managerialism logic, professionalism logic, users' logic, and EA discipline itself as a logic. In the context of study, managerialism logic emphasizes the improvement of interoperability among information systems associated with reforming administrative procedures and services, as well as increasing online services in state agencies. Those logics are influenced by different institutional pressures, such as some policies or master plans (as external pressures) from the government that encourage state agencies to use IT as a means to improve effectiveness and efficiency in governance and better service for customers. As a result, managers in agencies with organizations acted and spoke in terms that were familiar with this logic when they adopted EA.

Furthermore, professionalism logic illustrates project management professionalism in EA adoption. In this logic, EA projects are implemented, communicated, and managed based on certain standards, plans, or practices that are familiar with the practitioners. However, EA projects have a wider range of scopes in comparison to traditional IT projects, which normally focus on software and hardware. As a result, issues emerged such as contradictions between managerialism logic and project management professionalism on EA adoption. In addition, user logic indicates that internal users (e.g., back-end users of EA products or users influenced by EA adoption) follow their professional practices. For example, administrative users usually have to comply with procedures that are guided by approved policies. As a result, they tend to refuse to use new approaches if they do not yet fully comply with procedures or if users have to do extra work. For example, one of the EA products is an e-document system with a function that every document can be used as electronic by using electronic signatures. However, electronic signatures had not yet been recognized by law. This led to administrative users having to prepare both paper-based and electronic-based versions of every document.

Those logics simultaneously exist for different stakeholders, which leads to different directions and chosen activities, approaches, or ideas. This may lead to different outcomes in EA adoption even if organizations have similar objectives when they start adopting EA.

5.3.2 Organizational change throughout EA projects

The institutionalization process, as discussed in a previous section, leads to organizational changes under EA projects. Therefore, it helps to understand the factors that influence the changes in organizations when they adopt EA from the institutional perspective, including context (e.g., Vietnam), content, process, outcomes (e.g., models, strategies, or planning), and leadership (Kuipers et al., 2014).

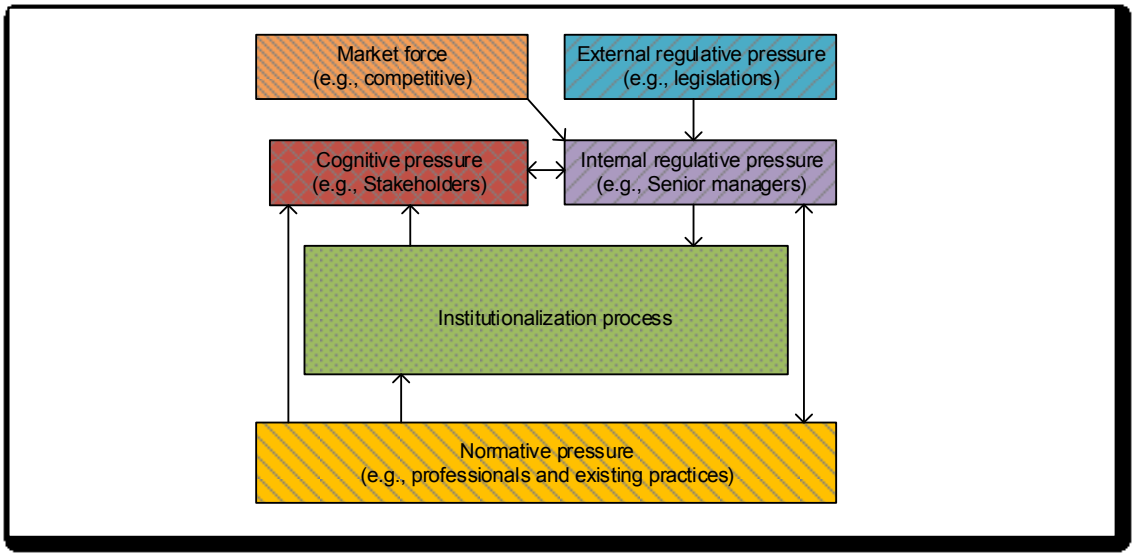

FIGURE 7 Factors influence organizational change in EA adoption, adapted from Dang and Pekkola (2017a), Figure 4

Factors that influence organizational change when organizations adopt EA can be seen in Figure 7; here, institutional factors that influence the EA adoption process are shown. *External pressures* are the sources of the innovation stage in the institutionalization process in EA adoption. For example, external pressure from "National Ranking ICT index" acted as a market force that drove organizations to compete with others. This drove the senior managers' decision on EA adoption to improve the current situation, such as improving services or decision making, to increase their ranking. Moreover, formal or informal policies acted as regulative pressures that influenced senior managers for the adoption of EA.

Furthermore, senior managers act internally as *regulative pressure*, forcing the organization to change and setting the directions of change in EA adoption. In addition, cognitive-culture pressures result from the interplay between stakeholders and senior managers; this influences the stakeholders' behaviors and activities in the EA adoption process, helping or hindering the changes in organizations.

Professionals and existing practices (e.g., as institutional normative pressures) influence both senior managers' (e.g., as internal regulative pressures) and stakeholders' (e.g., as cognitive-culture pressures) behaviors and activities; thus, they indirectly influence the institutionalization process when organizations adopt EA. Normative pressures also influence the institutionalization process (e.g., the change) directly in the way that members of those professional or existing practice groups participate in the EA adoption processes, such as taking part in EA projects or choosing the technologies in EA adoption.

As a result, professionals and existing practices may influence the directions, practices, and outcomes of EA adoption in organizations.

6 Conclusion

EA has received attention around the world, and various nations mandate using EA at the national-wide level. Yet, the issue of how EA gets adopted into organizations remains unclear. As a result, this study focuses on EA adoption into organizations, aiming at explaining what happens when organizations adopt EA through the lens of institutional theory. Therefore, the practical and theoretical distribution of this study lies between EA and information systems disciplines. In particular, it contributes to EA adoption and an institutional view on Information systems.

This section presented the contributions of the research and its implications for practices. Those contributions are drawn into two research streams. The research process started by identifying the root causes of the problems and strategies for the effective adoption of EA in organizations (e.g., the first stream; articles 2, 3 and 4), as well as the institutionalization process, including its stages, factors influencing the process, and the impact on organizations when they adopt EA (e.g., the second stream; articles 5 and 6). This research could be considered as a first step toward developing a theory for EA adoption processes in organizations.

6.1 The features of EA adoption in Vietnam

This section discusses EA adoption in the study's context. As an interpretive approach was chosen for this study, the context plays an important role in the findings (Davison & Martinsons, 2015).

First, the adoption of EA in the public sector is strongly influenced by governmental policies in the Western context, such as in the Netherlands, Demark, and the US (c.f., Janssen & Hjort-Madsen, 2007; Hjort-Madsen, 2007; Bui, 2015). Moreover, even though the literature did not clearly state the influence of the policies or the political visions of the government, policies are still one of the factors that play an important role in EA adoption in developing countries (c.f., Zheng & Zheng, 2013; Shaanika & Iyamu, 2015; Bakar, Selamat, & Kama, 2017). It was even more important in local government, as policies significantly affected EA adoption in health management information systems in the state of Tamil Nadu, India (Kaushik & Raman; 2014).

However, it seems that policies were not the biggest influence on EA adoption in Vietnam (c.f., Dang & Pekkola, 2017a). Instead, the roles of senior managers are very important for organizations starting to adopt EA. Particularly important are their perceptions and

assumptions about EA (c.f., Dang & Pekkola, 2016). It is interesting to note that in adoption in other fields in Vietnam, such as in e-procurement, the initiations are influenced by the government's policies and technology (c.f. Huang & colleagues, 2016). Organizations have to join the e-procurement systems in order to get contracts or take part in bidding procedures for their survival. Thus, market forces influence the adoption (Powell & DiMaggio, 1991). Those market forces, disruptions of technology, or legislation changes seem unlikely to significantly influence EA adoption, as is evident in this study.

Second, several countries have certain approaches for guidance in adopting EA in the public sector. Those approaches were published by their central governments (or Federal governments). In turn, local or state agencies can follow those approaches for adopting EA (c.f., OMB, 2012; US CIO, 1999, 2013; OIO, 2017; Seppänen, 2014). In contrast, the situations with frameworks, guidance, or approaches to EA adoption for the whole government seem not to have appeared yet in the developing world (c.f., Bakar, Selamat, & Kama, 2017). This could result in several consequences. For example, each agency has to invest in studying and finding appropriate EA approaches, architectures, and features, as happened in all four cases in this study. This may not be economical or strategic in comparison to the developed world, where they have certain guidelines that agencies can follow from the beginning of the adoption process.

Third, several problems have been recorded in EA adoption in both developed and developing countries (c.f., Seppänen, 2014; Syynimaa, 2015; Shaanika & Iyamu, 2015). Although most of the problems were also found in this research, it seems there are some problems appearing for the first time, including the influence of sponsors, users' conflicting benefits, and capabilities and skills. In particular, sponsors impacted the procurement requirements, processes, joint managements, and procedures of entire projects, as seen in Cases A and B (c.f. Dang & Samuli, 2016; Dang & Samuli 2017b), and conflicting benefits may lead to users sticking with existing approaches if using EA is optional, as seen in Case D (c.f., Dang, 2017). Moreover, the capability problems in EA adoption in this study supports the findings in ICT4D in relation to the capability issues, as the literature stated that in order to get ICTs adoption results, the focus should not be solely on whether users have ICT access or not but also on the need for enhanced information capabilities for disadvantaged communities, as in rural in Bolivia (Gigler, 2015). It is interesting to note that the capability approach has been suggested as an interesting topic of research in ICT4D in the years to come (Walsham, 2017).

6.2 Contribution to research

6.2.1 Contribution to EA literature

This study contributes to the literature by illustrating the different root causes of the problems in EA adoption, especially in the Vietnamese context. Those root causes can be categorized into four groups: root causes related to organizations who adopt EA (e.g., organization structure, legislation, and regulation and politics and sponsors); root causes related to project teams who deploy EA (e.g., EA team formation and EA team capability and skill); root causes related to users of EA products (e.g., User capability and skill and conflicting benefits), and root causes related to EA itself, as it contains multiple definitions, frameworks, understandings, and practices that allow subjective interpretations from different stakeholders (Bui, 2017). This could be important for both practitioners and researchers, as organizations should focus on the root causes of the problems instead of their consequences. Moreover, the literature focuses on problems (Isomäki & Liimatainen, 2008; Kim & Everest, 1994; Seppanen et al., 2009). This dissertation goes beyond this and attempts to understand the root causes and supports a new perspective on EA adoption in organizations.

The findings indicate that organizations faced less issues related to technology when they adopted EA and that technology is not a priority concern in EA adoption. Rather, the major concerns of organizations when they adopt EA are related to socio-technical problems. This contributes to the EA adoption perspectives, as IS literature has recently indicated that technology influences and is a source of problems in organizations' activities toward IS projects. Therefore, technology plays an important role in IS adoption (Ash, Berg, & Coiera, 2004; Dewett & Jones, 2001; Markus & Robey, 1988). The new angle of the findings can be explained by the fact that EA is about strategies, business, and IT alignment, and it is business oriented (Gregor et al., 2007; Ross et al., 2006). As a result, it constitutes very few technical and material items (Bui, 2017). Another possible reason is that, unlike in the developed world, where organizations have been adopting EA for decades and there are several information systems within and among organizations, in the context of this study, there are not many ISs within and among organizations, and most organizations have used simple technology for their IT adoption (Huang, Tran, Nguyen, & Nazir, 2016; Le, Rowe, Truex, & Huynh, 2012; Pham & Teich, 2013). This may lead to the technology problems in EA adoption not being identified as prominent issues.

When it comes to legitimacy strategies that organizations adopt in EA, this research provides understanding on how different legitimacy strategies are employed and how they

connect with problems in different tasks in EA initiation, which are given very incomplete and fragmented in EA adoption (Banaeianjahromi & Smolander, 2017). For example, seeking a common voice for EA frameworks and products seems to face major challenges and needs more legitimacy strategies than other tasks. This supports a new angle on EA frameworks and products, as previous literature has indicated the importance of EA product and framework quality (Lange et al., 2015; Schmidt & Buxmann, 2011). This observation emphasizes the need to focus on how different stakeholders reach such an agreement about products and EA frameworks. Moreover, it also indicates that although there are several frameworks and approaches for EA adoption, there is little agreement on appropriate frameworks for successful adoption in practice (Bui, 2015). In addition, the lack of consistent policy from the government in the context of this study may lead to the chaos in chosen EA frameworks and products.

In particular, some legitimacy strategies that appeared in this study seem to not usually be presented in the literature. For example, organizations have used political pressures and the promotion of project teams as legitimacy strategies to support their activities. A similar study on different legitimacy strategies has not been studied for EA. These findings are parallel to and consistent with the literature (c.f., Du, 2011; Flynn & Du, 2012; Suchman, 1995), so the results complement and enhance the existing body of knowledge on IS legitimacy.

The findings of this dissertation indicate the importance of the influence of managerial expectations and the assumptions of top management (e.g., senior managers, CIOs) about EA on the outcome of EA adoption. This extends the literature about top management's commitment (Zheng et al., 2013), managers' support (Krell et al., 2009; Teo & Pian, 2003; Yoon & George, 2013), and managers' participation (Liang et al., 2007) playing important roles in adopting IS. Thus, it adds a new angle indicating that the role of top management's assumptions and their expectations are also important for project outcomes. Concerning the context of this study, previous literature has indicated that projects received strong managers' support from top leaders (c.f., Obi & Nguyen, 2010), so did senior managers in those EA projects. However, the important issues that lead to effective adoption, as evidenced in this study, are leaders' capabilities and their assumptions about EA (e.g., capability to choose appropriate approaches, revising or changing EA features). As a result, top managers should thoroughly consider their assumptions about EA benefits and functions. This is because, as the empirical analysis revealed, it ultimately affects the directions of the project's timeline and outcomes. This study helps elaborate on the findings of Puuronen and Savolainen (1997), who stated the importance of flexibility and tailor-ability according to national and local requirements for organizations.

EA adoption, in some cases, is mandatory (e.g., the US and Finland have laws on EA), but in others is not, including this study's context. The findings suggest that policies, laws, and regulations are not key issues when it comes to EA adoption, especially in the public sector. This conflicts with the studies of Hjort-Madsen (2006, 2007), who addressed the importance of this matter. This could be explained by the fact that, in the context of those studies, agencies have to obey the law or legal documents in the adoption of EA in order to secure their resources. As a result, this study extends the literature by offering an alternative view of EA adoption.

Finally, regarding the outcomes of the EA adoptions, it seems that Case C was the most successful in comparison to the others (e.g., Cases A, B, and D), as Case C's model and approaches have been diffused, institutionalized, and recognized by the Premier Minister (c.f., Dang, 2017; Dang & Pekkola, 2017a). This means that other state agencies in different provinces within the country might use Case C as a best-practice case study for EA adoption. Moreover, Case C only used its own resources, flexibility, and tailoring approaches to develop its EA. While Cases A and B received strong resources from outside (e.g., human resources, finance), their success was somehow unclear. This contributes to the literature in the sense that organizations can successfully achieve EA adoption through internal leadership and resources. This finding confirms the study on the Klamath Tribes in Oregon, the USA, where important factors in ICT4D (e.g., external resource or technology) have not usually been identified as important in their practice, as Klamath Tribes did not search for external leadership or receive outside technology. Instead, they successfully used internal leadership and low-cost ICT to pursue their objectives (Young, 2018).

6.2.2 Contribution to IS literature

Institutional theory was used as a lens to study IS phenomenon with four main streams. They included a study on how organizational decisions are affected by institutions when they adopt IS, the institutionalization process, how institutions and IS interact, and discourse on institutionalization processes (Nielsen et al., 2014). The majority of the literature focuses on how institutions effect organizations' decisions to adopt IS (e.g., Jepperson, 1991; Teo et al., 2003). Therefore, this study contributes to the literature in that sense. In particular, this study focused on the institutionalization process, which is incomplete and fragmented in IS as well as EA studies (Mignerat & Rivard, 2009; Weiss et al., 2013). Thus, this contributes to the literature on how different sets of rules, norms, and values influence organizations in response to problems and their root causes in different phases of EA adoption. For example, the findings show that the importance of institutional elements varies over time. That is, values are important in early phases (e.g., initiation), while rules play significant roles in later phases (e.g., implementation) of EA

adoption. This study shows the importance of stakeholders' backgrounds, environments, and cultures (e.g., values), which could influence the approaches, frameworks, and scopes of the projects in the initiation phases, in contrast with other contexts, such as in the US and Denmark, where the importance of policies have been recorded (Hjort-Madsen, 2007).

Given that legitimacy is one of the most important concepts of institutional theory (Deephouse et al., 2017; Meyer & Rowan, 1977; Zucker, 1977), this finding sheds light on how organizations gain legitimacy in EA adoption. For example, cognitive and pragmatic legitimacy are characteristics that dominate EA initiation. This shows the importance of cognitive-culture, rather than rules and norms, in EA initiatives. The finding complements the work of Hsu and colleagues (2015), who stated that norms and rules play vital roles in IS adoption. This could be explained by the fact that Hsu and colleagues studied in the context of banking, where rules and regulations are well established and standardized, both locally and internationally, while in this study and EA in general, such rules and regulations are still far from achieved. Another possible reason is that this study focuses on the initiation phase, while Hsu and colleagues (2015) focused on later phases. Furthermore, it could also be explained that the nature of EA can be understood in several ways, depending on whom one asks (Bui, 2017), so the adoption of EA can vary based on the practitioners' backgrounds, relations, routines, and cultures.

Legitimacy strategies used for EA adoption in organizations have different instantiations in practice in the context of this study. This indicates that adopters need to prepare themselves for EA projects and acquire new skills. They cannot simply rely on old methods and approaches or on others' examples (Dang, 2017), as EA is pluralistic, nonlinear, organic contexts.

This dissertation explains how institutional processes occur, which few other studies in the EA literature have done (Mignerat & Rivard, 2009; Weiss et al., 2013). First, previous literature has indicated that, legislation, market forces, or the disruption of technology have caused innovations in the institutionalization process (c.f. Greenwood et al., 2002; Mignerat & Rivard, 2009; Tolbert & Zucker, 1996). In fact, several agencies have adopted EA because of the impact of policies, such as in Finland and the US (c.f., Hjort-Madsen, 2007; Seppänen, 2014). There is not clear evidence in the context of this research. Instead, the factors within an organization (e.g., senior managers) caused the innovation of the institutionalization process. Second, institutional logic (e.g., managerialism, professionalism, users, and EA itself) influenced the outcomes and phases in the institutionalization process, as they led to different choices and directions.

Moreover, the literature shows that institutional pressures and market forces affect how organizations change (Powell & DiMaggio, 1991). The findings provided evidence of the former and the later, but the later seem not to have clear evidence. This could be explained by the fact that the context of this study is the public sector, so market forces may play less important roles in change. In addition, the research provides insight into how internal (e.g., stakeholders and senior managers' cognitive-cultural factors) and external pressures (e.g., policies, professional committees) influence organizational changes and their stages (c.f. Figure 7). Those pressures led to organizational changes in culture, behaviors, choices, and activities. For example, external pressures, such as the national ranking ICT index, acted as the source of innovation in the institutionalization process and were presented as market forces, formal or informal policies that act as regulative pressures. Internal pressures acted as regulative pressures, forcing the organization to change and setting the directions of the changes in EA adoption. Moreover, cognitive-cultural pressures resulted from the interplay between stakeholders and senior managers, which influenced the stakeholders' behaviors and activities in the EA adoption process, either helping or hindering the change in organizations.

Those factors help organizations understand the different institutional factors that influence the EA adoption process. Although the different contexts may have different apparent pressures, they may have similar categories, as seen in Figure 7. Furthermore, the institutionalization process stages may not always be separate and may happen simultaneously, as evidenced in the empirical research (c.f. Dang & Pekkola, 2017a). This process is influenced by different logics from managers, users, professionals, and EA itself.

This study thus extends the literature on institutionalization in the EA context and in the micro level of analysis (Mignerat & Rivard, 2009; Weiss et al., 2013), since previous studies have mainly focused on the institutionalization of technology innovation (Swanson & Ramiller, 1997), challenges in institutionalization (e.g., organizational structure, administrative process, organizational politics, and technical capability) (Iyamu, 2009), institutional factors related to the effectiveness of the institutionalization (e.g., cause, constituents, content, control, and context) (Aier & Weiss, 2012a), and factors influencing the institutionalization process (e.g., social legitimacy, efficiency, organization grounding, trust, governance, goal alignment, and enforcement) (Weiss et al., 2013), and the relations between EA maturity and the effectiveness of IT resources (Bradley et al., 2012).

6.3 Implications for practice

The dissertation contributes to practice in several ways. The findings point out challenges and their possible root causes when adopting EA into organizations. For example, eight root causes (e.g., organization structure, legislation and regulation, politics and sponsors, EA team formation, EA team capability and skill, user capability and skill, user conflicting benefits, and EA fundamentals) were identified that lead to several consequences. Hence, practitioners should focus on the root causes instead of their consequences. This would prevent the problems for emerging in the first place in EA adoption and thus provide an effective approach for EA adoption.

Moreover, this dissertation also provided examples of how practitioners can handle those root causes. For example, rule activities range from policies for increasing the power of EA project management units to procedures for hiring experts as members of the project in order to overcome root causes related to politics and sponsors. It is also characterized by the loosely coupling of the government regarding local government models to cope with root causes related to regulations and legislation. Norms have been used to fulfill the capabilities of project team members and users in organized professional training, on-job training, conferences, and seminars. Forums, workshops, or establishing an EA chapter through ICT committees has been used as a norm to overcome root causes related to EA fundamentals. To deal with root causes related to organizational structure, they promoted EA project teamwork under top managers, or senior managers served as project managers. They are also flexible in order to form an EA team (e.g., as a part of an IT project). In dealing with root causes related to conflict benefits, they allowed more time to recognize the benefits or extensive applications of EA work as organizational procedures. These activities may assist organizations in gaining a better and deeper understanding, then designing strategies appropriately that respond to each challenge of the complex phenomena of EA adoption. This would provide an approach for the effective adoption of EA in organizations, especially in the adoption of IS projects in the public sector in Vietnam, which are limited or fail in some way (Ngo, Ma, & Gim, 2015; Obi & Nguyen, 2010). Furthermore, previous studies have stated that training users could be one of the first steps in effective IS adoption in the public sector in Vietnam (c.f., Tran, Seldon, Chu, & Nguyen, 2006; Phan & Nguyen, 1995). This study extends those results by pointing out several activities for overcoming this problem.

Seeking user commitment and support is one of the success factors in EA adoption. However, the literature does not provide insight into how to seek such commitment (Dang & Pekkola, 2017b; Lange et al., 2015; Schmidt & Buxmann, 2011). Therefore, this study provides help by offering ten legitimacy strategies. This supports the practitioners' in-

depth understanding of what happens and how when EA or other complex functions are first introduced into organizations (Vilminko-Heikkinen & Pekkola, 2017). Given that legitimacy is a vital issue for gaining success in IS projects (Flynn & Du, 2012; Harmon et al., 2015; Zimmerman & Zeitz, 2002), this dissertation's list of legitimacy strategies will enable practitioners to assess and prevent potential challenges by instructing them on how to legitimate one's ideas, projects, practices, or systems, ultimately increasing the effectiveness of the EA adoption.

The characteristics of the legitimacy strategies have been identified in EA adoption, that is, the importance of cognitive-culture in EA initiatives. Three categories of legitimacy strategies were also identified (e.g., legitimacy strategies for providers, legitimacy for seekers, and legitimacy used by seekers to enforce and convince providers). Practitioners can use these to propose strategies for gaining legitimacy for each stakeholders group, which has been identified as the biggest challenge in deploying IS (Flynn & Du, 2012).

6.4 Limitations

This study has its limitations. As it used the qualitative interpretive approach to study four cases and their specific stakeholders, settings, and environments in a single country, there are some biases and limitations in the research. First, there are limitations related to the descriptive validity, that is, the accuracy of the data collection, as the researcher may have brought biases into the data collection. During the data collection process, the researcher constantly cross checked the interview data transcripts, notes taken, and secondary data to validate the events, activities, and tasks that informants were involved in during EA adoption. Moreover, due to the projects' events, activities, and tasks having occurred before the interviews were conducted, the informants may have struggled to recall those events. To deal with those problems, the secondary data (e.g., the diaries, human-resources assignments, project plans, and schedules) were studied first. Then the projects' timelines were built with the project managers, and the timelines were used in discussion with the informants during the interview process. This helped the informants and interviewer to limit the biases of the data collection. Further, the researcher was able to discuss the projects' events with several of the same senior managers twice. Some of the projects' incidents were able to be triangulated, thus overcoming some of the limitations associated with recollection. Further, as open-ended interviews were used, the researcher faced digression from the original objectives. However, this limitation was handled by revisiting the transcriptions, and there were opportunities to revisit the informants if necessary.

Second, there are limitations related to the interpretive validity (i.e.., limitations related to reliability), as there was only one coder during the qualitative analysis process. However, this may have been reduced by recoding the data at various times and also by discussing the findings with the co-author. Moreover, this study used an interpretive approach with the aim of explaining what happens in certain settings. The dissertation stuck with theoretical lenses and thoughtful, thorough analysis processes, which should improve various concerns about reliability (Kaplan & Maxwell, 1994; Silverman & Marvasti, 2008).

Third, there are theoretical validity issues related to this study, as the researcher may have brought biases to the findings, as is characteristic in the qualitative approach. During the process of analysis, the author considered all the aspects of the data that emerged and also crosschecked pre-assumptions through the lenses of theory and several data sources. This may have reduced some biases in the research.

Fourth, the research used analytic generalizability rather than statistical generalizability (Lee & Baskerville, 2003). One could argue that this is limiting when it comes to the others' settings. However, the findings of the dissertation can be transferred to similar settings in other organizations, such as state agencies, the health sector, universities, and businesses adopting EA. Therefore, the results are transferrable to settings with similar conditions, such as the cases sharing similar incomes, limitations in ICT infrastructure, human capacity, percentage of online services, and limitations of public resources with other "middle e-government development index" group countries, such as Thailand, Malaysia, and China (UNPACS, 2014). This also might benefit other settings when it comes to the root causes of problems, the strategies, and the institutionalization process of EA adoption. Moreover, an effort to study the subjects raised on this dissertation would help better understand the transferability of the findings to other settings.

As the research focused on certain EA adoption contexts and phenomena in Vietnam's four cases (e.g., root causes, strategies, institutionalization), this may lead to the findings being strictly bound within the complex phenomena (Walsham, 1995). However, it could be argued that EA adoption and its phenomena in this study resemble the root causes of problems, strategies, and institutionalization of any socio-technical assemblage.

6.5 Future research

The research opens many possibilities for future research. First, the research is a starting point for developing process theories or frameworks for the effective adoption of EA in

organizations. It could focus on different settings (e.g., countries, industries, lines of business) with cross-field analysis for a better understanding of the phenomena (e.g., challenges, causes, solutions) and, thus, provide a better generalizability for understanding how organizations shape, diffuse, and institutionalize EA at multi-levels over time.

Second, future research could also focus on legitimacy strategies in different phases (e.g., implementation, or post-implementation) and with a wider range of stakeholders rather than those chosen in this study. Such studies would then provide a comprehensive understanding of the institutionalization process and the complex phenomena of EA adoption, for instance, how organizational activities evolve under different institutional conditions and how stakeholders affect organizational activities under different institutional conditions.

Third, technology plays an important role in successful IS projects (Ash et al., 2004; Dewett & Jones, 2001; Markus & Robey, 1988). However, this research did not reveal any issues relating to technology, leading to the need for more research on the matter.

Fourth, further research could also focus on EA adoption's impact on others in the view of organizational changes, such as the management of change and logic of change. Moreover, future research could also focus on EA adoption from different angles to understand deeper phenomena, such as context, content, process, outcomes, and leadership (Kuipers et al., 2014). In addition, all stakeholders and their activities, behaviors, and reactions could be examined in the view of institutional logics, or institutional contradictions concepts as part of the analysis, this could help generate insight on the phenomena and compare these to other disciplines, such as finance or economics (Burns & Vaivio, 2001). Furthermore, several institutional logics have been identified in this study. Future research could focus more on insights into those logics, such as tensions, conditions, and dominant logics in different cases.

Finally, future research could also focus on different angles (e.g., sectional changes, sub-sections) and stakeholders' roles and behaviors in the institutionalization stages by conducting a longitudinal case study.

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References

Aanestad, M., Jolliffe, B., Mukherjee, A., & Sahay, S. (2014). Infrastructuring Work: Building a State-Wide Hospital Information Infrastructure in India. *Information Systems Research,* 25(4), 834-845.

Aagesen, G., van Veenstra, A., Janssen, M., & Krogstie, J. (2011). The Entanglement of Enterprise Architecture and IT-Governance: The Cases of Norway and the Netherlands, Proceedings of the 44th HICSS.

Aier, S. (2014). The role of organizational culture for grounding, management, guidance and effectiveness of enterprise architecture principles. *Information Systems and e-Business Management,* 12(1), 43-70.

Aier, S., & Weiss, S. (2012a). An Institutional Framework for Analyzing Organizational Responses to the Establishment of Architectural Transformation, *ECIS 2012 Proceedings, Barcelona.*

Aier, S., & Weiss, S. (2012b). *Facilitating Enterprise Transformation Through Legitimacy –An Institutional Perspective.* In: Multikonferenz Wirtschaftsinformatik 2012, Gito, Braunschweig, pp. 1073–1084 (2012).

Aldrich, H. E., & Fiol, C. M. (1994). Fools Rush in? The Institutional Context of Industry Creation. *The Academy of Management Review,* 19(4), 645-670.

Anthopoulos, L. G., Gerogiannis, V., & Fitsilis, P. (2010). *The Impact of Enterprise Architecture's Absence in e-Government Development: the Greek Case.* Paper presented at the Information Society Conference.

Alwadain, A., Fielt, E., Korthaus, A., & Rosemann, M. (2015). Empirical insights into the development of a service-oriented enterprise architecture. *Data & Knowledge Engineering,* 105, 39-52.

Armour, F. J., & Kaisler, S. H. (2001). Enterprise Architecture: Agile Transition and Implementation. *IT Professional, 3 (6), 30-37.*

Armour, F. J., Kaisler, S. H., & Liu, S. Y. (1999). Building an enterprise architecture step by step. *IT Professional, 1 (4), 31-39.*

Ash, J. S., Berg, M., & Coiera, E. (2004). Some Unintended Consequences of Information Technology in Health Care: The Nature of Patient Care Information System-related Errors. *Journal of the American Medical Informatics Association,* 11(2).

Ask, A., & Hedström, K. (2011). Taking Initial Steps towards Enterprise Architecture in Local Government. In K. N. Andersen, E. Francesconi, Å. Grönlund & T. M. v. Engers (Eds.), *Proceedings of the 2nd EGOVIS*. Toulouse, France.

Avgerou, C., & Walsham, G. (2017). *Information Technology in Context: Studies from the Perspective of Developing Countries*. New York: Routledge.

Azad, M. A. K., Khan, M. A. A., & Alam, M. (2008). *Government enterprise architectures: present status of Bangladesh and scope of development.* Proceeding ICEGOV '08, 459-460 ACM New York, NY, USA ©2008.

Bakar, N. A. A., Selamat, H., & Kama, M. N. (2017). Assessing the Capability and Priority of Enterprise Architecture Implementation in Malaysian Public Sector, *PACIS 2017 Proceedings. 79.*

Banaeianjahromi, N., & Smolander, K. (2016). What do we know about the role of enterprise architecture in enterprise integration? A systematic mapping study. *Journal of Enterprise Information Management,* 29(1), 140 - 164.

Banaeianjahromi, N., & Smolander, K. (2017). Lack of Communication and Collaboration in Enterprise Architecture Development. *Information Systems Frontiers*, 1-32.

Baptista, J., Newella, S., & Curriea, W. (2010). Paradoxical Effects of Institutionalisation on the Strategic Awareness of Technology in Organisations. *Journal of Strategic Information Systems,* 19(3), 171-183.

Bell, M., & Pavitt, K. (1993). Technological accumulation and industrial growth: contrasts between developed and developing countries. *Industrial and Corporate Change,* 2(2), 157–210.

Bellman, B., & Rausch, F. (2004). Enterprise Architecture for e-Government. In R. Traunmüller (Ed.), *EGOV 2004* (pp. 48-56). Zaragoza, Spain.

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The Case Research Strategy in Studies of Information Systems. *MIS Quarterly,* 11(3), pp. 369-386.

Berente, N., & Yoo, Y. (2012). Institutional Contradictions and Loose Coupling: Postimplementation of NASA's Enterprise Information System. *Information Systems Research,* 23(2), 376–396.

Bernard, S. A. (2012). *An Introduction to Enterprise Architecture*. Bloomington, In: (Third edition) Bloomington: AuthorHouse.

Bhattacherjee, A., & Hikmet, N. (2007). Physicians' resistance toward healthcare information technology: a theoretical model and empirical test. *European Journal of Information Systems,* 16(6), 725–737.

Bischoff, S., Aier, S., & Winter, R. (2014). *Use It or Lose It? The Role of Pressure for Use and Utility of Enterprise Architecture Artifacts.* Paper presented at the 2014 IEEE 16th Conference on Business Informatics.

Bloomberg, J. (2014). *Is Enterprise Architecture Completely Broken?* Retrieved August 8, 2015, from http://www.forbes.com/sites/jasonbloomberg/2014/07/11/is-enterprisearchitecture-completely-broken/

Boh, W. F., & Yellin, D. (2006). Using Enterprise Architecture Standards in Managing Information Technology. *Journal of Management Information Systems,* 23(3), 163-207.

Boudreau, M.-C., & Robey, D. (2005). Enacting Integrated Information Technology: A Human Agency Perspective. *Organization Science,* 16(1), 3 - 18.

Bradley, R. V., Pratt, R. M. E., Byrd, T. A., Outlay, C. N., & Wynn, D. E. (2012). Enterprise architecture, IT effectiveness and the mediating role of IT alignment in US hospitals. *Information Systems Journal,* 22(2), 97-127.

Brown, A. D. (1995). Managing understandings: politics, symbolism, niche marketing and the quest for legitimacy in IT implementation. *Organization Studies,* 16(6), 951–969.

Brown, S. A., Massey, A. P., Montoya-Weiss, M. M., & Burkman, J. R. (2002). Do I really have to? User acceptance of mandated technology. *European Journal of Information Systems,* 11(283-295).

Bruls, W. A. G., Steenbergen, M. v., Foorthuis, R. M., Bos, R., & Brinkkemper, S. (2010). Domain Architectures as an Instrument to Refine Enterprise Architecture. *Communications of the Association for Information Systems,* Vol. 27, Article 27.

Bui, Q. (2015). Increasing the Relevance of Enterprise Architecture through "Crisitunities" in U.S. State Governments. *MIS Quarterly Executive,* 14(4).

Bui, Q. N. (2017). Evaluating Enterprise Architecture Frameworks Using Essential Elements. *Communications of the Association for Information Systems,* 41, 6.

Bui, Q. N., & Levy, M. (2017). Institutionalization of Contested Practices: A Case of Enterprise Architecture Implementation in a US State Government, *Proceedings of the 50th HICSS*.

Burnes, B. (2004). *Managing Change* (Fourth ed.): Pearson.

Burns, J., & Vaivio, J. (2001). Management accounting change. *Management Accounting Research,* 12, 389–402.

Carota, S., Corradini, F., & Re, B. (2010). *The role of applicative cooperation in the Marche Region Enterprise Architecture.* Paper presented at the eChallenges.

Chakravarthy, B., & Gargiulo, M. (1998). Maintaining leadership legitimacy in the transition to new organizational forms. *Journal of Management Studies,* 35(4), 437–456.

Chen, Y. N., Chen, H. M., Huang, W., & Ching, R. K. H. (2006). E-Government Strategies in Developed and Developing Countries: An Implementation Framework and Case Study. *Journal of Global Information Management,* 14(1), 23-46.

Cho, S., & Mathiassen, L. (2007). The Role of Industry Infrastructure in Telehealth Innovations: A Multi-level Analysis of a Telestroke Program. *European Journal of Information Systems,* 16(6), 738-750.

Chuang, C.-H., & van Loggerenberg, J. (2013). *Challenges Facing Enterprise Architects: A South African Perspective.* Paper presented at the 43rd HICSS, HI.

Chung, L., Song, H.-K., Song, Y.-T., & Subramanian, N. (2009). Understanding the Role of Enterprise Architecture towards Better Institutionalization, *10th ACIS*: IEEE.

Cloutier, C., & Langley, A. (2013). The Logic of Institutional Logics: Insights From French Pragmatist Sociology. *Journal of Management Inquiry,* 22(4), 360–380.

Creswell, J. W., & Miller, D. L. (2000). Determining Validity in Qualitative Inquiry. *Theory Into Practice,* 39(3), 124-130.

Dada, D. (2006). The Failure of E-Government in Developing Countries: A Literature Review. *The Electronic Journal of Information Systems in Developing Countries,* 26(1), 1-10.

Dang, D. D. (2017). Enterprise Architecture Institutionalization: A Tale of Two Cases, *In Proceedings of the 25th ECIS,* AIS.

Dang, D. D., & Pekkola, S. (2016). Institutionalising Enterprise Architecture in the Public Sector in Vietnam, *In Proceedings of the 24th ECIS,* AIS.

Dang, D. D., & Pekkola, S. (2017a). Enterprise Architecture and Organizational Reform: A Debrief of the Project, *In Proceedings of the 21st PACIS,* AIS.

Dang, D. D., & Pekkola, S. (2017b). Problems of Enterprise Architecture Adoption in the Public Sector: Root Causes and Some Solutions. In L. Rusu & G. Viscusi (Eds.), *Information Technology Governance in Public Organizations: Theory and Practice*: Springer International Publishing.

Dang, D. D., & Pekkola, S. (2017c). Systematic Literature Review on Enterprise Architecture in the Public Sector. *Electronic Journal of e-Government,* 15(2), 130-154.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly,* 13(3), 319-340.

Davison, R. M., & Martinsons, M. G. (2015). Context is king! Considering particularism in research design and reporting. *Journal of Information Technology,* 31(3), 241–249.

Deephouse, D. L. (1996). Does Isomorphism Legitimate? *The Academy of Management Journal,* 39(4), 1024-1039.

Deephouse, D. L., & Suchman, M. (2008). Legitimacy in organizational institutionalism. In R. Greenwood, C. Oliver, R. Suddaby & K. Sahlin-Andersson (Eds.), *The SAGE Handbook of Organizational Institutionalism* (pp. 49-77).

Deephouse, D. L., Bundy, J., Tost, L. P., & Suchman, M. C. (2017). Organizational legitimacy: Six key questions. In R. Greenwood, C. Oliver, T. B. Lawrence & R. E. Meyer (Eds.), *The SAGE Handbook of Organizational Institutionalism (2nd ed.)* (pp. 928): Thousand Oaks CA: Sage.

Dewett, T., & Jones, G. R. (2001). The role of information technology in the organization: a review, model, and assessment. *Journal of Management,* 27(3).

Dietz, J. L. G. (2008). *Architecture: Building Strategy Into Design*: Academic Service.

DiMaggio, P. J., & Powell, W. W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *American Sociological Review,* 48(2), 147-160.

Du, Y. (2011). Seeking stakeholder support and approval: a case study of legitimation process in an information system development project. *Int. J. Business and Systems Research,* 5(2).

Du, Y., & Flynn, D. (2010). *Exploring the legitimation seeking Activities in an Information System Project.* Paper presented at the ICIS 2010.

Dumas, M., Mendling, J., Rosa, M. L., & Reijers, H. A. (2013). *Fundamentals of Business Process Management*: Springer.

Dwivedi, Y. K., Wastell, D., Laumer, S., Henriksen, H. Z., Myers, M. D., Bunker, D., et al. (2014). Research on information systems failures and successes: Status update and future directions. *Inf Syst Front*.

Ebneter, D., Grivas, S. G., Kumar, T. U., & Wache, H. (2010). Enterprise Architecture Frameworks for Enabling Cloud Computing, *IEEE 3rd International Conference on Cloud Computing*. Miami, FL, USA: IEEE.

Eisenhardt, K. M. (1988). Agency- and Institutional-Theory Explanations: The Case of Retail Sales Compensation. *Academy of Management,* 31(3), 488-511.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review,* 14(4), 532-550.

Ewusi-Mensah, K. (1997). Critical issues in abandoned information systems development projects. *Communications of the ACM,* 40(9), 74-80.

Farwick, M., Agreiter, B., Breu, R., Häring, M., Voges, K., & Hanschke, I. (2010). Towards Living Landscape Models: Automated Integration of Infrastructure Cloud in Enterprise Architecture Management, *IEEE 3rd International Conference on Cloud Computing*. Miami, FL, USA: IEEE.

Flynn, D., & Du, Y. (2012). A case study of the legitimation process undertaken to gain support for an information system in a Chinese university. *European Journal of Information Systems,* 21, 212–228.

Flynn, D., & Hussain, Z. (2004). *Seeking Legitimation for an Information System: A Preliminary Process Model.* Paper presented at the ECIS, AIS.

Flynn, D., & Puarungroj, W. (2006). *The dynamics of the legitimation process in an information systems project: an interpretive analysis.* Paper presented at the Proceedings of 14th ECIS, Goteborg, Sweden.

Foorthuis, R., Steenbergen, M. v., Brinkkemper, S., & Bruls, W. A. G. (2016). A theory building study of enterprise architecture practices and benefits. *Information Systems Frontiers,* 18(3), 541–564.

Forman, C., King, J. L., & Lyytinen, K. (2014). Special Section Introduction—Information, Technology, and the Changing Nature of Work. *Information Systems Research,* 25(4), 789-795.

Friedland, R., & Alford, R. R. (1991). Bringing Society Back In: Symbols, Practices, and Institutional Contradictions. In W. W. Powell & P. J. DiMaggio (Eds.), *The New Institutionalism in Organizational Analysis* (pp. 232-263). Chicago: University of Chicago Press.

Gallaugher, J. and Stoller, G. (2004), Software Outsourcing in Vietnam: A Case Study of a Locally Operating Pioneer*. The Electronic Journal of Information Systems in Developing Countries*, 17: 1–18.

Gibbons, M. T. (1987). Introduction: the Politics of Interpretation. In M. T. Gibbons (Ed.), *Interpreting Politics* (pp. 1-31). New York: New York University Press.

Gigler, B.-S. (2015). *Development as freedom in a digital age : experiences of the rural poor in Bolivia*. Washington, DC: The World Bank.

Glaser, B., & Strauss, A. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*.

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report,* 8(4), 597-607.

Goodhue, D. L., & Thompson, R. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly,* 19(2), 213-236.

Greenwood, R., & Hinings, C. R. (1996). Understanding Radical Organizational Change: Bringing together the Old and the New Institutionalism. *The Academy of Management Review,* 21(4), 1022-1054.

Greenwood, R., Suddaby, R., & Hinings, C. R. (2002). Theorizing Change: The Role of Professional Associations in the Transformation of Institutionalized Fields. *The Academy of Management Journal0,* 45(1), 58-80.

Gregor, S. (2006). The Nature of Theory in Information Systems. *MIS Quarterly,* 30(3), 611-642.

Gregor, S. (2017). On Theory. In R. D. Galliers & M.-K. Stein (Eds.), *The Routledge Companion to Management Information Systems* (pp. 608): Routledge.

Gregor, S., Hart, D., & Martin, N. (2007). Enterprise Architectures: Enablers of Business Strategy and IS/IT Alignment in Government. *Information Technology & People,* 20(2), 96-120.

Gøtze, J., Christiansen, P. E., Mortensen, R. K., & Paszkowski, S. (2009). Cross-National Interoperability and Enterprise Architecture. *Informatica*, 20(3), 369-396.

Harmon, D. J., Green, S. E., & Goodnight, G. T. (2015). A Model of Rhetorical Legitimation: The Structure of Communication and Cognition Underlying Institutional Maintenance and Change. *Academy of Management Review,* 40(1), 76–95.

Hauder, M., Roth, S., Matthes, F., & Schulz, C. (2013). *An Examination of Organizational Factors Influencing Enterprise Architecture Management Challenges.* Paper presented at the 21st ECIS, the Netherlands.

Haunschild, P., & Chandler, D. (2008). Institutional-Level Learning: Learning as a Source of Institutional Change. In R. Greenwood, C. Oliver, R. Suddaby & K. Sahlin (Eds.), *The SAGE Handbook of Organizational Institutionalism*: SAGA.

Hiekkanen, K. K., J.J.; Collin, J.; Patricio, E.; Helenius, M.; Mykkanen, J. (2013). *Architects' Perceptions on EA Use -- An Empirical Study.* Paper presented at IEEE 15th Conference on Business Informatics (CBI).

Hjort-Madsen, K. (2006). Enterprise Architecture Implementation and Management: A Case Study on Interoperability, *Proceedings of the 39th HICSS,* Hawaii.

Hjort-Madsen, K. (2007). Institutional patterns of enterprise architecture adoption in government. *Transforming Government: People, Process and Policy,* 1(4), 333-349.

Hjort-Madsen, K., & Gøtze, J. (2004). *Enterprise Architecture in Government - Towards a Multi-Level Framework for Managing IT in Government.* Paper presented at the Proceedings of ECEG04, Dublin, Ireland.

Hjort-Madsen, K., & Pries-Heje, J. (2009). Enterprise Architecture in Government: Fad or Future? *Proceedings of the 42nd HICSS*. Waikoloa, Big Island, Hawaii.

Ho, T. M., Nguyen, H. V., Vuong, T.-T., Dam, Q.-M., Pham, H.-H., & Vuong, Q.-H. (2017). Exploring Vietnamese co-authorship patterns in social sciences with basic network measures of 2008-2017 Scopus data. *F1000Research*, *6*, 1559.

Hollands, R. G. (2008). Will the real smart city please stand up? Intelligent, progressive or entrepreneurial? *Cities,* 12(3).

Hoogervorst, J. A. P. (2004). Enterprise architecture: Enabling integration, agility and change. *Int. J. Coop. Info. Syst.,* 13.

Hoogervorst, J. A. P. (2009). *Enterprise Governance and Enterprise Engineering*: Springer.

Hope, T., Chew, E., & Sharma, R. (2017). The Failure of Success Factors: Lessons from Success and Failure Cases of Enterprise Architecture Implementation, *SIGMIS-CPR'17*.

Hsu, C., Lin, Y.-T., & Wang, T. (2015). A legitimacy challenge of a cross-cultural inter-organizational information system. *European Journal of Information Systems,* 24, 278-294.

Huang, D. C., Tran, Q. D., Nguyen, T. Q. T., & Nazir, S. (2016). Initial Adoption vs. Institutionalization of E-Procurement in Construction Firms: The Role of Government in Developing Countries. In *Web Design and Development: Concepts, Methodologies, Tools, and Applications*: IGI Global.

Hussain, Z. I., & Cornelius, N. (2009). The use of domination and legitimation in information systems implementation. *Information Systems Journal,* 19, 197-224.

Hussein, S. S., Mahrin, M. N. r., & Maarop, N. (2017). Preliminary Study of Malaysian Public Sector (MPS) Transformation Readiness through Enterprise Architecture (EA) Establishment, *PACIS 2017 Proceedings. 229*.

Huysmans, P., & Verelst, J. (2013). Towards an Engineering-Based Research Approach for Enterprise Architecture: Lessons Learned from Normalized Systems Theory. In X. Franch & P. Soffer (Eds.), *Advanced Information Systems Engineering Workshops* (pp. 58-72): Springer.

Isomäki, H., & Liimatainen, K. (2008). Challenges of Government Enterprise Architecture Work – Stakeholders' Views. In M. A. Wimmer, H. J. Scholl & E. Ferro (Eds.), *EGOV 2008* (pp. 364-374). Turin, Italy.

Iyamu, T. (2009). *The Factors Affecting Institutionalisation of Enterprise Architecture in the Organisation.* Paper presented at the IEEE CEC '09, pp. 221-225.

Iyamu, T. (2011). Institutionalisation of the Enterprise Architecture: The Actor-Network Perspective. *International Journal of Actor-Network Theory and Technological Innovation,* 3(1), 27-38.

Jahani, B., Javadein, S. R. S., & Jafari, H. A. (2010). Measurement of enterprise architecture readiness within organizations. *Business Strategy Series,* 11(3), 177-191.

Janssen, M., & Hjort-Madsen, K. (2007). *Analyzing Enterprise Architecture in National Governments: The Cases of Denmark and the Netherlands.* Paper presented at the Proceedings of the 40th HICSS, Hawaii.

Janssen, M., & Klievink, B. (2012). Can enterprise architectures reduce failure in development projects? *Transforming Government: People, Process and Policy,* 6, 1 (27 – 40).

Jasperson, J. S., Carte, T. A., Saunders, C. S., Butler, B. S., Croes, H. J. P., & Zheng, W. (2002). Review: Power and Information Technology Research: A Metatriangulation Review. *MIS Quarterly,* 26(4), 397-459

Jensen, C. T. (2011). Integrating EA and BPM Synergistically: Methodologically Combining Planning and Delivery, *2011 IEEE 13th Conference on Commerce and Enterprise Computing*. Luxembourg: IEEE.

Jepperson, R. L. (1991). Institutions, Institutional Effects, and Institutionalization. In W. W. Powell & P. J. DiMaggio (Eds.), *The New Institutionalism in Organizational Analysis* (pp. 143–163). Chicago: University of Chicago Press.

Jovchelovitch, S., & Bauer, M. W. (2000). Narrative interviewing. In M. W. Bauer & G. Gaskell (Eds.), *Qualitative Researching with Text, Image and Sound: a practical handbook*. London: SAGE Publications.

Jusuf, M. B., & Kurnia, S. (2017). Understanding the Benefits and Success Factors of Enterprise Architecture, Proceedings of the 50th HICSS.

Kaganer, E., Pawlowski, S. D., & Wiley-Patton, S. (2010). Building Legitimacy for IT Innovations: The Case of Computerized Physician Order Entry Systems. *Journal of the Association for Information Systems,* 11(1), 1-33.

Kaisler, S. H., & Armour, F. (2017). 15 Years of Enterprise Architecting at HICSS: Revisiting the Critical Problems, *Proceedings of the 50th HICSS,* Hawaii.

Kaisler, S. H., Armour, F., & Valivullah, M. (2005). *Enterprise Architecting: Critical Problems.* Paper presented at the 38th HICSS, Hawaii.

Kaplan, B., & Maxwell, J. A. (1994). Qualitative Research Methods for Evaluating Computer Information Systems. In J. G. Anderson, C. E. Aydin & S. J. Jay (Eds.), *Evaluating Health Care Information Systems: Methods and Applications* (pp. pp. 45-68). CA: Sage, Thousand Oaks.

Kasemsap, K. (2015). The Role of Information System within Enterprise Architecture and their Impact on Business Performance. In M. Wadhwa & A. Harper (Eds.), *Technology, Innovation, and Enterprise Transformation* (pp. 262-284). Hershey, PA: IGI Global.

Kaushik, A., & AparnaRaman. (2014). The new data-driven enterprise architecture for e-healthcare: Lessons from the Indian public sector. *Government Information Quarterly,* 32 (1), 63-74.

Keable, M., Landry, M., & Banville, C. (1998). The legitimacy gap between IS professionals and users. *Communications of the ACM,* 41(5), 146-156.

Kemper, E. A., Stringfield, S., & Teddlie, C. (2003). Mixed methods sampling strategies in social science research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of Mixed Methods in Social & Behavioral Research* (pp. 273–296). Thousand Oaks, CA: Saga.

Khalifa, M., & Davison, R. M. (2006). SME adoption of IT: the case of electronic trading systems. *IEEE Transactions on Engineering Management,* 53(2), 275-284.

Kim, J.-W., Kwon, J.-H., Kim, Y.-G., Song, C.-Y., Kim, H.-S., & Baik, D.-K. (2006). EA-FoC: Enterprise Architecture Framework Based on Commonality. *Journal of Computer Science and Technology,* 21(6), 952–964.

Kim, Y.-G., & Everest, G. (1994). Building an IS Architecture: Collective Wisdom from the Field. *Information and Management,* 26(1), 1-11.

Kitchenham, B. A., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering*. Department of Computer Science University of Durham Durham, UK.

Klein, H. K., & Hirschheim, R. A. (1989). Legitimation in information systems development: a social change perspective. *Office: Technology and People,* 5(1), 29-46.

Klein, H. K., & Myers, M. D. (1999). A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. *MIS Quarterly, Special Issue on Intensive Research,* 23(1), pp. 67-93.

Kohli, R., & Kettinger, W. J. (2004). Informating the clan: controlling physicians' costs and outcomes. *MIS Quarterly,* 28(3), 363-394.

Kotusev, S. (2017). Enterprise Architecture: What Did We Study? *International Journal of Cooperative Information Systems,* 26 (4).

Kotusev, S., Singh, M., & Storey, I. (2015a). *Consolidating Enterprise Architecture Management Research.* Paper presented at the 48th HICSS, HI.

Kotusev, S., Singh, M., & Storey, I. (2015b). *Investigating the Usage of Enterprise Architecture Artifacts.* Paper presented at the ECIS 2015.

Kotusev, S., Singh, M., & Storey, I. (2016). Enterprise Architecture Practice in Retail: Problems and Solutions. *Journal of Enterprise Architecture,* 12(3).

Krell, K., Matook, S., & Matook, F. (2009). The Effects of Regulatory Pressure on Information Systems Adoption Success: An Institutional Theorey Pespecitve, *ECIS*.

Kuipers, B. S., Kickert, W., Tummers, L., Grandia, J., Voet, J. v. d., & Higgs, M. (2014). The Management of Change in the Public Organizations: A Literature Review. *Public Administration,* 92(1), 1-20.

Lange, M., Mendling, J., & Recker, J. (2012). Measuring the realization of benefits from enterprise architecture management. *Journal of Enterprise Architecture,* 8(2), 30-44.

Lange, M., Mendling, J., & Recker, J. (2015). An empirical analysis of the factors and measures of Enterprise Architecture Management success. *European Journal of Information Systems,* 25(5), 411–431.

Lapalme, J. (2012). Three Schools of Enterprise Architecture. *IT Professional, 14 (6), 37-43.*

Lapalme, J., Gerber, A., Merwe, A. V. d., Zachmand, J., Vries, M. D., & Hinkelmann, K. (2016). Exploring the future of enterprise architecture: A Zachman perspective. *Computers in Industry,* 79, 103–113.

Le, V. H., Rowe, F., Truex, D., & Huynh, M. Q. (2012). An Empirical Study of Determinants of E-Commerce Adoption in SMEs in Vietnam: An Economy in Transition. *Journal of Global Information Management,* 20(3), 23–54.

Lee, A. S., & Baskerville, R. L. (2003). Generalizing Generalizability in Information Systems Research. *Information Systems Research,* 14 (3), 221–243.

Lee, J. D., & Kwon, Y. I. (2013). *A study on strategy planning and outcome of EA in Korea.* Paper presented at the 15th ICACT.

Lemmetti, J., & Pekkola, S. (2012). Understanding Enterprise Architecture: Perceptions by the Finnish Public Sector. In H. J. Scholl, M. Janssen, M. Wimmer, C. Moe & L. Flak (Eds.), *EGOV 2012* (pp. 162-173). Kristiansand, Norway.

Lemmetti, J., & Pekkola, S. (2014). *Enterprise architecture in public ICT procurement in Finland.* Paper presented at the IFIP WG 8.5 EGOV and ePart 2014, Dublin, Ireland.

Leonardi, P. M. (2014). Social Media, Knowledge Sharing, and Innovation: Toward a Theory of Communication Visibility. *Information Systems Research,* 25(4), 796-816.

Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of Enterprise Systems: The Effect of Institutional Pressures and the Mediating Role of Top Management. *MIS Quarterly,* 31(1), 59-87.

Liimatainen, K., Hoffmann, M., & Heikkilä, J. (2007). *Overview of Enterprise Architecture work in 15 countries*: Ministry of Finance, State IT Management Unit, Research reports 6b.

Lin, C., & Nguyen, C. (2011). Exploring E-Payment Adoption in Vietnam and Taiwan. *The Journal of Computer Information Systems,* 51(4), 41-52.

Lucke, C., Krell, S., & Lechner, U. (2010). *Critical Issues in Enterprise Architecting—A Literature Review.* Paper presented at the Proceedings of the 16th AMCIS.

Luftman, J., & Ben-Zvi, T. (2011). Key Issues for IT Executives 2011: Cautious Optimism in Uncertain Economic Times. *MIS Quarterly Executive,* 10(4), 203–212.

Luftman, J., Zadeh, H. S., Derksen, B., Santana, M., Rigoni, E. H., & Huang, Z. D. (2012). Key information technology and management issues 2011-2012: an international study. *Journal of Information Technology,* 27(3), 198-212.

Lynch, N. (2006). *Enterprise Architecture – how does it work in the Australian Bureau of Statistics?* Paper presented at the ACIS 2006 Proceedings. Paper 49.

Lyytinen, K., Newman, M., & Al-Muharfi, A.-R. A. (2009). Institutionalizing enterprise resource planning in the Saudi steel industry: A punctuated socio-technical analysis. *Journal of Information Technology,* 24(4), 286-304.

Löhe, J., & Legner, C. (2014). Overcoming implementation challenges in enterprise architecture management: a design theory for architecture-driven IT Management (ADRIMA). *Information Systems and E-Business Management,* 12(1), 101-137.

Myers, M.D. & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization,* 17(1), pp 2-26.

Magnusson, J., & Nilsson, A. (2006). Infusing an architectural framework with neo-institutional theory: reports from recent change management initiatives within the Swedish public administration, *Proceedings of the 39th HICSS,* Hawaii.

Magoulas, T., Hadzic, A., Saarikko, T., & Pessi, K. (2012). Alignment in Enterprise Architecture: A Comparative Analysis of Four Architectural Approaches. *Electronic Journal Information Systems Evaluation,* 15(1), 88-101.

Mahalingam, A., & Levitt, R. E. (2007). Institutional Theory as a Framework for Analyzing Conflicts on Global Projects. *Journal of Construction Engineering and Management,* 133(7).

Mahmood, Z. (2011). Cloud Computing for Enterprise Architectures: Concepts, Principles and Approaches. In H. R. Mahmood Z. (Ed.), *Cloud Computing for Enterprise Architectures* (pp. 3-19). London: Springer.

Manh, H.D. (2015). Scientific publications in Vietnam as seen from Scopus during 1996–2013. *Scientometrics*, 105 (1), 83-95.

Mani, D., Srikanth, K., & Bharadwaj, A. (2014). Efficacy of R&D Work in Offshore Captive Centers: An Empirical Study of Task Characteristics, Coordination Mechanisms, and Performance. *Information Systems Research,* 25(4), 846-864.

Markus, M. L. (2004). Technochange Management: Using IT to Drive Organizational Change. *Journal of Information Technology,* 19(1), 4–20.

Markus, M. L., & Robey, D. (1988). Information Technology and Organizational Change: Causal Structure in Theory and Research. *Management Science,* 34(5), 583-598.

Maxwell, J. A. (1992). Understanding and Validity in Qualitative Research. *Harvard Educational Review,* 62(3).

Meyer, J. W., & Rowan, B. (1977). Institutionalized Organizations: Formal Structure as Myth and Ceremony. *American Journal of Sociology,* 83(2), 340-363.

MIC. (2017). *The White Book of Vietnam on Information and Communications Technology*. Hanoi: Information and Communication Publishing House.

Mignerat, M., & Rivard, S. (2009). Positioning the Institutional Perspective in Information Systems Research. *Journal of Information Technology,* 24(4), 369-391.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis*: Sage, Thousand Oaks, CA.

Mohamed, M. A., Galal-Edeen, G. H., & Has-san, H. A. (2013). *Towards Adoption of Government Enterprise Architecture: The Cases of Egypt and Syria.* Paper presented at the 13th ECEG 2013, Como, Italy.

Myers, M. D. (2009). *Qualitative Research in Business and Management*. London, UK: SAGA.

Myers, M. D., & Young, L. W. (1997). Hidden agendas, power and managerial assumptions in information systems development: An ethnographic study. *Information Technology & People,* 10(3), 224-240.

Neirotti, P., Marco, A. D., Cagliano, A. C., Mangano, G., & Scorrano, F. (2014). Current trends in Smart City initiatives: Some stylised facts. *Cities,* 38, 25-36.

Ngo, T. V. K., Ma, T. D., & Gim, G. (2015). E-Government in Vietnam: Situation, Prospects, Trends, and Challenges. In I. S. Sodhi (Ed.), *Trends, Prospects, and Challenges in Asian E-Governance* (pp. 25): IGI Global

Nguyễn, M. H. (2010), Nghiên cứu xây dựng kiến trúc công nghệ thông tin và truyền thông và các giải pháp công nghệ phù hợp cho việc triển khai Chính phủ điện tử ở Việt Nam, Báo cáo tổng hợp Đề tài khoa học cấp Nhà nước mã số KC.01.18, Bộ Thông tin Truyền thông.

Nguyễn, V. Đ., Lê, K. Q. (2015), "Nghiên cứu, tìm hiểu kiến trúc TOGAF và những ứng dụng của TOGAF trong các trường đại học", *Tạp chí Công nghệ Thông tin và Truyền thông*, kỳ 1 tháng 4/2015.

Nguyen, T. H., Umemoto, K. and Dam, H. C. (2014), The Knowledge-Bridging Process in Software Offshoring from Japan to Vietnam. *The Electronic Journal of Information Systems in Developing Countries*, 64: 1–29.

Nguyen, T. N., & Braa, J. (2016). Scaffolding Health Information Infrastructure's Generativity by Scaffolded Gateways: The Case of Vietnam. *Electronic Journal of Information Systems in Developing Countries (EJISDC),* 75(1), 1–22.

Nguyen, T. T., & Schauder, D. (2007). Grounding E-Government in Vietnam: from Antecedents to Responsive Government Services. *Journal of Business Systems, Governance and Ethics,* 2(3).

Ngoc, H. (2017). Nhóm ngành KHXH&NV có cần bài báo quốc tế? Retrieved January 20, 2018, from https://tuoitre.vn/nhom-nganh-khxhnv-co-can-bai-bao-quoc-te-1288253.htm.

Nielsen, J. A., Mathiassen, L., & Newell, S. (2014). Theorization and Translation in Information Technology Institutionalization: Evidence from Danish Home Care. *MIS Quarterly,* 38(1), 165-186.

Niemi, E. (2007). Enterprise Architecture Stakeholders - a Holistic View, *AMCIS 2007 Proceedings. Paper 41*.

Niemi, E. I., & Pekkola, S. (2016). Enterprise Architecture Benefit Realization: Review of the Models and a Case Study of a Public Organization. *ACM SIGMIS Database*, 47(3), 55-80.

Nikpay, F., Ahmad, R., Rouhani, B. D., & Shamshirband, S. (2016). A systematic review on post-implementation evaluation models of enterprise architecture artefacts. *Information Systems Frontiers*, 1–20.

Nili, A., Tate, M., & Johnstone, D. (2017). A Framework and Approach for Analysis of Focus Group Data in Information Systems Research. *Communications of the Association for Information Systems,* 40, Article 1.

Nordheim, S., & Päivärinta, T. (2006). Implementing enterprise content management: from evolution through strategy to contradictions out-of-the-box. *European Journal of Information Systems,* 15, 648–662.

Obi, T., & Nguyen, T. T. H. (2010). E-Government Project Implementation: Insight from Interviews in Vietnam. *Journal of Asia-Pacific Studies,* 14.

Oliver, C. (1991). Strategic Responses to Institutional Processes. *Academy Of Management Review,* 16(1), 145–179.

OMB. (2012). The Common Approach to Federal Enterprise Architecture. In U. S. Government.

OIO (2017). OIO Arkitektur guide. Retrieved January 20, 2018, from http://arkitekturguiden.digitaliser.dk/

Orlikowski, W. J., & Barley, S. R. (2001). Technology and Institutions: What can research on information technology and research on organizations learn from each other? *MIS Quarterly,* 25(2), 145–165.

Orlikowski, W. J., & Baroudi, J. J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. *Information Systems Research,* 2(1), 1-28.

Orlikowski, W. J., & Yates, J. (2006). ICT and Organizational Change A Commentary. *The Journal of Applied Behavioral Science,* 42(1), 127-134.

Palthe, J. (2014). Regulative, Normative, and Cognitive Elements of Organizations: Implications for Managing Change. *Management and Organizational Studies,* 1(2), 59-66.

Parr, A. N., Shanks, G., & Darke, P. (1999). Identification of Necessary Factors for Successful Implementation of ERP Systems. In O. Ngwenyama, L. D. Introna, M. D. Myers & J. I. DeGross (Eds.), *New Information Technologies in Organizational Processes* (pp. 99-119): Springer US.

Pentland, B. T. (1999). Building Process Theory with Narrative: From Description to Explanation. *The Academy of Management Review,* 24(4), 711-724.

Penttinen, K., & Isomäki, H. (2010). Stakeholders' views on government enterprise architecture: strategic goals and new public services, *Proceedings of the 1st EGOVIS 2010*. Bilbao, Spain.

Peristeras, V., & Tarabanis, K. (2000). Towards an enterprise architecture for public adminstration using a top-down approach. *European Journal of Information Systems 9 (4), 252-260*.

Pham, L., & Doan, N. P. A. (2014). Intention to Use E-Banking in a Newly Emerging Country: Vietnamese Customer's Perspective. *International Journal of Enterprise Information Systems (IJEIS),* 10(2), 18.

Pham, L., & Teich, J. E. (2013). A Success Model for Enterprise Resource Planning Adoption to Improve Financial Performance in Vietnam’s Equitized State Owned

Enterprises. In *Competition, Strategy, and Modern Enterprise Information Systems* (pp. 17): IGI Global.

Phan, D. D., & Nguyen, H. L. (1995). Vietnam's IT-2000 program: The challenges ahead. *Information Technology for Development,* 6(2), 85-94.

Pham, D. D., Pittayachawan, S., & Nkhoma, M. (2015). Demystifying online personas of Vietnamese young adults on Facebook: A Q-methodology approach. *Australasian Journal of Information Systems,* 19.

Powell, W. W., & Colyvas, J. A. (2008). Microfoundations of institutional theory. In R. Greenwood, C. Oliver, R. Suddaby & K. Sahlin-Andersso (Eds.), *The SAGE Handbook of Organizational Institutionalism* (pp. 276–298). London: Sage Publications.

Powell, W. W., & DiMaggio, P. J. (1991). *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press.

Puuronen, S., & Savolainen, V. (1997). Mobile information systems—executives' view. *Information Systems Journal,* 7(1), 3–20.

Qiu, Y., Gopal, A., & Hann, I.-H. (2017). Logic Pluralism in Mobile Platform Ecosystems: A Study of Indie App Developers on the iOS App Store. *Information Systems Research*, 1-25.

Rahimi, F., Gøtze, J., & Møller, C. (2017). Enterprise Architecture Management: Toward a Taxonomy of Applications. *Communications of the Association for Information Systems,* 40, Article 7.

Rai, A., Venkatesh, V., Lewisenkatesh, M., & Bala, H. (2010). Transitioning to a Modular Enterprise Architecture: Drivers, Constraints, and Actions. *MIS Quarterly Executive,* 9(2), 83-95.

Randone, C. (2012). Enterprise Architecture, IT Service Management, and Service-Oriented Architecture: Relationships, Approaches, and Operative Guidelines. *Journal of Enterprise Architecture,* 8, 45-55.

Ribeiro, J. A., & Scapens, R. W. (2006). Institutional theories in management accounting change. *Qualitative Research in Accounting & Management,* 3(2), 94 - 111.

Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (2013). *Qualitative research practice: A guide for social science students and researchers (Second edition)*: SAGA.

Rosing, M. v., Hove, M., Rao, R. S., & Preston, T. W. (2011). Combining BPM and EA in Complex IT Projects: (A Business Architecture Discipline), *2011 IEEE 13th Conference on Commerce and Enterprise Computing*. Luxembourg: IEEE.

Ross, J. W. (2009). Information Technology Strategy-Creating a strategic IT architecture competency: Learning in stages. In R. D. Galliers & D. E. Leidner (Eds.), *Strategic Information Management: Challenges and Strategies in Managing Information Systems* (pp. 584): Routledge.

Ross, J. W., & Beath, C. M. (2006). Sustainable IT Outsourcing Success: Let Enterprise Architecture Be Your Guide. *MIS Quarterly Executive,* 5(4), 181-192.

Ross, J. W., & Quaadgras, A. (2012). *Enterprise Architecture Is Not Just for Architects*: Center for Information Systems Research, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA.

Ross, J. W., Weill, P., & Robertson, D. C. (2006). *Enterprise Architecture as Strategy: Creating a Foundation for Business Execution*: Harvard Business School Press.

Roth, S., Hauder, M., Farwick, M., Breu, R., & Matthes, F. (2013). Enterprise Architecture Documentation: Current Practices and Future Directions, *Wirtschaftsinformatik Proceedings*.

Rouhani, B. D., Mahrin, M. N., Nikpay, F., & Rouhani, B. D. (2014). *Current Issues on Enterprise Architecture Implementation Methodology* Paper presented at the New Perspectives in Information Systems and Technologies.

Rukanova, B., Stijn, E. v., Henriksen, H. Z., Baida, Z., & Tan, Y.-H. (2009). Understanding the influence of multiple levels of governments on the development of inter-organizational systems. *EJIS,* 18, 387–408.

Saint-Louis, P., & Lapalme, J. (2016). Investigation of the lack of common understanding in the discipline of enterprise architecture: A systematic mapping study, *2016 IEEE 20th EDOCW*: IEEE.

Salancik, G. R., & Pfeffer, J. (1978). *The external control of organizations: A resource dependence perspective*: New York: Harper & Row.

Schekkerman, J. (2004). *How to Survive in the Jungle of Enterprise Architecture Frameworks—Creating or Choosing an Enterprise Architecture Framework*: Victoria, Canada: Trafford.

Schmidt, C., & Buxmann, P. (2011). Outcomes and success factors of enterprise IT architecture management: empirical insight from the international financial services industry. *European Journal of Information Systems,* 20, 168-185.

Scholl, H. J., Kubicek, H., & Cimander, R. (2011). Interoperability, Enterprise Architectures, and IT Governance in Government. In M. Janssen, H. J. Scholl, M. A. Wimmer & Y.-h. Tan (Eds.), *EGOV 2011* (pp. 345-354). Delft, The Netherlands.

Scott, J. (2000). *Social Network Analysis A Handbook*: SAGE Publications.

Scott, W. R. (1995). *Institutions and Organizations Foundations for Organizational Science*: Sage.

Scott, W. R. (2005). Institutional theory. In *Encyclopedia of Social Theory* (pp. 408-414): Thousand Oaks, CA: Sage.

Seppanen, V., Heikkila, J., & Liimatainen, K. (2009). Key Issues in EA-implementation: Case study of two Finnish government agencies, *Proceedings of the 11th IEEE Conference on Commerce and Enterprise Computing, 114-120.*

Seppänen, V. (2014). *From problems to critical success factors of enterprise architecture adoption.* University of Jyväskylä, Finland.

Shaanika, I., & Iyamu, T. (2015). Deployment of Enterprise Architecture in The Namibian Government: The Use of Activity Theory to Examine the Influencing Factors. *The Electronic Journal of Information Systems in Developing Countries*, 71(6), 1-21.

Shepherdson, C., Tan, A. W. K., & Nam, T. V. (2009). An e-governance framework for Vietnam. *International Journal of Electronic Governance,* 2(2/3), 170-191.

Silverman, D., & Marvasti, A. B. (2008). *Doing qualitative research: a comphensive guide*: Saga.

Simon, D., Fischbach, K., & Schoder, D. (2013). An Exploration of Enterprise Architecture Research. *Communications of the Association for Information Systems,* 32, 1.

Simon, D., Fischbach, K., & Schoder, D. (2014). Enterprise architecture management and its role in corporate strategic management. *Inf Syst E-Bus Manage,* 12(5), 5-42.

Soh, C., & Sia, S. K. (2004). An Institutional Perspective on Sources of ERP Package-Organisation Misalignments. *Journal of Strategic Information Systems,* 13(4), 375-397.

Somers, T. M., & Nelson, K. (2001). The Impact of Critical Success Factors Across the Stages of Enterprise Resource Planning Implementations, *Proceedings of the 34th HICSS,* Hawaii.

Sowa, J. F., & Zachman, J. A. (1992). Extending and Formalizing the Framework for Information Systems Architecture. *IBM Systems Journal,* 31(3), 590-616.

Spewak, S. H., & Hill, S. C. (1993). *Enterprise Architecture Planning: Developing a Blueprint for Data, Applications, and Technology* (2nd ed.). New York: John Wiley & Sons, Inc.

Stake, R. E. (2006). *Multiple Case Study Analysis*: The Guilford Press.

Stake, R. E. (2005). Qualitative Case Studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research 3rd edition* (pp. 443-466): Saga.

Stake, R. E. (2010). *Qualitative Research: Studying How Things Work*: The Guilford Press.

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research: techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks: Sage Publications.

Suchman, M. C. (1995). Managing legitimacy: strategic and institutional approaches. *The Academy of Management Review,* 20(3), 571–610.

Suchaiya, S., & Keretho, S. (2014). Analyzing national e-Government interoperability frameworks: A case of Thailand, *2014 Ninth International Conference on Digital Information Management (ICDIM)*.

Sumner, M. (2000). *Risk Factors in Enterprise Wide Information Management System Projects.* Paper presented at the Proceedings of the ACM SIGCPR, 180-187.

Swanson, E. B., & Ramiller, N. C. (1997). The Organizing Vision in Information Systems Innovation. *Organization Science,* 8(5), 458-474.

Syynimaa, N. (2015). *Enterprise Architecture Adoption Method for Higher Education Institutions.* University of Reading, UK.

Tamm, T., Seddon, P. B., Shanks, G., & Reynolds, P. (2011). How Does Enterprise Architecture Add Value to Organisations? *Communications of the Association for Information Systems,* 28(10).

Tarabanis, K., Peristeras, V., Fragidis, G. (2001). Building an Enterprise Architecture for Public Administration: A High-level Data Model for Strategic Planning, *Proceedings of ECIS*.

Teo, H. H., Wei, K. K., & Benbasat, I. (2003). Predicting Intention to Adopt Interorganizational Linkages: An Institutional Perspective. *MIS Quarterly,* (27:1), 19–49.

Teo, T. S., & Pian, Y. (2003). A contingency perspective on Internet adoption and competitive advantage. *European Journal of Information Systems,* 12, 78–92.

Thornton, P. H., & Ocasio, W. (2008). Institutional Logics. In R. Greenwood, C. Oliver, R. Suddaby & K. Sahlin-Andersson (Eds.), *The SAGE Handbook of Organizational Institutionalism*.

Tolbert, P. S., & Zucker, L. G. (1996). The Institutionalization of Institutional Theory. In C. H. a. W. N. S.Clegg (Ed.), *Handbook of organization studies (pp. 175-190).* London: SAGE.

Torre, L. v. d., & Zee, M. v. (2017). Rational Enterprise Architecture. In T. K. Benferhat S., Ali M. (Ed.), *Advances in Artificial Intelligence: From Theory to Practice* (pp. 9-18): Springer.

Tost, L. (2011). An Integrative Model of Legitimacy Judgments. *The Academy of Management Review,* 36(1), 686-710.

Tran, V., A., Seldon, H., L., Chu, H., D., & Nguyen, K., P. (2006). Electronic healthcare communications in Vietnam in 2004. *International Journal of Medical Informatics,* 75(10-11), 764-770.

Tsai, W.-H., Purbokusumo, Y., Cheng, J. M.-S., & Tuan, N. D. (2009). E-government evaluation: the case of Vietnam's provincial websites. *Electronic Government, an International Journal,* 6(1), 41-53.

US CIO. (1999). Federal Enterprise Architecture Framework (Version 1.1).

US CIO. (2013). The Federal Enterprise Architecture Framework (FEAF) v2.

UNCTAD. (2017). *Information Economy Report 2017*. New York: UN.

UNPACS. (2014). *The United Nations E-Government Survey 2014: E-Government for the Future We Want*. United Nations, New York.

Valtonen, K., Korhonen, I., Rekonen, R., & Leppänen, M. (2010). EA as a Tool in Change and Coherency Management – a Case of a Local Government. In R. H. Sprague, Jr. (Ed.), *Proceedings of the 43rd HICSS*, HI: IEEE.

Van de Ven, A. H., & Poole, M. S. (1995). Explaining Development and Change in Organizations. *Academy of Management,* 20(3), 510-540.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly,* 27(3), 425-478.

Vicente, M., Gama, N., & Silva, M. M. d. (2013). Using ArchiMate and TOGAF to Understand the Enterprise Architecture and ITIL Relationship, *International Conference on Advanced Information Systems Engineering* (pp. 134-145).

Vilminko-Heikkinen, R., & Pekkola, S. (2017). Master data management and its organizational implementation: An ethnographical study within the public sector. *Journal of Enterprise Information Management,* 30(3), 454-475.

Volkoff, O., & Strong, D. (2013). Critical Realism and Affordances: Theorizing IT-Associated Organizational Change Processes. *MIS Quarterly,* 37(3), 819-834.

Volkoff, O., Strong, D. M., & Elmes, M. B. (2007). Technological Embeddedness and Organizational Change. *Organization Science,* 18(5), 832-848.

Wagter, R., Berg, M. v. d., Luijpers, J., & Steenbergen, M. v. (2005). *Dynamic Enterprise Architecture: How to Make It Work*: Wiley & Sons.

Walsham, G. (1995). Interpretive case studies in IS research: nature and method. *European Journal of Information Systems,* 4, 74–81.

Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems,* 15, 320–330.

Walsham, G. (2009). *Interpreting Information Systems in Organizations*: Creative Commons Attribution 3.0 License.

Walsham, G. (2017). ICT4D research: reflections on history and future agenda. *Information Technology for Development,* 23(1), 18-41.

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: writing a literature review. *MIS Quarterly,* 26(2), xiii-xxiii.

Weiss, S., Aier, S., & Winter, R. (2013). *Institutionalization and the Effectiveness of Enterprise Architecture Management.* Paper presented at the 34th ICIS, Milan.

Winter, K., Buckl, S., Matthes, F., & Schweda, C. M. (2010). *Investigating the State-of-the-art in Enterprise Architecture Management Methods in Literature and Practice.* Paper presented at the MCIS 2010 Proceedings. Paper 90.

Winter, R., & Fischer, R. (2006). Essential Layers, Artifacts, and Dependencies of Enterprise Architecture, *10th IEEE EDOCW'06*.

World Bank (2017a). World Bank Country and Lending Groups. Retrieved January 20, 2018, from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

World Bank (2017b). The World Bank In Vietnam. Retrieved January 20, 2018, from http://www.worldbank.org/en/country/vietnam/overview.

Yoon, T. E., & George, J. F. (2013). Why aren't organizations adopting virtual worlds? *Computers in Human Behavior,* 29, 772–790.

Young, A. G. (2018). Using ICT for social good: Cultural identity restoration through emancipatory pedagogy. *Information Systems Journal,* 28(2), 340–358.

Zachman, J. P. (1987). A Framework for Information Systems Architecture. *IBM Systems Journal,* 26(3), 276–292.

Zhang, L., Lee, M. K. O., Zhang, Z., & Banerjee, P. (2002). *Critical success factors of enterprise resource planning systems implementation success in China.* Paper presented at the The 36th HICSS, Hawaii.

Zheng, D. Q., Chen, J., Huang, L. H., & Zhang, C. (2013). E-government adoption in public administration organizations: integrating institutional theory perspective and resource-based view. *EJIS,* 22(2), 221-234.

Zheng, T., & Zheng, L. (2013). Examining e-government enterprise architecture research in China: A systematic approach and research agenda. *Government Information Quarterly,* 30(1), S59-S67.

Zimmerman, M. A., & Zeitz, G. J. (2002). Beyond Survival: Achieving New Venture Growth by Building Legitimacy. *The Academy of Management Review,* 27(3), 414-431.

Zink, G. (2009). How to Restart an Enterprise Architecture Program After Initial Failure. *Journal of Enterprise Architecture,* 5(2), 31-41.

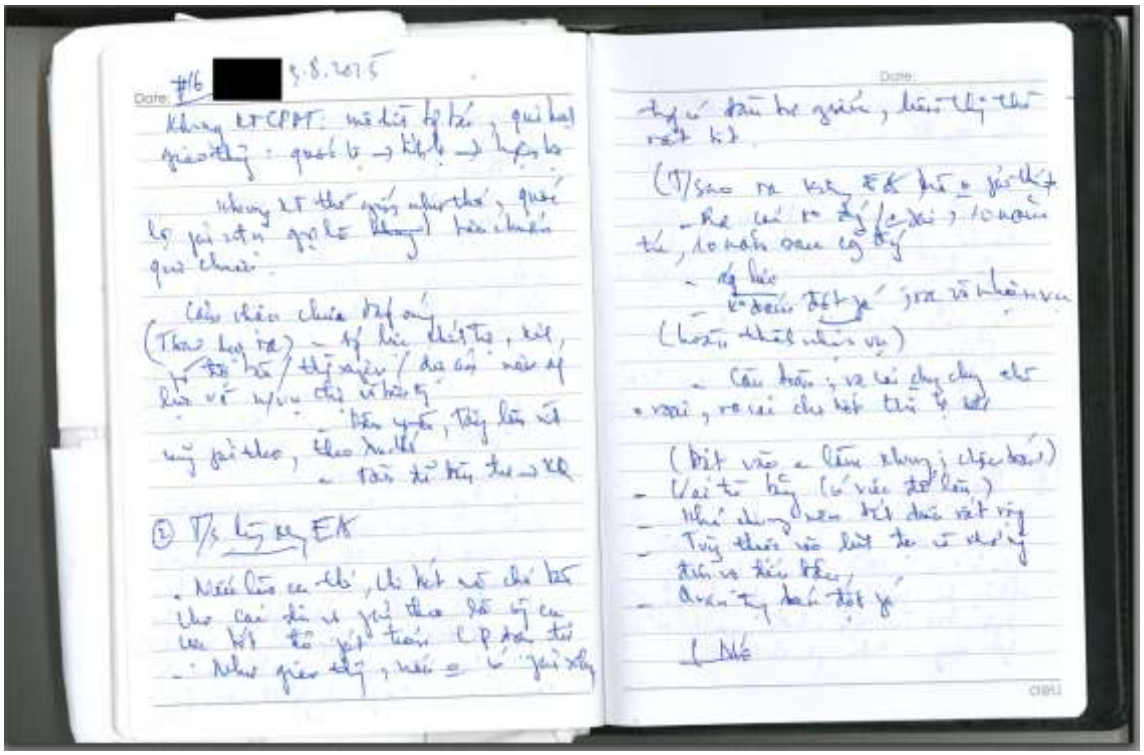
Zucker, L. G. (1977). The role of institutionalization in cultural persistence. *American Sociological Review,* 42(5), 726-743.

Appendix

Appendix. Data collection and analysis

A. Example of note-taking during the interviews

This excerpt is an example of the note-taking during an interview between the author and a civil servant in Case A (code #16, name redacted for anonymity, dated August 3, 2015).



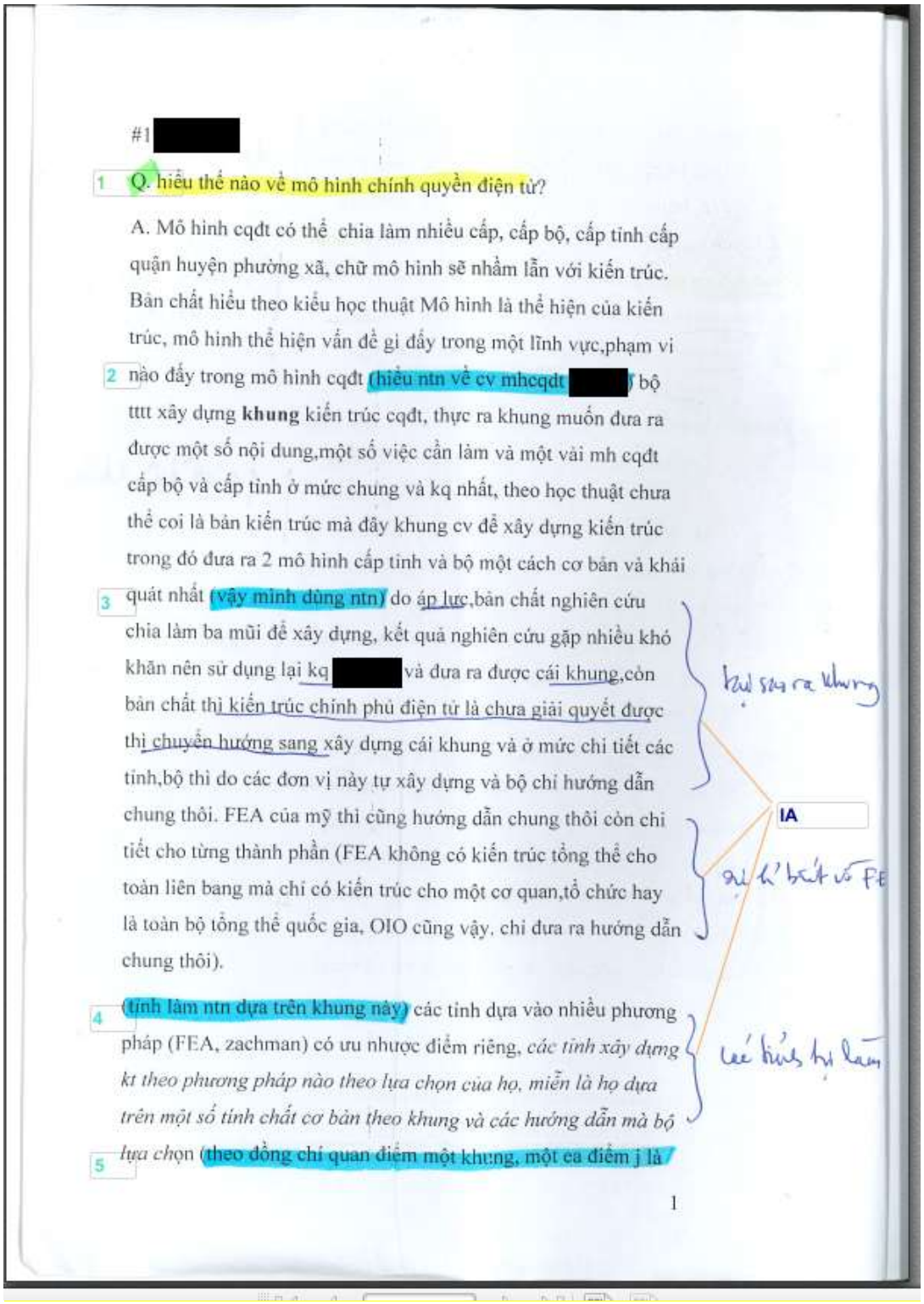
B. Example of open-ended questions and initial analyzation of the data

This excerpt is a sample of an open-ended question and the initial analyzation of the data. This transcript is the content of an interview between the author and a CIO in Case A, code #1, the name of interviewee and some information was redacted for an anonymity. This started with the main question (numbered 1) and followed with several open-ended questions (numbered 2, 3, 4, and 5). The initial analyzation of the text is marked in the right margin (IA in the excerpt).

The main question was (#1) How do you understand EA?

The following open-ended questions were: (#2) How do you understand EA in A? (#3) How does your agency use EA products? (#4) How do other agencies adopt EA/use EA

products based on this guidance? (#5) What is your opinion about the important features of EA?



#1 [redacted]

1 Q. hiểu thế nào về mô hình chính quyền điện tử?

A. Mô hình cqdt có thể chia làm nhiều cấp, cấp bộ, cấp tỉnh cấp quận huyện phường xã, chữ mô hình sẽ nhầm lẫn với kiến trúc. Bản chất hiểu theo kiểu học thuật Mô hình là thể hiện của kiến trúc, mô hình thể hiện vấn đề gì đấy trong một lĩnh vực,phạm vi 2 nào đấy trong mô hình cqdt (hiểu ntn về cv mhcqdt [redacted] bộ tttt xây dựng **khung** kiến trúc cqdt, thực ra khung muốn đưa ra được một số nội dung,một số việc cần làm và một vài mh cqdt cấp bộ và cấp tỉnh ở mức chung và kq nhất, theo học thuật chưa thể coi là bản kiến trúc mà đây khung cv để xây dựng kiến trúc trong đó đưa ra 2 mô hình cấp tỉnh và bộ một cách cơ bản và khái 3 quát nhất (vậy mình dùng ntn) do áp lực,bản chất nghiên cứu chia làm ba mũi để xây dựng, kết quả nghiên cứu gặp nhiều khó khăn nên sử dụng lại kq [redacted] và đưa ra được cái khung,còn bản chất thì kiến trúc chính phủ điện tử là chưa giải quyết được thì chuyển hướng sang xây dựng cái khung và ở mức chi tiết các tỉnh,bộ thì do các đơn vị này tự xây dựng và bộ chỉ hướng dẫn chung thôi. FEA của mỹ thì cũng hướng dẫn chung thôi còn chi tiết cho từng thành phần (FEA không có kiến trúc tổng thể cho toàn liên bang mà chỉ có kiến trúc cho một cơ quan,tổ chức hay là toàn bộ tổng thể quốc gia, OIO cũng vậy, chỉ đưa ra hướng dẫn chung thôi).

4 (tỉnh làm ntn dựa trên khung này) các tỉnh dựa vào nhiều phương pháp (FEA, zachman) có ưu nhược điểm riêng, *các tỉnh xây dựng kt theo phương pháp nào theo lựa chọn của họ, miễn là họ dựa trên một số tính chất cơ bản theo khung và các hướng dẫn mà bộ lựa chọn* (theo đồng chí quan điểm một khung, một ea điểm j là 5

1

C. Interview guidance (themes and questionnaire)

The semi-structured interview guidance was organized in themes, and each theme contained a number of questions or subjects. However, depending on the answers given by each informant, it was sometimes appropriate to ask other follow-up questions related to the objectives, themes, topics, or other interesting issues.

Part I. Exploratory Questions

Objective: Understanding the interviewees' basic information and the projects.

Interviewees' backgrounds and roles in the projects (if necessary).

Initial use of EA in organizations (e.g., How does informant understand EA? What/who prompted the use of EA in your organization? When was the project started and how?)

Part II. Practice Questions (EA adoption process questions)

Objective: Understanding EA adoption processes in the organizations, such as the projects' activities, events, features, resources, and usage.

Project deployment (e.g., How was the project organized? How was the informant involved in the project's tasks, phases, activities, or events? How does the informant compare similar projects they have been involved in or experienced or observed?)

Methods (e.g., What methodologies/approaches have you used in this project? How do they compare with past or other approaches that you have experienced?)

EA features (e.g., How would you define the characteristics/features of the project? How did the main different interest groups in your organization view EA?)

Resources (e.g., What were the main issues related to resources for the project? How did you handle those issues?)

EA usage (e.g., Can your project's products be used in practice? How do new EA features/functions become practices? How do changes happen when using products?)

Evaluation (e.g., Who/which parties was/were responsible for evaluation of the project? Which method/approach has been used for the evaluation work? Who was responsible for approving the evaluation result?)

Part III. EA Adoption Problems Questions

Objective: Understanding the challenges or problems that informants have experienced during EA adoption, including the problems' possible reasons, impact of the problems, and how they overcame those problems.

Problems (What was the major challenge experienced in each different phase of the EA project? Why did you see the above-mentioned points as major challenges/problems? What were prior conditions cause the main problems in EA adoption? How did they affect the project?)

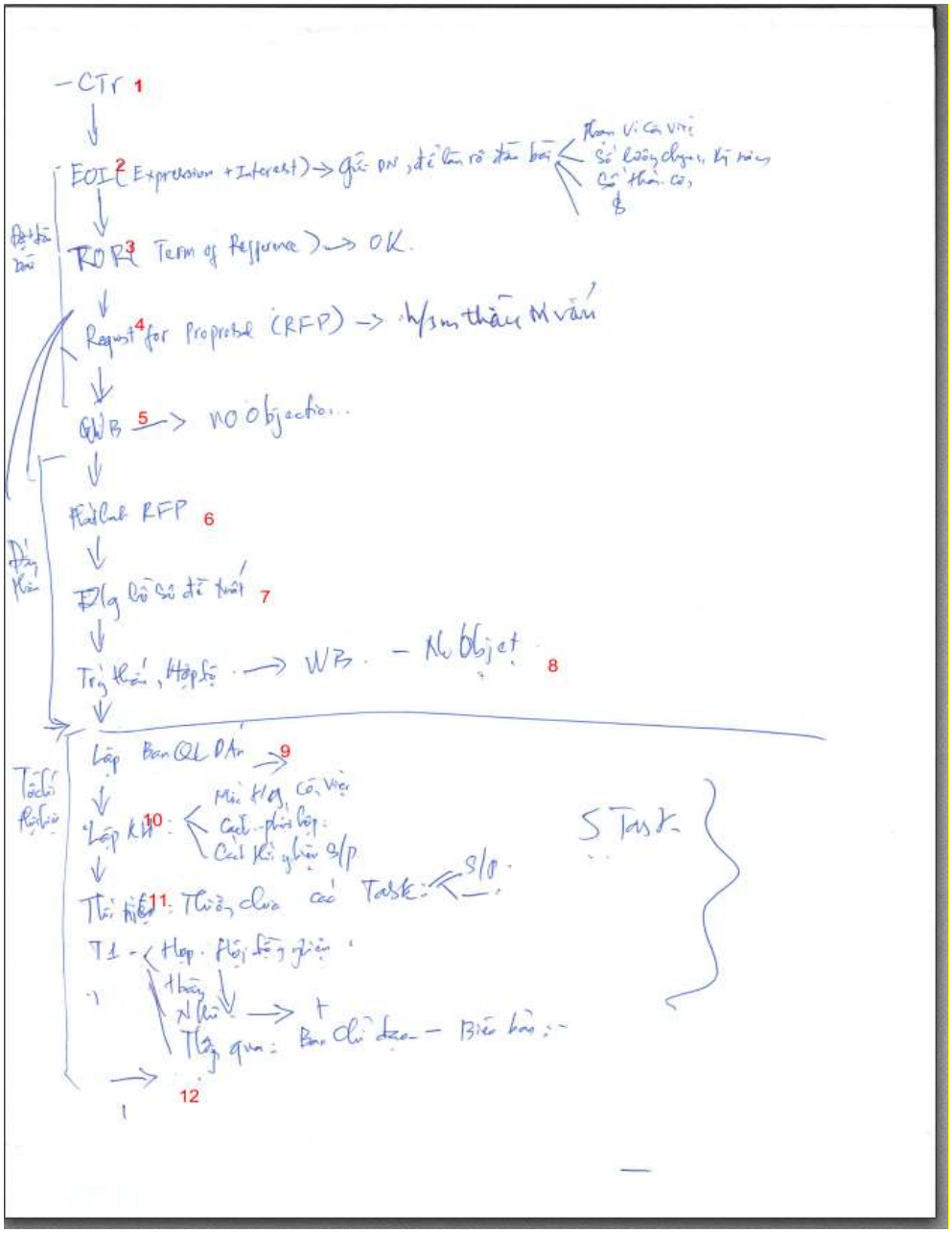
Strategies (How did you/your group/organization overcome these problems, including your roles? Describe how difficult they were. Describe how each project's tasks, events, or activities were legitimated or approved. Who was involved in this?)

Part IV. Other Questions

Are there any other interesting issues related to projects that you would like to share?

D. The project's steps

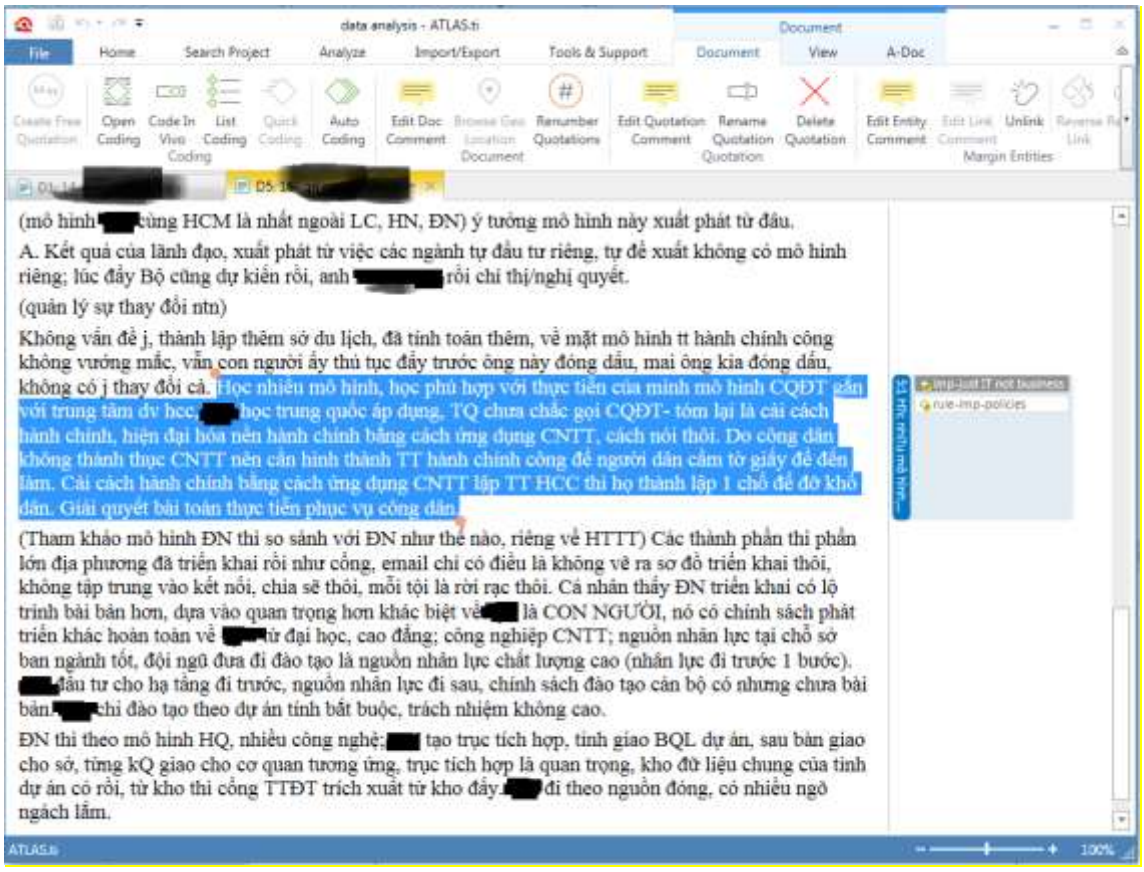
This excerpt shows the project's steps in Case A. The document was written by a project manager during the interview with the author. Case A's project was about 12 steps (from proposal of the EA features – steps 1 to 12 – to closing). Each step involved or was influenced by both Case A and the sponsor. Steps 1 to 8 can be categorized as the initiation phase; steps 9 to 10 can be categorized as the planning phase; and steps 11 to 12 can be categorized as the implementation phase.



E. Coding

E1. Open-coding

This is an example of the open-coding technique from the Dang and Pekkola (2016) article. The interview was transcribed and moved to ATLAS.ti software for coding assistance. Some information was redacted for reasons of anonymity. The text with blue background can be coded with two codes, namely “rules related to policies on implementation phase” and “implementation focusing on IT rather than business aspects” in the right margin.



E2. Coding process

This table illustrates an example of the coding process of identified problems in EA adoption (Dang & Pekkola, 2017b). The first column is the interviewees’ quotations that have been transcribed into English from Vietnamese. The last three columns describe the first cycle, the second cycle, and the third cycle of the coding process.

Example of quotations	Primary coded (step 1)	Sub-category (step 2)	Broader-category (step 3)
In some cases, we needed a year or longer to persuade the leader and staff to change their attitude due to conflicting benefits. (Enterprise architect, Case C)	Willingness	Conflicting benefits and willingness to use EA	User-related problems
I think that our leaders and staff are afraid that when EA is deployed, their roles and benefits will be reduced. (Enterprise architect, Case C)	Benefit		
The majority of the inhabitants in our province live in rural areas and have low computer literacy levels. It is difficult to change their behavior when we are deploying public services. We spend time training users. (IT specialist, Case B)	Capabilities	User's capabilities and skills	

E3. Coding in the lens of theory.

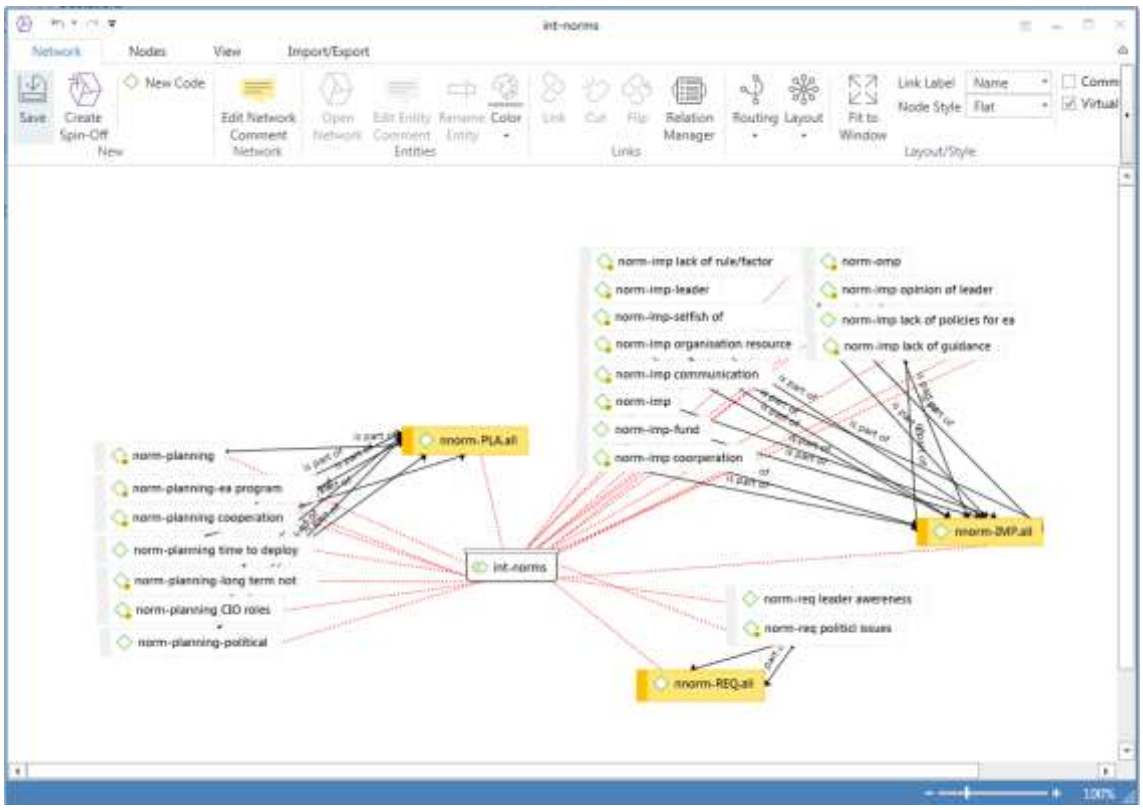
This table is an example of mapping from quotes to the theoretical concept (Dang & Pekkola, 2017b). The first column is the interviewees' quotations from the cases. The second column shows the concept of theory, and the last column shows the theoretical category.

Example quotations	Concept	Category
The guidance from the central government is inappropriate in our agencies when it comes to practical issues. (IT specialist, Case A)	It is about rules, policies, or regulations	Rules
Through professional forums, we were able to easily find a solution that we never had before. (Enterprise architect, Case C)	It is the organization's professionalization, such as training, networking activities in the institution	Norms
TOGAF seems to be too large and needs a business focus, and the FEA's approach requires high EA skills and capabilities in each sub-unit. These are impossible in our organization, even in the whole country. Thus, we will choose our own approach. (EA worker, Case B)	It is about cognitive culture within the case environment setting	Values

E4. Group codes

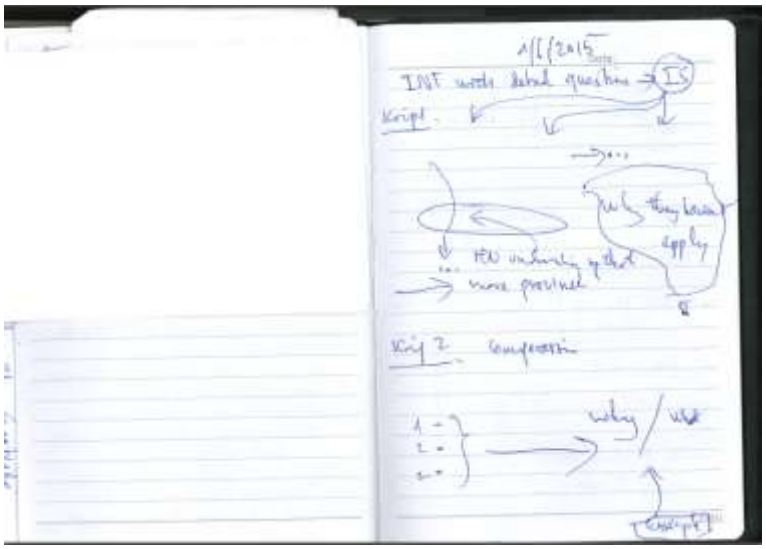
This screenshot illustrates an example of codes for EA adoption through the lens of institutional theory, using ATLAS.ti software for coding assistance. It is about the norms of EA adoption in its different phases (see E3 for concept of norms). In particular, norms in the initiation phase were coded as nnorm-REQ-all, norms in the planning phase were

coded as nnorm-PLA-all, and norms in the implementation phase were coded as norm-IMP-all.



F. Early planning for data collection and analysis

This excerpt is an example of the early planning for data collection and analysis (dated June 1, 2015. INT stands for institutional theory; IS stands for information systems).



INT

Level of analysis — macrolevel — sector / field / global level

— ...level — institutional / individual / groups of individuals inside the organisation

Code vs quotation

quotation = what the person said

code = what about person said something

→ code is the concept behind what a person said

... for my logic for this

v W case

How to get stock of EA in PS
How EA institutionalize in PS → 1st | 2nd | ... → PhD

what is (nó là gì) — why (tại sao) — what should be (nó phải là gì) ← value-free (phi giá trị)

- why and how is EA adopted for IT planning in PS

S1 Organize the data (power)
↓
S2 identify framework
↓
S3 sort data into framework
↓
S4 use the framework for descriptive analysis
↓
S5 second order analysis

- problems — requirement / planning / implementation

ORIGINAL PAPERS

I

SYSTEMATIC LITERATURE REVIEW ON ENTERPRISE ARCHITECTURE IN THE PUBLIC SECTOR

by

Duong D. Dang and Samuli Pekkola, 2017

The Electronic Journal of e-Government, 15, 2, 132-154

II

PROBLEMS OF ENTERPRISE ARCHITECTURE ADOPTION IN THE PUBLIC SECTOR: ROOT CAUSES AND SOME SOLUTIONS

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L. Rusu and G. Viscusi (eds.), Information Technology Governance in Public Organizations, Integrated Series in Information Systems 38

The paper is available at © Springer through https://link.springer.com/chapter/10.1007/978-3-319-58978-7_8

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Summer 6-15-2016

INSTITUTIONALISING ENTERPRISE ARCHITECTURE IN THE PUBLIC SECTOR IN VIETNAM

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IV

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V

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Spring 6-10-2017

ENTERPRISE ARCHITECTURE INSTITUTIONALIZATION: A TALE OF TWO CASES

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VI

ENTERPRISE ARCHITECTURE AND ORGANIZATIONAL REFORM: A DEBRIEF OF THE PROJECT

by

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Proceedings of the 21st Pacific-Asia Conference on Information Systems (PAICS 2017).
Research paper 71.

The paper is available at AIS Electronic Library (AISeL) through http://aisel.aisnet.org/pacis2017/71

Summer 7-19-2017

Enterprise Architecture and Organizational Reform: A Project Debrief

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ISBN 978-952-15-4133-9
ISSN 1459-2045