

# Organizational Practices and Praxes in the Implementation, Execution and Governance of Enterprise Architecture - A Strategic Management Perspective

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Toni Pallaspuro

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**Author** Toni Pallaspuro

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## Abstract

### Research objective

Organizations today face the challenge of adapting and responding quickly to changes in their operating environments. For this reason they have aimed at finding working solutions for utilizing information technology to its fullest strategic extent. Enterprise Architecture (EA) is suggested to enable business driven information technology development and empower co-operation between business operations and data administrations. Literature on the topic is, however, mostly written from a commercial point of view and academic business research remains limited. The purpose of this research is to form a general picture of the strategic organizational practices and praxes regarding the implementation, execution and governance of EA, and establish a descriptive cross-section of managerial perceptions concerning the phenomenon in large Finnish enterprises.

### Theory and methodology

The theoretical basis of this research relies on two significant schools of thought: Managerial Cognition and Strategy-as-Practice (SAP). The interconnection of the two views is presented in the research, and on that basis they are combined to form a theoretical framework for the study. The research gap is studied through the experiences and thoughts of strategy practitioners with the purpose of revealing the manifestations of managerial cognitions within the compass of this multilayered phenomenon. The research problem is tackled by conducting a qualitative empirical study concentrating on four large Finnish enterprises – two public and two from the private sector.

### Findings and conclusions

The research findings indicate that a technology oriented EA culture is still prevalent in Finland. However, organizations show a clear desire to move from the current state towards a more dynamic, business driven modus operandi. The results show distinct differences in the related decision making models between the private and public organizations, which affect the formation of different causal logics. The findings also suggest a link between the private enterprises' policies and innovation. Based on the broad empirical evidence, this thesis introduces twelve business oriented practices and praxes related to Enterprise Architecture work, which provide businesses and executives with practical insight into working approaches in Enterprise Architecture organization. Notably, the findings prove that the cognitive and practice perspectives complement each other in line of the constructed theoretical framework by extending understanding on different parts of the strategy formulation and strategic action process and indicating the link to the formation of organizational practices and praxis.

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**Keywords** Enterprise Architecture, strategy-as-practice, practice, praxis, managerial cognition industry velocity, attention focus, causal logics

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## Tiivistelmä

### Tutkimuksen tavoite

Tänä päivänä organisaatiot kohtaavat haasteita pyrkiessään nopeasti mukautumaan muuttuvan toimintaympäristön tahdissa. Tästä syystä ne ovat pyrkineet löytämään toimivia tapoja informaatioteknologian strategialähtöiselle hyödyntämiselle. Kokonaisarkkitehtuurin (KA) on väitetty mahdollistavan liiketoiminnan tarpeista lähtevän tietojärjestelmäkehityksen sekä luovan mahdollisuuksia yhteistyön lisäämiselle liiketoiminnan ja tietohallinnon välille. Aihepiirin kirjallisuus on kuitenkin pääosin kirjoitettu kaupallisesta näkökulmasta ja akateeminen liiketoimintalähtöinen tutkimus on vähäistä. Tämän tutkimuksen tarkoituksena on antaa yleinen kuva KA:n toteutukseen, toimeenpanoon ja hallintointiin liittyvistä strategisista käytänteistä sekä luoda poikkileikkaus johdon käsityksistä ilmiöön liittyen suurissa suomalaisissa organisaatioissa.

### Teoria ja metodologia

Tutkimuksen teoreettisen pohjan luovat kaksi merkittävää tutkimussuuntausta: manageriaaliset kognitiot ja strategia käytänteenä. Tutkimuksessa esitetään näiden näkökulmien välinen yhteys, jonka pohjalta ne yhdistetään teoreettisen viitekehyksen pohjaksi. Tutkimusaukkoa tarkastellaan organisaatioiden strategisten toimijoiden kokemusten ja ajatusten kautta. Näiden avulla tarkoituksena on paljastaa manageriaalisten kognitioiden ilmentymät tämän monitahoisen ilmiön ympärillä. Tutkimusongelmaan paneudutaan kvalitatiivisen empiirisen tutkimuksen kautta, jossa keskitytään tarkastelemaan neljää suurta suomalaista organisaatiota – kahta julkiselta ja kahta yksityiseltä sektorilta.

### Tulokset ja päätelmät

Tutkimustulosten mukaan KA-kulttuuri Suomessa on edelleen teknologiapainotteista, mutta organisaatioissa on selvää halua siirtyä dynaamisempaan, liiketoimintalähtöiseen toimintatapaan. Tulokset osoittavat selkeitä eroja yksityisten ja julkisten organisaatioiden päätöksentekomalleissa, jotka vaikuttavat kausaalilogiikoiden erilaistumiseen. Tulokset viittaavat myös yhteyteen yksityisten yritysten toimintatapojen ja innovaatioiden synnyn välillä. Laajan empiirisen tulosaineiston pohjalta tässä tutkielmassa esitellään kaksitoista liiketoimintasuuntautunutta käytännettä kokonaisarkkitehtuurityöhön liittyen. Nämä luovat organisaatioille ja johtajille käytännön näkökulman KA:n organisoimisen toimiviin ratkaisuihin. Huomionarvoisesti löydökset todistavat, että laajentamalla ymmärrystä strategian laatimisen ja strategisten toimenpiteiden prosessista sekä osoittamalla näiden yhteyden organisaatiokäytänteiden syntyyn, kognitiivinen ja käytäntöön pohjautuva näkökulma täydentävät toisiaan esitetyn teoreettisen viitekehyksen mukaisesti.

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**Avainsanat** Kokonaisarkkitehtuuri, strategia käytänteenä, käytänne, manageriaalinen kognitio, toimialan kiertonopeus, tarkkaavaisuuden keskittyminen, kausaalilogiikka

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# 1. INTRODUCTION

## 1.1. Research background

Many organizations today face the challenge of adapting and responding quickly to changes of all types: changing technology, changing customer needs, growing customer turnover, and changing business partners (Morganwalp & Sage 2003). Globalization, the economic downturn and mergers and acquisitions are forcing enterprises to rethink and restructure their business models and organizational structures. New products and services need to be developed and delivered better, faster and cheaper due to increasing international competition. Enterprises have to be increasingly efficient, flexible and innovative to be successful. (Steen, Strating, Lankhorst, ter Doest and Iacob 2005) Recently major changes are taking place also in public administrations all over the world. Citizens are calling for better services at lower costs, faster responsiveness in an unstable and changing political, economic, societal and technological (PEST) environment, and closer proximity of public administrations and services. (Peristeras & Tarabanis 2000) For public or private organizations to truly succeed in this constantly changing world, they must design, build, and maintain large-scale distributed enterprise systems that are able to adapt to changing business needs. (Steen et al. 2005)

Strategic management literature is filled with theories and models on how to make the enterprise meet its strategic goals and organize its functions in the most productive way. However, as change is a common denominator in today's enterprises, one method for strategic management has again in the 21<sup>st</sup> century started to raise more interest among organizations – Enterprise Architecture (EA). Attention has especially received the way EA's most recent models give organizations a structure in moving from information technology focused development towards business driven planning and execution. Everyone is familiar with the term *architecture* in relation to building houses. Architecture specifies the spatial structure, dimensions, functions, materials, colors, and construction of a building, based on the requirements of its future owners and users, and in accordance with applicable regulations. In a similar manner, architecture in an organization indicates



the blueprint and style of the organization commonly referred to as 'Enterprise Architecture'.

The concept of Enterprise Architecture was first developed in the 1980's and has since been adopted by several successful companies including some of the world's leading enterprises like Intel, Volkswagen and IBM, to name a few but also by a large number of public sector organizations e.g. in the United States. Today, Enterprise Architect is a profession occupying a vast amount of people in a great number of organizations. Architecture is not only envisioned as a technical venture but as an organization wide operational backbone, which is evident in the increasing number of business architect positions both in the business and public sectors.

In Finland, resources in the public sector are being reduced as part of the governmental productivity program whereas more tasks are assumed due to changes in the economic structure and legal obligations from the European Union, leading to growing pressures for higher productivity and more precise collaborative decision making. Therefore, documenting business processes systematically by using standardized methods, and building enterprise systems that utilize information technology to its fullest strategic extent, are at the core of proper resource allocation and reduction of work load. The required changes in the organizational and business structures require strategic initiatives and working governance models. It is suggested that EA as an approach for controlling the complexity and constant changes in the business environment of an organization, can enable a real alignment between the business vision, business requirements and information systems (Ylimäki & Halttunen 2006). Since *"every organization has an enterprise architecture, whether it is aware of it or not"* (CAEAP 2010), the main challenge is on making it clear to every person within the organization, and on using it for reaching strategic goals.

This thesis focuses on this very current and important topic for public sector management in Finland by investigating practices related to the implementation, execution and governance of Enterprise Architecture as part of strategic management. The research aims at producing new insight on the subject area, which can later be utilized by enterprises in corresponding situations. The basis for the research is formed from earlier findings on

Enterprise Architecture. However, no studies on EA practices or praxes seem available. As the interest in the research is on how to bring EA to the organization's operation in practice, which is again largely guided by managers' cognitive patterns, the study draws from the extant literature of Strategy-as-Practice (SAP) and Managerial Cognition theories to comprise a theoretical background.

Earlier studies suggest a link between managerial cognitions and strategic action (Hambrick & Mason 1984; Jenkins & Johnson 1997). As Enterprise Architecture is a strategic management method and helps organizations in executing their strategic actions, managerial cognition forms a natural basis for the theoretical part of the thesis. Managerial cognitions enable the formulation of a more comprehensive picture of the reasons for and thought processes behind the executed practices. Studying managerial cognitions in this context allows for richer interview data and a more in-depth analysis of how the studied phenomenon is perceived and valued within the organizations. Furthermore, it enables the research to go deeper into the ways in which the studied people process the data concerning EA and break that into executable strategic practices. Strategy-as-practice theory on the other hand takes a more practical view concentrating on the practices of the studied organizations that are a result of the subjective representations of managers driving strategic actions. SAP research is concerned with the actual operational implications of strategy work, i.e. who does the work, what people do, how they do it, what they apply in the work, and what impacts these have for shaping strategy (Jarzabkowski & Spee 2009). As the second part of the theoretical section, these form the basis for the concrete outcomes of the study, i.e. working practices.

By combining strategy-as-practice and managerial cognition, the paper introduces a theoretical framework for studying strategic organizational practices and praxes, which forms the theoretical background for the study and adds to its scientific importance. To provide more important managerial utility alongside the revealed generic practices and praxes, a model for Enterprise Architecture governance is presented at the end of the paper by combining findings from this research with current theoretical literature.

## 1.2. Research gap and objectives

Stakeholders in enterprises are faced with challenges that result from technological changes occurring at accelerated pace, economic and environmental issues demanding immediate actions, and a need for more precise collaborative decision making (Isom, Miller-Sylvia and Vaidya 2010). Thus, many organizations are concerned with how to successfully transition to an organization utilizing information technology to its fullest strategic extent. In response, enterprises have started to develop enterprise architectures (Morganwalp & Sage 2003; Steen et al. 2005).

During the past few years, enterprise architectures have garnered considerable attention especially from the community of information systems specialists and business professional as a way to control the complexity and constant changes in the business environment, and enabling the development of information systems originating from business needs and requirements. However, for most parts it has been written from a commercial point of view and academic business research on the topic area remains limited. Most of the existing academic literature on Enterprise Architecture still focus only on the technology aspects, i.e. systems, applications and software, and IT-infrastructure; study the implementation of EA in a single case organization; or introduce hypothetical theoretical models suggesting a link between EA and enterprise performance or orientation (see e.g. Richardson, Jackson & Dickson 1990; Hong & Williams 2003; Morganwalp & Sage 2003; Neaga & Harding 2005; Assimakopoulos & Riggas 2006; Ylimäki & Halttunen 2006; Boh & Yellin 2007; Mathee, Tobin & Van Der Merwe 2007; Daniel & Réka 2008; Cardwell 2008; Andary & Sage 2010).

One of the few studies of EA with a strategic viewpoint published in academic journals is that of Erol, Ozgur, Brian and Mansouri (2010) who propose that Enterprise Architecture is a key factor in increasing enterprise resilience. They define agility, flexibility, adaptability and connectivity as supporting attributes of enterprise resilience, and recognize information technology's central role in assisting connectivity and collaboration contributing to resilience on all levels. According to their proposed framework, there are two primary enablers of enterprise resilience: 1) the capability of an enterprise to connect systems, people, processes and information taking into account the dynamics of

environment, stakeholders and competitors; and 2) the alignment of information technology with business goals. These require interoperability and integration within the enterprise, and modeling of the underlying technology infrastructure. (Ibid.) The basis for reaching these goals is in applying an Enterprise Architecture. Still, currently there is no evidence of prior research focusing on either EA practices or managerial cognitions in implementing or governing Enterprise Architecture as part of strategic management.

Enterprise Architecture as a strategic planning discipline aims at helping management in translating business strategies into implementable technological solutions (Jonkers, Lankhorst, ter Doest, Arbab, Bosma and Wieringa 2006). EA is concerned with both the organizational structures and governing structures regarding handling of development initiatives reflecting the needs described by business functions. Therefore, this research aims to shed some light on the subject area by focusing especially on the organizing of business driven EA instead of concentrating on the suitability for information technology modeling. By incorporating managerial cognition and strategy-as-practice theories, the focus is on providing information and generating understanding of how managers perceive Enterprise Architecture in the organization as a sum of conceptual and operational representations, i.e. practices, and how these manifest as praxes through intangible cognitive models of practitioners (Tikkanen, Lamberg, Parvinen, & Kallunki 2005).

Enterprises, whether in the private or public sector, aim to organize their functions in a manner that best meets their targeted goals. Organizational goals and ways to reach them are most commonly presented by mission, vision and strategy. The three describe the current state of the enterprise, the desired state at a point in the future, and the plan on how to reach the set goals. Enterprise Architecture is a method enabling communication and organization within the enterprise regarding business requirements at present, the business vision, and the information systems to be developed. Strategy-making, i.e. presenting a mission, formulating a vision, implementing a strategy, choosing methods for doing so, and governing the related practices are enforced by the organizations' strategic management and interpreted, communicated, sold, shaped and engaged in by an extended group of practitioners outside management ranks (Mantere 2005; Rouleau 2005; Vaara & Whittington 2012). Thus, the research concentrates on studying the organizations' extended (strategic) management and the people responsible for Enterprise Architecture

implementation, execution and governance. According to the typology of nine domains of strategy-as-practice research, focus in this thesis is on the *practitioners*, i.e. those involved in making strategy, *practices*, i.e. routinized and accepted types of behavior and procedures, and *praxis*, i.e. the process of activities through which strategy is accomplished over time in their related surroundings (Jarzabkowski and Spee 2009; Vaara & Whittington 2012).

Through interviews this research aims to provide more information on the scarcely researched phenomenon and increase knowledge by partly filling the presented research gap above. The research objectives can be summarized as follows: 1) *what is the scope and level of EA in the studied organizations*, 2) *how has EA been implemented in the enterprises and what kinds of structures have been formed*, and 3) *how is EA developed and governed as part of strategic management and how does this manifest as practices and praxes within the organizations?* These objectives are untangled by incorporating broad and multidimensional research questions that provide information on several levels and from many angles regarding EA. The research findings are expected to contribute mostly to managerial implications due to their close relation to strategy implementation and operational practices and praxes.

### **1.2.1. Research questions**

The research question (RQ) and sub-questions (SQ) are formulated so that the level of understanding deepens with every question, and at the same time the thread of the theoretical foundation of strategy-as-practice and managerial cognition is carried along. Based on earlier academic literature and the theoretical framework, the research questions make up the theme areas in the thesis (Eskola & Vastamäki 2001: 33). According to Hambrick and Mason (1984), organizational outcomes [i.e. practices and praxes] can be partially predicted from managerial backgrounds. As an individual's cognitive base evolves from experiences (Cyert & March 1992: 128), demographic characteristics act as indicators of its qualities (Hambrick & Mason 1984). Therefore, the study includes also preliminary questions on the interviewees' background information. Sub-questions begin with managerial perceptions on the role of EA, continue with governance related matters, and

conclude with exposing organizational practices regarding EA work. Accordingly a more precise questionnaire outline is drafted, which is used as a guideline in the interviews.

By relying on the literature on strategy-as-practice and managerial cognition studies, the main research question and sub-questions are presented as follows:

**RQ: What are the organizational practices and praxes concerning the implementation, execution and governance of Enterprise Architecture, and how are these perceived as part of strategic management?**

*SQ1: How is the role of EA perceived within the strategic managements of organizations?*

*SQ2: How is EA governed in organizations?*

*SQ3: How are development-ideas executed, supervised and monitored in organizations?*

*SQ4: How is Enterprise Architecture communicated to enable assimilation of its principles and benefits?*

The research questions are answered by conducting an empirical study concentrating on two private enterprises and two public organizations, and interviewing four executives/managers or upper clerical workers (experts) responsible for strategic planning and governance with a link to EA work, and four people responsible for the execution of strategic decisions at the operational level, i.e. architects or managers. To ensure relevant data regarding formulated and tested practices, the research focuses on enterprises, which have over two years of experience from EA work. The research data is analyzed by categorizing it according to themes that are formed based on the theoretical framework.

### **1.2.2. Research boundaries**

While the existence of both the economic and the cognitive view in guiding strategic action are accepted, and the need for both views in reaching a holistic picture of strategic decision making (Johnson & Hoopes 2003) is recognized, this research focuses on exploring managers' cognitive views and their concrete expression in the form of practices and

praxes instead of the economic industry structures. The study addresses the research questions by focusing on managers' subjective representations of their organizations' operating environments and management practices. The study has a meso-praxis, i.e. focus is on the organizational level practices and praxis, and industry level (macro) or unit level (micro) practices are not studied separately. Unit level practices and the influences of external forces, e.g. legislation are only accounted for when they form a central part of the organizational level practices and praxes.

The empirical study investigates large Enterprises. Small and medium sized organizations are ruled out as they may not have the required resources for a full scale Enterprise Architecture implementation and execution. The concentration in the study is on aggregate practitioners, i.e. managers and top enterprise architects. Individual practitioners, e.g. John the CEO, are not studied. The interviews are conducted with individual executives, managers or strategists, but the information retrieved is applied and viewed on an aggregate level, e.g. top management. (Jarzabkowski and Spee 2009)

The thesis focuses on Enterprise Architecture from the business architecture point of view. This entails a concentration on the ways of conducting business, organizing activities, and implementing organizational and governing structures but leaving out the technical details related to systems and technology architecture.

In this research past performance of organizations as a background factor is ruled out of the empirical context since the empirical data indicates that providing evidence on the effects of EA on performance is not possible due to lack of decent measuring. Also, information on past performance related to specific factors such as Enterprise Architecture is mostly regarded as business secrets.

### **1.3. Empirical justification for the study**

In 1999 the Administration of President Clinton in the United States passed laws requiring all Federal Agencies to set up formal and understandable Enterprise Architectures so that information could be easily shared between them (Cardwell 2008). Accordingly,

architecture governance has been widely implemented within in the United States public sector as the Federal Government has adopted the Federal Enterprise Architecture (FEA) that aims to ease sharing of information and resources across federal agencies, reduce costs, and improve citizen services in compliance with the Clinger-Cohen Act. The law requires that U.S. government agencies can use these architectures to show how specific programs are related to the overall structure of the agency and how each of those programs supports the strategic goals of the agency.

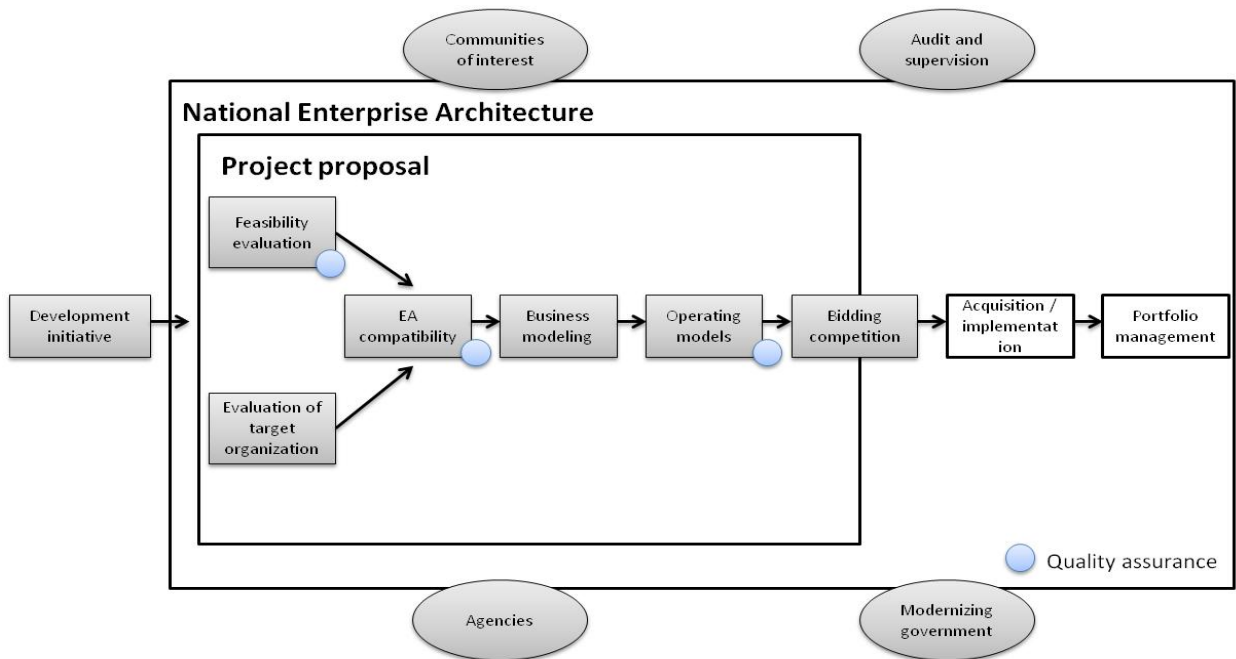


FIGURE 1. The FEAR Governance Model  
(Adapted from University of Jyväskylä 2010)

In Finland, the so called Interoperability Act (Laki julkisen hallinnon tietohallinnon ohjauksesta (634/2011)) that came into force on 1 September 2011 mandates all government organizations to implement and utilize an Enterprise Architecture framework (Finlex 2011). The aim of the Act is to ease sharing of information and resources across federal agencies by developing interoperability on the level of processes and operating systems. This is seen as a central goal in the efforts to reduce costs and overlapping work (Valtiovarainministeriö 2011). In response, public enterprises are now searching for working practices for the implementation, execution and governance of Enterprise Architecture in order to comply with the statute, and to make it so that they can better



fulfill the current and future PEST requirements. Thus, the legislative pressure acts as a starting point for this research as it tries to provide answers to a number of public enterprises on how they could organize their operations, and implement Enterprise Architecture by executing verified working practices.

The IT faculty, Information Technology Research Institute (ITRI), of the University of Jyväskylä, has conducted an extensive research program within the last four years to support the Enterprise Architecture work in Finnish public administrations. The Finnish Enterprise Architecture Research (FEAR) project supports the ongoing efforts of the government and the Ministry of Finance to establish common architectures and integrated systems to efficiently and cost-effectively provide unified services to administrations, businesses and citizens in accordance to the EU guidelines. The research work includes an analysis of existing international EA frameworks and methodologies in 15 countries, and provides a governance model (Figure 1) that is intended to be used as a guideline in government development programs or investment initiatives.

The FEAR model together with the upcoming Finnish Government and Finnish Public Administration EA frameworks supported by the The JHS-Public Administration Recommendations ([www.jhs-suositukset.fi](http://www.jhs-suositukset.fi)) set by The Advisory Committee on Information Management in Public Administration (JUHTA) give more specific guidelines for the planning, implementation, execution, governance and development of EA frameworks and practices. Together these give public organizations a comprehensive set of material as a starting point for architecture work. Still like most reference frameworks, also these are generic in nature, and therefore leave a great deal of room for research on working practices and praxis within different fields of operation.

## 1.4. Definitions

**Business architecture:** A dimension of Enterprise Architecture that describes the business strategy, models, processes, services and organization. Provides the foundation upon which the other Enterprise Architecture dimensions base their decisions. (Aziz et al. 2005)

**Enterprise:** A public or private sector organization, an entire business or corporation, a part of a larger enterprise, a conglomerate of several organizations or a multiply outsourced business operation organized for a specific purpose. (Used interchangeably with the word organization)

**Enterprise Architect:** A professional who brings together rational business views with logical blueprints enabling the transformation from business strategy to operational execution (CAEAP 2010).

**Enterprise Architecture:** Systematically derived and captured structural descriptions of the mode of operation for a given enterprise, describing the enterprise's operations in both logical and technical terms, and providing these perspectives for the enterprise's current environment and for its targeted future environment, as well as for the transition plan for moving to the desired future state (Hite 2004).

**FEAR:** The Finnish Enterprise Architecture Research, which resulted in the introduction of the FEAR Governance Model (University of Jyväskylä 2010).

**Managerial Cognition:** Theory stating that strategic decision-making signifies intentional and deliberate activity where managers consciously direct a company's strategic resource allocation (Schendel & Hofer 1979), and where each manager's perception and interpretation reflects his or her own cognitive base (Hambrick & Mason 1984; Wiersema & Bantel 1992).

**Organization:** A public or private entity comprising of one or several enterprises sharing [partly] a common ownership, organized to accomplish an overall, common goal or set of goals. (Used interchangeably with the word enterprise)

**Practice(s):** Practices are routinized types of behavior, which consist of several interconnected elements including bodily and mental activities, background knowledge, norms, know-how, states of emotion and motivational knowledge, the usage of material artifacts and technologies, and formation of immaterial constructs such as procedures and organizational structures. (Reckwitz 2002; Molloy & Whittington 2005; Denis, Langley & Rouleau 2006; Jarzabkowski & Spee 2009; Vaara & Whittington 2012).

**Practitioner:** An internal aggregate actor within an enterprise directly involved in strategy work or in its execution (Jarzabkowski & Spee 2009).

**Praxis:** (pl. praxes) A stream of [strategic] activity that interconnects the micro actions of individuals and groups with the tools of strategy and the wider institutions in which those actions are located and to which they contribute (Jarzabkowski & Spee 2009).

**Strategy-as-Practice (SAP):** Theory of strategy, which attends the actual micro-practices and everyday routines of strategy formation (Chia 2004) and widens the realm beyond modeling and process focus to include the work, tools and workers of strategy (Whittington 1996, 2002; Chia 2004).

## **1.5. Structure of the thesis**

Following the introduction, the second chapter of the thesis covers the theoretical context by introducing the studied subject area of Enterprise Architecture. This is followed by a presentation of the theoretical literature of strategy-as-practice and managerial cognition research, which leads to forming the theoretical framework for the study. The section covers the central concepts of SAP, i.e. practitioner, practice and praxis, and managerial cognition, i.e. industry velocity, attention focus, and causal logics. The importance of both views in understanding strategy formulation and strategic management are explained proceeding to the introduction of the interrelationship of the two theoretical views. Chapter three continues with a review of the methodology and thorough argumentation regarding the employed methods. Research rigor and quality is evaluated through the central concepts of conformability, credibility, transferability and dependability. In the fourth chapter, the research results are presented in line with the set research questions, and mirrored against the theoretical framework and its underlying theories. In chapter five the main results are discussed and reflected to the theoretical context in question and the broader theoretical evidence. Then the theoretical and managerial implications of the findings are explained. Finally, in conclusions the main points of the thesis are summarized. The last chapter covers also the limitations to the study and suggests some extended research around the topic area.

## **2. LITERATURE REVIEW AND THEORETICAL CONTEXT**

### **2.1. Enterprise Architecture**

Advances in information technology and the wider usage of more complex information systems for work processing in the 1980's raised the question of how to manage, describe and document the increasing number of interacting variables within and between systems. In response, John Zachman in 1987 introduced the term 'Enterprise Architecture' in his article "*A Framework for Information Systems Architecture*" (Zachman 1987). Although the paper concentrates on information systems, it encompasses the scope of the entire enterprise. In the 20+ years since the publication of Zachman's paper, Enterprise Architecture has had an increasing impact on enterprises of all sizes. After the turn of the century, more organizations have adopted EA as means of improving efficiency, effectiveness, and agility. Simultaneously, there has been much discussion about the extension of Enterprise Architecture beyond the IT organization into the rest of the enterprise. (CAEAP 2010) Unfortunately, in many organizations enterprise architecture programs remain disconnected from the business and are perceived primarily as technical endeavors (CAEAP 2010). However, the trend is clearly changing and organizations are following the lead that EA frameworks took already in the turn of the 1990's by moving their focus beyond the scope of IT.

#### **2.1.1. What is Enterprise Architecture?**

Enterprise Architecture is a coherent whole of principles, methods and models that are used in the design and realization of the enterprise's organizational structure, business processes, information systems, and infrastructure. EA can be used to systematically define an organization's current and future environment. As a strategic planning discipline it helps in translating business strategies into implementable technology solutions. (Jonkers et al. 2006) Most importantly, Enterprise Architecture reference frameworks or models include a common theme – they attempt to provide coherence to the way strategy is expressed and implemented by introducing a holistic model of the enterprise that can be shared by everyone involved in a change process (Veasey 2001). The Center for the

Advancement of the Enterprise Architecture Profession (CAEAP 2010) describes an Enterprise Architect as follows:

*“An enterprise architect is a professional who brings together rational business views with logical blueprints enabling the transformation from business strategy to operational execution.”*

Enterprise Architecture is a term with different meanings, but typically refers to architecture management on a high level. Director Randolph C. Hite (2004) of the US General Accounting Office gives a comprehensive description of Enterprise Architecture that this study adopts:

*“We can view enterprise architectures as systematically derived and captured structural descriptions – in useful models, diagrams and narrative – of the mode of operation for a given enterprise. As such, the architecture describes the enterprise’s operations in both logical terms (such as interrelated business processes and business rules, information needs and flows, and work locations and users) and technical terms (such as hardware, software, data, communications, and security attributes and performance standards). Moreover, it provides these perspectives both for the enterprise’s current (or ‘as-is’) environment and for its targeted future (or ‘to-be’) environment, as well as for the transition plan for moving from the ‘as-is’ to the ‘to be’ environment.”*

First and foremost, Enterprise Architecture is a tool for strategic management in organizations. By employing Enterprise Architecture as a management methodology, organizations can simplify processes or automate them better, and reduce their number of systems and dependencies following the strategic guidelines set by the management.

As depicted in Figure 2, EA is driven by the enterprise’s strategy work and focused by the continuous operational and financial planning that provides the conditions for development. Through identifying development areas and ordering initial reports on them, EA helps in governing the planning of initiatives and projects. This leads to describing the planned projects or initiatives more precisely and through these outcomes, architecture descriptions and policies are developed in the organization. The developed policies act as the foundation for all future development initiatives, enabling controlled and consistent development and coordination within the enterprise. The EA policies are altered as part of

the EA development process based on the strategy process requirements, thus maintaining them up-to-date at all times.



FIGURE 2. EA as part of the strategic, operational and financial planning (Adapted from JUHTA 2011)

In today's world, the business practice in providing services requires information technology. Thus an integrated approach to business and IT is indispensable (Jonkers et al. 2006). Ylimäki and Halttunen (2006) state that Enterprise Architecture enables a real alignment between the business vision, business requirements and information systems. Again, Cardwell (2008) suggests that EA has attracted attention in medium sized and larger organizations due to the tendency according to which most if not all employees should know how their contribution in the enterprise processes influences the success of the organization. In recent years, public administrations have borrowed management methodologies and practices that have been successfully tested in the private sector during the last two decades (Peristeras & Tarabanis 2000). Accordingly, EA has become a major focus area also in the public sector.

### **2.1.2. The Enterprise Architecture process**

Building or implementing EA in an organization is not a onetime event. It usually requires years of hard work that involves breaking down existing structures and processes and changing the whole way of thinking. It is continuous development and reiteration, and the implementation efforts need to align with the organization's overall ability to absorb change (Andary & Sage 2010). In their study of Star Enterprise, a joint venture partnership between Texaco Inc. and the Saudi Arabian Oil Company, Richardson et al. (1990) conclude that building an architecture that defines and interrelates data, hardware, software, and communications resources, as well as the business process thinking guiding the work, is a long-term process. This requires consistency throughout the process without individual groups searching for local solutions, time building consensus among technical staff, and communication of derived principles throughout the organization (Ibid.).

There is no universally agreed process and representation of enterprise architecture amongst researchers and practitioners. Architecture frameworks use disciplines to create views that represent different perspectives of an enterprise. The disciplines are generally categorized as business architecture, information architecture, software [or application] architecture and technical architecture (Tang, Han & Chen 2004) in line with TOGAF, as illustrated in Figure 3, which gives a good overall description of the functions and responsibilities of each discipline.

The Enterprise Architecture process builds on the foundation that business requirements drive development in organizations. Information architecture follows business requirements by defining the required and produced information and documents in any process and describing how and what kind of data is stored. Application architecture prescribes the necessary IT structure based on the business demands and in support of information architecture requirements. Finally, the technology architecture acts as the enabler by creating a foundation for IT-systems development around the business process requirements and the general and enterprise specific technical standards and strategies. (Tang et al. 2004; Aziz et al. 2005)

Most commonly, EA is implemented by taking bits and pieces of operations and applying new methods on them, and then expanding the work. Chris Forde, the Vice President of the Enterprise Architecture and Membership Capabilities at The Open Group, compares the work of an enterprise architect to that of a medical doctor performing a diagnosis: *“An enterprise architect is a doctor who is helping an organization recover...Like a doctor, you are going to look at the most important symptoms and focus on them. Then as they are addressed, other problems become more urgent.”* (Woods 2011)

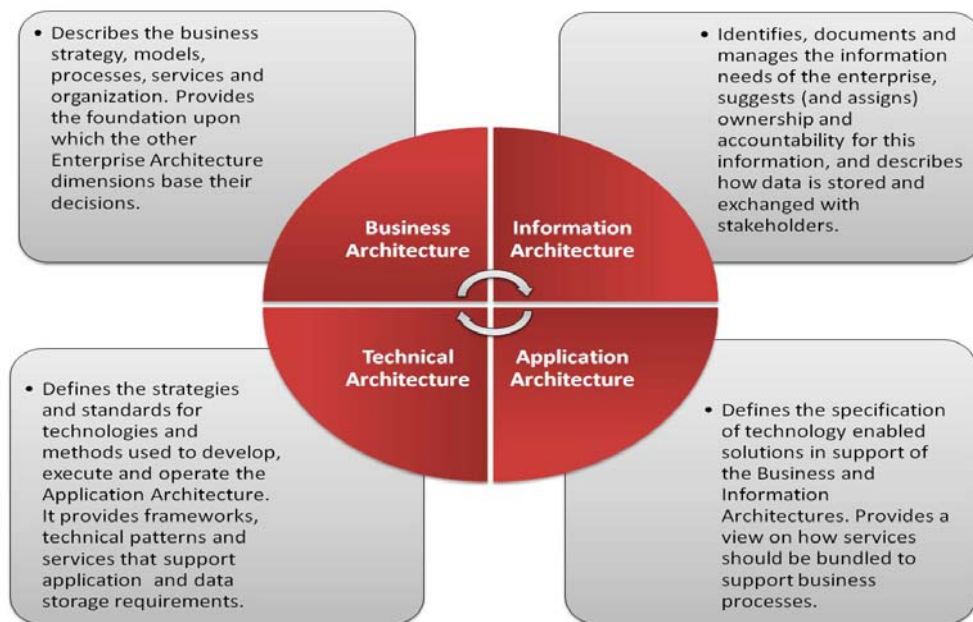


FIGURE 3. The disciplines of Enterprise Architecture  
(Adapted from Aziz et al. 2005)

The ongoing work around EA is guided by existing EA reference frameworks. These frameworks are applied by modifying them to the specific organization and adapting parts to create a holistic picture for that surrounding. Without adaptation, the frameworks are mostly too massive and the steps too bureaucratic, since they are designed to give answers to most varying situations. In their study, Urbaczewski and Mrdal (2006) come to the conclusion that many of the enterprise architecture frameworks differ in terms of their approach and level of detail – where some act as proposed guidelines, others have specific methodologies to follow. Due to the abstract nature of most EA frameworks, one could question their validity and their suitability for providing an accurate guideline for organizations to follow (Urbaczewski & Mrdal 2006). Throughout the literature this



becomes evident; one cannot just look at another organization that has an EA framework in place and copy it. Architecture is practically impossible to copy directly because of the high number of interacting variables involved (Veasey 2001), and differences in organizational structures and processes.

Regardless of the difficulty of copying an existing Enterprise Architecture, an organization can learn a great deal by familiarizing itself with the EA implementation, execution and governance practices of other enterprises. This is due to the fact that architectures can take several years to establish (Veasey 2001) and the most common reason for abandoning EA is the complexity of the method and the amount of failures on the way to working practices. As Boster, Liu and Rob (2000) put it: *“An EA effort is a huge undertaking... We’ve seen an organization abandon its 2,000-page EA because no one but the chief architect understood the product”*. Thus, learning from working practices and praxes, and adapting these to one’s own environment is a key driver also for this research. After all, a common rule for Enterprise Architecture Frameworks is that they can be combined by using one as a baseline and adding parts from other frameworks where they seem to provide a good solution.

Studying organizational practices and praxes in the Enterprise Architecture context is crucial as it relates directly to the realization of strategy, and the alignment of the current mission and the desired vision of the enterprise. Thus studying the actual practices and praxes gives concrete evidence that supports the somewhat intangible models and frameworks. Understanding managerial cognitions related to the implementation, execution and governance of Enterprise Architecture provides managerial utility as it helps to clarify how this broad and multidivisional concept is treated by practitioners, and how their limited fields of vision, selective perceptions and interpretations (Hambric & Mason 1984; Finkelstein & Hambrick 1996) have influenced the formation of related practices and praxes.

## **2.2. Strategy-as-Practice**

The traditional strategy literature tells us very little about who strategists are or how to become one, and is largely silent about what strategists do in their day-to-day work. We know surprisingly little about what tools and techniques strategists now use and how and where they get them from. The practice perspective offers a way to answering these questions. It widens the realm beyond modeling and process focus to include the work, tools and workers of strategy. (Whittington 1996, 2002; Chia 2004)

### ***2.2.1. The practice perspective in strategy research***

One of the most fundamental questions in strategic management has been, and still is, how to conceptualize the essence of industries and markets and explain the factors describing competitive landscapes. Scholars have come to the conclusion that existing frameworks and theories do not adequately explain competitive factors. In consequence, several different schools of thought have emerged. In managerial discipline ten different schools of thought now form the two main perspectives – the prescriptive and the descriptive views. (Panagiotou 2006) The prescriptive view can be associated closely with economics, sees the business environment as objective, and is mostly concerned with ‘what is’. The descriptive view takes a more subjective approach and concentrates on ‘how things are done’ (Mintzberg, Ahlstrand, Bruce & Lampel 1998: 5-6). The latter forms the basis for strategy-as-practice research.

The origins of the practice perspective in strategy research can be traced back to Wittgenstein (1951) and Heidegger (1962). The movement from the dominant macro, institutional and resource based approaches towards a process centric strategy approach was initiated by Mintzberg (1987) and Pettigrew (1992, 1997). In the last two decades, strategy research has turned its attention more and more to the practical work and implications of strategy and strategic planning to the extent that we can talk about a ‘practice turn’ in the field (Schatzki 2001; Reckwitz 2002). However, it was not until the early 2000s following some earlier influential publications that SAP research started to build a distinctive identity (Vaara & Whittington 2012). Ever since, there has been a growing call for attending the actual micro-practices and everyday routines of strategy

formation (Chia 2004). SAP research has answered this by investigating the ‘praxis, practitioners and practices’ (Whittington 2002, Jarzabkowski & Spee 2009), i.e. the work, workers and tools of strategy (Whittington 2002). Clifford Geertz (1973: 5) tells us that if you want to understand what a science is, you should look first to what its practitioners do. The same applies for strategy. We can better understand what strategy is, the more we study what strategists do, i.e. the everyday practices and praxes of executives, managers and people responsible for strategy execution. As Chia (2004) points out, much of what we generally think of as being strategy work actually involves talk, presentations, committees, meetings and everyday routines.

Traditional process research has been reluctant to investigate the role of managerial agency (Pettigrew 1985). While Carter, Clegg and Kornberger (2008) claim the term practice is used as a synonym for process, and Langley (2007) views the whole concept as a category of process, SAP is mostly seen different from the traditional process research in its view of agency – its close focus on producing strategic action (Johnson, Melin, & Whittington 2003; Jarzabkowski 2005, 2008; Johnson, Langley, Melin & Whittington 2007; Whittington 2007). The micro-strategy and strategizing perspective evident in SAP research dives deeper into organizations to actually help managers do their work differently, drawing from the kind of systematic theoretical base that allows the accumulation of practical knowledge (Johnson et al. 2003).

### **2.2.2. A micro-level view on strategy**

Grant (2002: 91) concludes that “*After nearly half a century of research, the advice we academics can offer managers in designing and implementing their corporate strategies is tentative at best.*” Johnson et al. (2003) argue that, while the field of strategy has traditionally concentrated on the macro-level of organizations and has not been able to show a positive relationship between diversification and performance, it needs to now attend to much more micro-level phenomena. Their activity-based view of strategy focuses on the detailed processes and practices, which constitute the day-to-day activities of organizational life and relate to strategic outcomes. The view is developed by considering two major theories, the resource based view (RBV) and institutionalism; and two bodies of

empirical work, corporate diversification and structure, and the process tradition of strategy research. (Johnson et al. 2003)

According to the activity-based view, focus on resources is not enough in today's competitive environment where markets are open, labor is mobile, information is in abundance, and resources are increasingly tradable. Priem and Butler (2001) complain that the definition of resources in studies of RBV is typically too broad, and thus poor at discriminating between those resources that managers can actually manipulate and those beyond their control. Johnson et al. (2003) argue that sustainable advantage cannot be built on the foundation of a transparent organization. It needs to rely on the micro assets that are hard to discern, i.e. the practices and actions within the organization. Furthermore, the today's hypercompetitive environment of speed, surprise and innovation impacts both the level and frequency of strategic activity (Ibid.).

Very little is known about the actual managerial activity involved in designing new organizational structures (Bate, Khan & Pye 2000). Studies in organizational design traditionally indicate too broad categorization to differentiate between significant variations in structure, for instance between various types of multidivisional (Markides & Williamson 1996). Continuous structural changes in contemporary business cannot be supported by static structural categories, either (Brown & Eisenhardt 1997). Furthermore, Chakravarthy and Doz (1992) describe process research being about the systems and processes of organizations as wholes. This indicates how this tradition does not look at what is going on inside the organizations. Process research gives an overall picture of processes related to organizational decision-making and organizational change, but leaves out the practical activity [praxis] and tools [practices] necessary to make these processes happen. (Johnson et al. 2003)

In sum, both theoretical and empirical traditions have been unable to demonstrate clear linkages to economic performance or to shed light in the gap between the two. Therefore, if we are to help management, a more micro-level view of strategy where we focus on managers managing activities is needed. (Johnson et al. 2003). However, instead of concentrating merely on how managers shape the economic performance of private organizations (Nag, Hambrick & Chen 2007; Ronda-Pupo & Guerras-Martin 2012), SAP

studies broaden the understanding of performance and investigate not-for-profit organizations such as universities and public administrations (Vaara & Whittington 2012). The activity-based view and the whole SAP tradition investigates what is actually done and by whom, and how organizational action is enabled or constrained by prevailing practices (Feldman & Orlikowski 2011). Accordingly, the paper turns next to the fundamental concepts of the SAP field.

### **2.2.3. Practitioners, practices and praxis**

Strategy-as-Practice research is concerned with the actual work carried out by those who write, implement or govern strategy and strategy processes (Whittington 1996; Chia 2004; Jarzabkowski & Spee 2009, McCabe 2010). It focuses on the ways in which actors in their decisions and actions are enabled by organizational and wider social practices (Vaara & Whittington 2012). The SAP study leans on three broad research parameters: 1) practitioners – the people who do strategy work, 2) practices – the social, symbolic and material tools through which accepted and routinized strategy work is done, and 3) praxis – the flow of activity in which strategy is accomplished (Reckwitz 2002; Jarzabkowski & Spee 2009).

In the practice perspective a practitioner is commonly defined widely to describe both internal and external actors – those who are directly involved in strategy work, and those that have indirect influence in it, e.g. the policy makers, the media, and business schools (Jarzabkowski & Whittington 2008). Furthermore, the literature indicates that the term practitioner can refer not only to an individual but also to a group of practitioners. Accordingly, the SAP research have focused either on individual actors like George the CEO in interaction with other actors, or the aggregate level concentrating on a class of actors, such as ‘top management’. The aggregate studies analyze information to explain aggregate behavior even when collected from individuals. (Jarzabkowski & Spee 2009)

Jarzabkowski and Spee (2009) introduce the typology of nine domains in their article ‘Strategy-as-practice: A review and future directions for the field’. The typology is used to map the research done in the field of SAP by the level of study with regard to praxis, and the focus of the study regarding the type of studied people, i.e. practitioners (see Figure 4).

Based on the typology, this thesis adopts a category E study with *meso level praxis* by studying individual organizations, and concentrating on executives, managers and specialists as a unified group of people, i.e. *aggregate actors within the organizations*. This is in line with the set aims of discovering generic organizational practices and praxes regarding EA. Still, the different roles of top level executives, general managers, enterprise architects, planning staff etc. are recognized. Accordingly, elaborating from Jarzabkowski and Spee (2009) a practitioner is defined as follows:

*A practitioner is an internal aggregate actor directly involved in strategy work or in its execution.*

Practices are extensively studied both theoretically and empirically in the strategy-as-practice publications (see e.g. Hendry 2000; Jarzabkowski 2003; Salvato 2003; Mantere 2005; Jarzabkowski & Wilson 2006; Whittington, Molloy, Mayer & Smith 2006). Still, practices have as many definitions as there are papers covering them, and there are a great number of concepts of practices used within the SAP research (Chia 2004; Carter et al. 2008; Jarzabkowski & Spee 2009). Drawing from social theory, practice is commonly referred to as anything that people do. Often practices are viewed as those acts that people repeatedly engage in. Strategic practices can thus refer to such things as resource allocation, monitoring, control, documentation, briefing, use of analytical frameworks and strategic planning routines. Practices in a way look into what has been done – the accepted and legitimate repeated doings in the past (Whittington 2002). As Mintzberg (1987) points out, this is important because “[m]anagers may have to live strategy in the future, but they must understand it through the past”. By understanding the patterns that form in ones behavior enables knowing ones capabilities and future potential (Ibid.)

Jarzabkowski and Spee (2009: 82) call practices “*a means of doing in which organizing is constituted*”. The short definition accurately holds the general understanding of practices. Elaborating on this, Reckwitz (2002) describes practices as routinized types of behavior consisting of several bodily and mental activities driven by emotional and motivational knowledge. However, the elaborate description does not sufficiently take into account the material practices like presentations (e.g. PowerPoint), spatial arrangements, or the more intangible aspects like organizational structures. Therefore drawing from Reckwitz (2002), Molloy and Whittington (2005), Denis et al. (2006), Jarzabkowski and Spee (2009) and

Vaara and Whittington (2012), this research adopts the following comprehensive definition, which provides a good starting point for the study of both practices and cognitive aspects regarding them:

*Practices are routinized types of behavior, which consist of several interconnected elements including bodily and mental activities, background knowledge, norms, know-how, states of emotion and motivational knowledge, the usage of material artifacts and technologies, and formation of immaterial constructs such as procedures and organizational structures.*

The term praxis generally refers to a stream of strategic activity. It is the process by which a method or skill is enacted, practiced, or realized. Praxis may also refer to the act of applying, exercising, or practicing ideas. However, as there are nuances in the way the term is used, a clear definition is called for. This paper elaborates from the definition by Jarzabkowski and Spee (2009) and defines praxis as follows:

*Praxis is a stream of [strategic] activity that interconnects the micro actions of individuals and groups with the tools of strategy and the wider institutions in which those actions are located and to which they contribute.*

This explanation looks at praxis broadly and allows the research to examine what individual employees are doing within the organization, and also combine these with the organization's operational environment to form a continuum of work. The definition is also in line with Sztompka's (1991: 96) proposition, which indicates that praxis is where operation and action meet. According to the practice perspective, individual behavior is always embedded within a web of social practices, i.e. praxis relies on practices (Vaara & Whittington 2012). Praxes are central in organizational life as they realize strategy, and through small changes in these every-day routines, they shape standard practices and ultimately may result in re-crafting of corporate strategies (Whittington 2002).

Strategists as practitioners use their practical skills routinely in the everyday world of strategy-making. Still we know very little about what they are and the formal ways in which they are acquired. The agenda for strategy-as-practice research is to find out more about the work of strategizing and how strategists learn to do it. (Whittington 1996) Uncovering the taken-for-granted practices that shape social life and strategy work remains a central task of the practice theorist (Vaara & Whittington 2012). Therefore this paper

turns next to managerial cognition literature, which focuses on studying how strategists understand and perceive their surrounding environment, interpret it and turn these interpretations into strategic actions, finally resulting in practices and praxes (Whittington 2002).

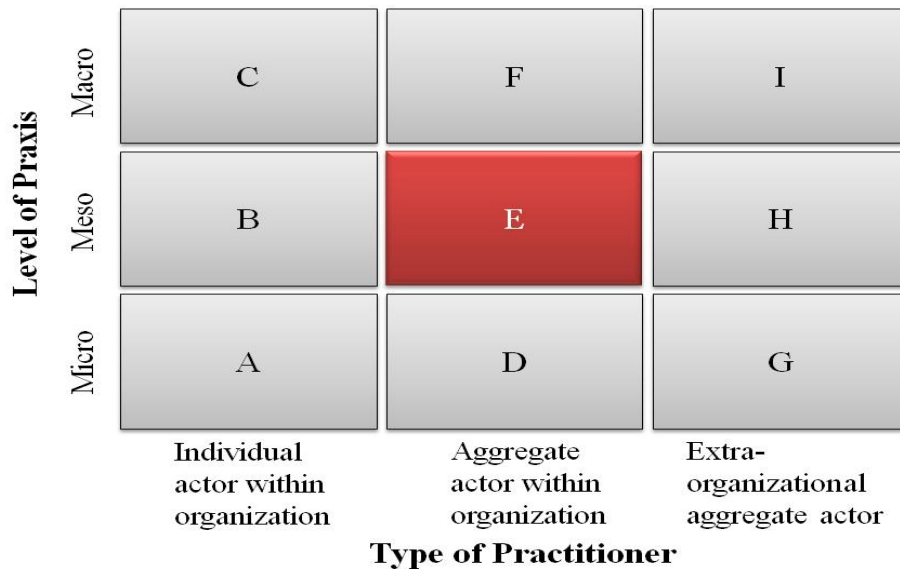


FIGURE 4. The Typology of Nine Domains of SAP research  
(Adapted from Jarzabkowski & Spee 2009)

### 2.3. Managerial Cognition

The term cognition originates from the Latin term *cognoscere* ‘to know’, ‘to conceptualize’ or ‘to recognize’. Cognition is used as a scientific term referring to mental processes, and the phenomenon has been studied mostly in the area of psychology. (Best 1999: 15-17; Coren, Ward & Enns 1999: 9) Cognitive studies can be traced back to the 1920s when the schema construct from clinical neurology (Head 1920) was discovered in modern psychology through the work of Bartlett (1932), Woodworth (1938), and Oldfield and Zangwill (1942). But it was not until Neisser (1967) wrote his book *Cognitive Psychology* that researchers began to investigate cognitions mediating effect on responses to stimuli (Walsh 1995).

The theory or research view of managerial cognition can be traced back at least to the 1950s and the theorists of the Carnegie School movement, who claimed that complex



decisions are in large parts the outcome of behavioral factors instead of aims for higher economic returns (March & Simon 1958; Cyert & March 1963). In his book about strategy and structure on the history of the American industrial enterprise, Chandler (1962) set the idea of strategy as an intelligent activity into motion. Still, during the 1970s, resource dependence, population ecology, and transaction cost economics ruled the field for explaining firm behavior (Walsh 1995). When Schendel and Hofer (1979) prescribed the analytical strategic management process proclaiming that strategic decision-making signified intentional, and deliberate activity where managers consciously direct the company's strategic resource allocation, managerial cognition became a pivotal topic. However, it was not until Hambrick and Mason (1984) introduced the Upper Echelons (UE) theory that the research around the topic was triggered. Ever since, management theorists and researchers have given much attention to managerial cognitive phenomena (Porac, Thomas & Baden-Fuller 1989; Porac & Thomas 1990; Hodgkinson & Johnson 1994; Swan & Newell 1994; Gallén 1997; Yamin & Gunasekaran 1999). The basis for managerial cognition studies is that each manager's perception and interpretation reflects his or her own cognitive base (Hambrick & Mason 1984; Wiersema & Bantel 1992), which drives strategic decision making.

### **2.3.1. The Upper Echelons Theory**

Two of the several explanations of strategy development and strategic action, evident in the managerial literature, can be viewed as the most dominant ones: 1) the economic view, which assumes total rationality on the part of managers and contends that industry structure is the primary influence of strategic action, and 2) the cognitive view, which suggests that top managers develop subjective representations of their environment that drive their strategic decisions and subsequently firm action (Nadkarni & Barr 2008). As Stubbart (1989) puts it, according to the economic view “[r]ational managers all possess the same knowledge, all reason the same logical way, all notice the same threats and opportunities, and all pursue the same goals”. The cognitive view, on the other hand, recognizes the influence of the manager's cognitive style on his or her decisions. This is apparent in the Upper Echelons model proposed by Hambrick and Mason (1984) and Finkelstein and Hambrick (1996), which indicates how a manager's cognitive base influences the perceptual process underlying decision making (see Figure 5).

According to Wiersema and Bantel (1992) a cognitive base limits the manager's field of vision, leads to a selective perception because the manager only pays attention to some of the stimuli in his or her field of vision, and the information that is processed is filtered through the lens of the manager's cognitive base. Nadkarni and Barr (2008) state that managers develop subjective representations of their environments, which affect their views of events and activities thus guiding their strategic actions. In other words, a manager or any person for that matter can only partially recognize and observe the surrounding environment, which leads to a partial field of vision that is narrowed down based on the person's cognitive base. Cognitive base again is shaped by the manager's background. The three attributes present in the cognitive view and managerial cognition literature – *attention focus, causal logics and industry velocity* – are introduced next.

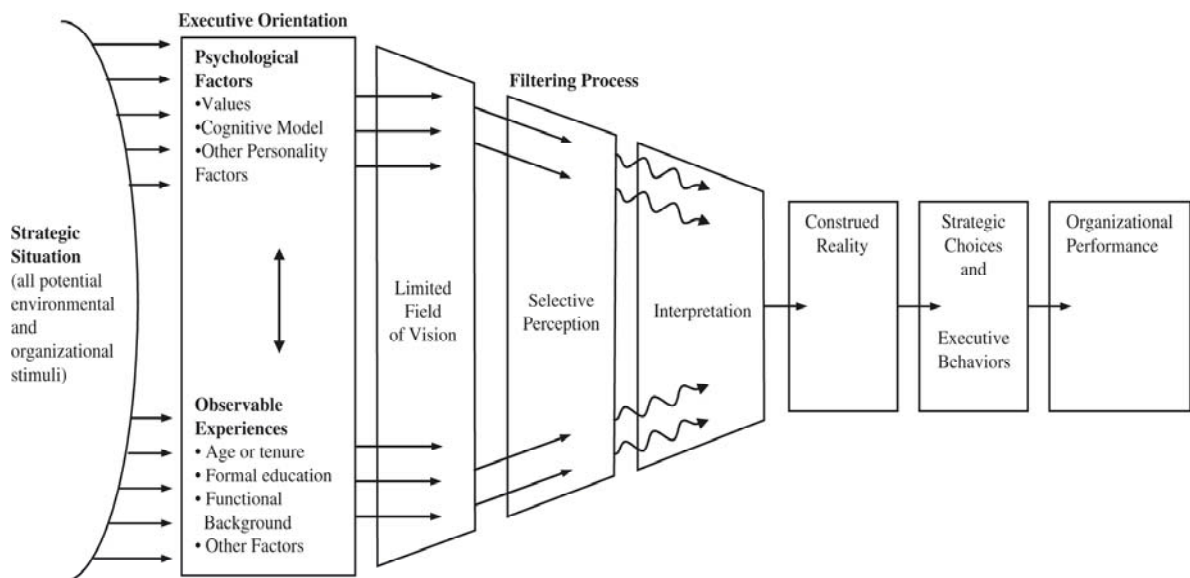


FIGURE 5. The strategic choice process according to the Upper Echelons Theory (Adapted from Hambric and Mason (1984) and Finkelstein and Hambrick (1996))

### 2.3.2. *Attention focus, causal logics and industry velocity*

In researching strategic action, Nadkarni and Barr (2008) cover three important determinants of managerial cognition and their impact on strategic action – *attention focus, causal logics and industry velocity*. Drawing from the earlier work of Daft and Weick

(1984), Hambrick and Mason (1984), Starbuck and Milliken (1988), Bogner and Barr (2000), and Fiol and O'Connor (2003), they define attention focus as:

*“[T]he degree to which top managers’ subjective representations of their external environment are dominated by concepts related to one (or more) domain over others”* (Nadkarni & Barr 2008).

This means that as top managers face an abundance of information on a continuous basis, they develop subjective representations that provide a selective attention helping them to concentrate on those issues they deem most relevant while ignoring others, ultimately driving their strategic decision-making processes. Similarities to the Upper Echelons Perspective by Hambrick and Mason (1984) are evident.

Causal reasoning forms the basis for our understanding of decision making (Fiske & Taylor 1991), and the way in which strategic decisions are processed, i.e. concluded, understood, and communicated (Huff 1990). Nadkarni and Barr (2008) define it as follows:

*“Environment-strategy causal logics is the order of the perceived causal relationship between external environment and firm strategy”*.

In the decision making process managers form views based on a combination of environmental and strategy concepts in a causal manner. Causal logics refer specifically to this connective relationship between the raw signals from the environment and the strategy of the firm, i.e. how strategists form and adapt their strategies according to changes in the environment. (Nadkarni & Barr 2008) In their simulation study on risk preferences and attention focus, March and Shapira (1992) concluded that external factors like available resources and past performance of firms affect the attention focus of practitioners, which is in line with the environment-strategy causality found by Nadkarni and Barr (2008).

Causal reasoning and attention focus are affected by a manager’s cognitive base. The cognitive base is again formed based on the manager’s background. Background characteristics are plenty but the observable ones and perhaps most easily objectively gathered ones are demographic factors such as age, position in an organization, functional background and education (Hambrick & Mason 1984). According to the Upper Echelons Theory, organizational outcomes [i.e. practices and praxes] can be partially predicted from

managerial backgrounds (Hambrick & Mason 1984). Top managers' youth is associated with corporate growth (Hart & Mellors 1970; Child 1974) but also with a higher risk tendency apparent in the volatility of sales and earnings (Hambrick & Mason 1984). This can also be viewed as a tendency to more willingly adopt new methods and strategies.

Functional or work background is regarded as affecting the way and scope in which managers solve problems, and the tendency for maintaining status quo (Hambrick & Mason 1984). According to Cyert and March (1963), top management teams that have risen solely through the organization will have a very limited perception and knowledge pool to base their decisions on. Executives promoted within an enterprise are also less keen on making changes to the structure, procedures, and positions of people than those hired outside the organizations (Helmich & Brown 1972). This indicates a link between the work backgrounds of the top executive team members and the adoption of a new strategic management method, e.g. Enterprise Architecture.

Hambrick and Mason (1984) hypothesize that “[t]he amount but not the type of formal education of a management team is positively associated with innovation”. Earlier studies have shown a clear positive link between the level of education and receptivity to innovation (Becker 1970; Kimberly & Evanisko 1981). Thus, the level of formal education may act as an explaining factor in the adaptation of Enterprise Architecture as a strategic management method.

Empirical evidence suggests that managerial cognition varies depending on the industry context (Keats & Hitt 1988; Sutcliffe & Huber 1998). In both the practice oriented and academic oriented strategy literature (Bourgeois & Eisenhardt 1988; Brown & Eisenhardt 1997; Eisenhardt & Martin 2000) and managerial cognition literature (Nadkarni & Barr 2008), one concept in particular has drawn a lot of attention – industry velocity. Industry velocity, also known as industry clockspeed, refers to the speed of an industry. Drawing from Nadkarni and Narayanan (2007) and Brown and Eisenhardt (1997):

*Industry velocity reflects the rate of change in an industry and the unpredictability of changes in industry variables.*

High velocity industries pose a challenge for strategic management to be able to form an understanding of their environment due to rapid and unpredictable changes in technologies and competitors' strategic actions. In low velocity industries, on the other hand, top managers in incumbent firms can gradually build an understanding of the business environment. These differences in cognitive challenges for top managers are reflected in their attention focus and the related causal logics. (Nadkarni & Barr 2008)

In low velocity environments, top managers have a tendency to direct their attention to changes in the general sector, i.e. social, demographic, economic and political dimensions, since the task sector factors, i.e. competitors, suppliers and customers, are rather stable and easily predictable. Thus, in the long run attention of the management team in low velocity industries will be biased towards the more macro-level general sector. (Nadkarni & Barr 2008) In high velocity industries where the environment changes rapidly and frequently, constantly disrupting the competitive status, competitors, customers and distribution channels are not permanent. Enterprises thus engage in action by experimenting, testing and probing (Eisenhardt 1989) reactively and wait to see what happens (Weick 1995). In the long run, as the organizations enact and construct their environments through innovative strategies that make previous action sensible (Daft & Weick 1984; Weick 1995) rather than developing strategies in response to environmental changes (Lyles & Schwenk 1992), they are likely to result in strategy to environment beliefs and develop proactive causal logics (Fahey & Narayanan 1989). In contrast, low velocity industries are characterized by predictable changes (Eisenhardt & Martin 2000) and as top executives analyze, learn from, and respond to their concrete and measurable operating environments, they are more likely to develop environment driven deterministic causal logics where strategies are developed in response to environmental demands (Nadkarni & Barr 2008).

Industry velocity, therefore, acts as a crucial factor in explaining possible differences between public and private enterprises in the study. Also, industry velocity can help in describing possible variances in the way strategic management methods have been implemented and constructed, and how strategic actions are executed. Accordingly, the construct of Enterprise Architectures in the public and private sector enterprises may vary in how they adapt to instant changes in the environment.

## **2.4. The interrelationship of cognition and strategic practices**

The more complex the decision, the more applicable the managerial cognition theory is thought to be (Hambrick & Mason 1984). Strategic thinking and management are considered as highly complex areas, so managerial cognition seems to be a good fit for this research domain, and earlier findings also lean to the same direction. Berger and Luckmann (1967) suggest that unusual ideas occur among people who do not share the standard beliefs or ways of conduct. Innovations also seem to be made by marginal groups who act outside the mainstream and have managers who think outside-the-box (Fligstein 1991; Leblebici, Salancik, Copay & King 1991). Thus, managerial cognition research is at the heart of finding out entrepreneurial spirit and innovational thought processes concerning organizational practices within larger contexts.

Managerial cognition has been studied closely in relation to enterprise performance (Jenkins & Johnson 1997; Greve 1998; Panagiotou 2006). Studies suggest a link between the managerial cognitions, strategic action, and organizational performance (Hambrick and Mason 1984; Jenkins & Johnson 1997). According to the Upper Echelons views, top managers bring together and interpret information for the firm as a whole (Hambrick & Mason 1984). The point at which information merges and is transferred to enterprise level action is presumed to be at the executive level (Daft & Weick 1984). Thus, cognitions on the strategic level in organizations seem to portray a clear link to strategic action and unavoidably to organizational praxis, practices and practitioners.

In his book *Institutions and Organizations: Foundations for Organisational Science*, Scott (1995) addresses the need to understand cognition and mental structures as influential factors in organizational processes and argues for a need to study more closely practitioners' influence on them. Eden and Ackermann (1998) conclude that close engagement with practice is needed in order to understand the relation between cognition and strategy. According to Johnson et al. (2003), organizational activities form the basis of strategic management. In the management and organizational cognition context, Walsh (1995) argues that it is necessary to understand strategic management in terms of people's behavior, whereas, Weick and Roberts (1993) indicate that collective cognition is part of organizational activities.

Accordingly, managerial cognition research comes in many ways close to the SAP literature. However, where managerial cognition research focuses on explaining the mental models or knowledge structures (schemas in psychological studies) of the studied people and try to uncover the views of the specific interviewees, the strategy-as-practice research takes a more practical view concentrating on the practices and praxes in organizations that are a result of the subjective representations of individual practitioners or groups of practitioners driving strategic actions. *As a result, combining the two views in a qualitative research can result in an in-depth analysis of the actual practices and praxes within the studied organizations, but also in revealing the related strategic reasoning and perceptions of the practitioners.* Furthermore, the external and internal factors influencing the formation of organizational practices are important in understanding their generalization. The external and internal viewpoints embedded in the managerial cognition and strategy-as-practice literature is combined in this research to form a theoretical framework for the analysis of strategic organizational practices, which is presented next.

## **2.5. Theoretical Framework**

There is a clear link between the managerial cognition literature and the strategy-as-practice research, as demonstrated above. This link between the two acts as the building block for the theoretical framework of the thesis. The *Framework for Analyzing Strategic Organizational Practices (FASOP)* presented in Figure 6 lays the foundation for the empirical study in this thesis. The framework includes parts from both SAP and managerial cognition literature, which are tied together within the organizational environment by incorporating a generic strategic management method in the construct. In this thesis Enterprise Architecture portrays the strategic management method but it could be equally represented by another school of strategic management.

The orange balloons in the framework indicate the Contextual Factors that influence managerial cognition comprising of Attention Focus and Causal Logics as described earlier in the paper. Resources, past performance and industry velocity are all examples of environmental elements that affect the cognitive models of the practitioners within strategic management by disrupting the environment or directing managers' attention.

As explained earlier in the paper, causal logics refer to the connective relationship between the raw signals from the environment and the strategy of the firm, i.e. how strategists form and adapt their strategies according to changes in the environment (Nadkarni & Barr 2008). Causal logics indicate how available resources affect strategic thinking e.g. by directing managers' attention on things that are within budget. Again, industry velocity influences top managers' attention focus and mediates causal logics, and causes emphasis either on the task or general sector. This again has a direct impact on the formation of praxis and practices, e.g. through concentration on short term vs. long term priorities.

In the lower left hand corner, the blue balloons represent the Demographic Factors of the practitioners (i.e. those involved in EA work on strategic governance or operational control level) and depict variables that may explain differences in practices and praxes among seemingly similar organizations as described earlier. For this research, formal education, age and functional background, i.e. whether a manager is hired outside or from within the organization to his/her current position, are chosen as Demographic Factors due to the availability of information on them.

Earlier research indicates that top managers' youth is linked with a higher risk tendency (Hambrick & Mason 1984) and corporate growth (Hart & Mellors 1970; Child 1974). This suggests that younger managers are also more prone to adopt new management methods and strategies that offer a possibility for increased efficiency and profits. This link between cognition and Demographic Factors like age, functional background and education is established, and its causal relationship to managerial decision making is presented in the FASOP.

The link between functional or work background of the managers and the adoption of a new strategic management method, e.g. Enterprise Architecture is described earlier. Also the positive affiliation between the level of formal education and receptivity to innovation works as one explaining factor in the adoption of a strategic management method. Accordingly, the FASOP incorporates both functional background and formal education in the Demographic Factors to illustrate their connection to managers' cognitive base.



External Influencing Factors refer to the wide range of things that affect the decision regarding the choice of a strategic management method in an enterprise. Aggressive marketing or the dominant market position of another competing management tool could fall to this category of factors. These pose only a minor empirical aspect in this study but need further attention in the broader context of explaining strategic action.

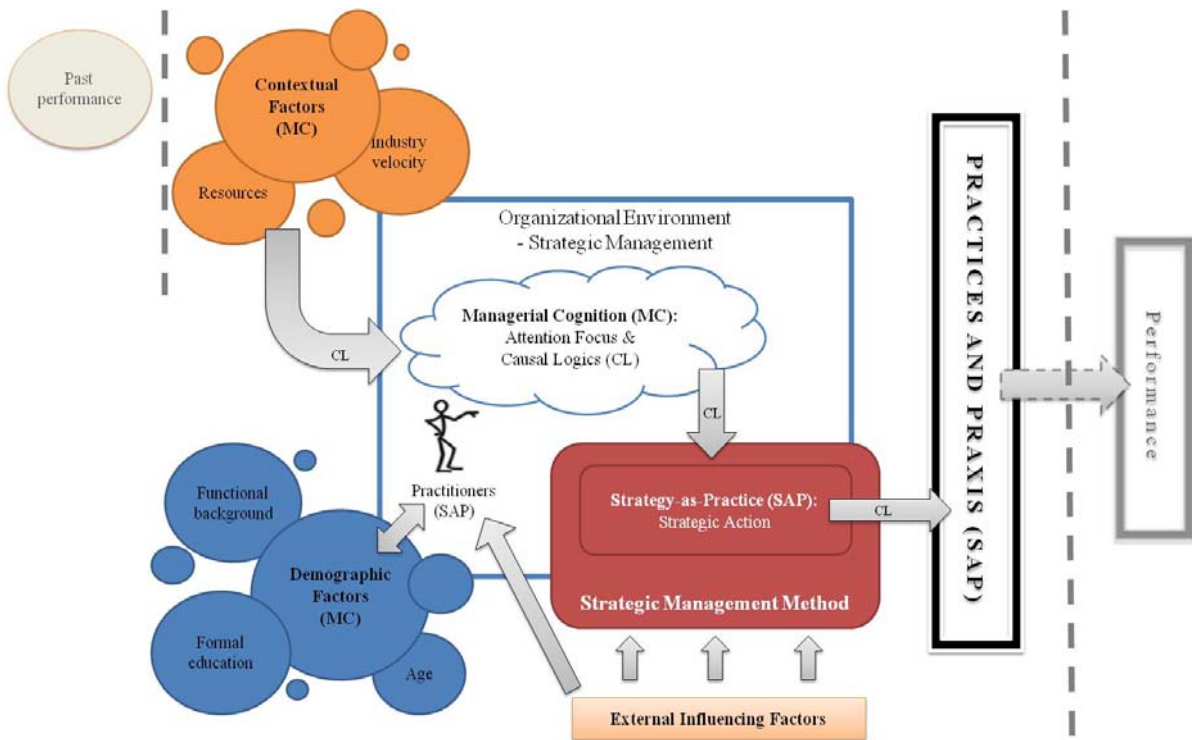


FIGURE 6. The Framework for Analyzing Strategic Organizational Practices

The red box in the framework encompasses the Strategic Management Method, which illustrates the research phenomenon. In this study, Enterprise Architecture is chosen as the area to be studied. However, the model does not limit the use in different surroundings or with other management methods. Strategic Actions, which lie within the strategic management method, are the results of the management's attention focus and causal logics within the boundaries of the chosen method, i.e. Enterprise Architecture as indicated in the theoretical context. Through communication, the strategic actions eventually lead to shared understanding among workers, which manifests as practices and praxes as per SAP literature.

In this thesis past performance of organizations as a background factor is ruled out of the empirical context due to two reasons: 1) lack of measuring makes it impossible to provide evidence on the effects of Enterprise Architecture on performance, and 2) past performance information are at parts regarded as business secrets. Furthermore, this study is defined to concentrate on identifying working organizational practices and praxes regarding EA. Therefore, economic performance resulting from the relationship between the strategic choices and the formed practices and praxes is not covered, but it provides leeway for extended research around the topic. However, in line with SAP research performance often means more than just economic performance (Vaara & Whittington 2012). Performance may for example refer to how practitioners perform their roles (Vaara & Whittington 2012). Therefore performance in this sense becomes a part of the practices and praxes the research aims to investigate.

### 3. RESEARCH METHODOLOGY

#### 3.1. Research philosophy and paradigm

Quinton (1995: 666) defines philosophy as “*Rationally critical thinking, of a more or less systematic kind about the general nature of the world (metaphysics or theory of existence), the justification of belief (epistemology or theory of knowledge), and the conduct of life (ethics or theory of value)*”. Deriving from that, research philosophy can be described as the development of the research background, research knowledge and its nature. All in all, philosophy is regarded as a crucial parameter to ‘Why research?’ (Holden & Lynch 2004). This is how the philosophical aspects tie the background and theoretical part of the research together with the empirical study.

Research philosophy is explained by the research paradigm, which acts as a broad framework comprising of perceptions, beliefs and understanding of several theories and practices that are used to conduct the research. Paradigm is a worldview – a general perspective or a way of breaking down the complexity of the real world (Patton 1990: 37). Paradigm is central in how the study is conducted as it entails the ontology, epistemology and methodology of the research. Ontology refers to the form and nature of reality and tries to find out what there is that can be known about it (Guba & Lincoln 1994: 108). Stanley and Wise (1993: 188) define epistemology as “...*a framework or theory for specifying the constitution and generation of knowledge about the social world*”, i.e. the theory of knowledge. Epistemology is the philosophical study of what is required in order to have rational beliefs and knowledge. A fundamental epistemological question could, thus, be: Under what conditions does a subject know something to be the case? Methodology again refers to the ways in which the researcher goes about finding out whatever she believes can be known (Guba & Lincoln 1994: 108). Ontology, epistemology, and methodology are usually interdependent, which means that when one is selected as a standpoint for the study, the others will follow.

The research questions in this thesis are formulated in a manner suitable for qualitative techniques. According to the research objectives, background and questions, a suitable

research paradigm is post-positivism with critical realist ontology. As Crossan (2003) states, whereas positivism adopts a clear quantitative approach to investigating phenomena, post-positivist approaches aim to describe and explore in-depth phenomena from a qualitative perspective. Generally, focusing on what people think and how they perceive their surroundings, i.e. their cognitions, would suggest an interpretative approach for the research. However, in this context a critical realist approach (ontology) is applied as the interest in this study is not with the managers as unique individuals, but more on the insights they can give concerning the practices on EA planning, implementation, execution, governance, monitoring and development. Critical realism admits into explanations theoretical terms that are not directly amenable to observation (Bryman 2004: 12). The ontology indicates that reality is only imperfectly apprehensible because of subjective intellectual mechanisms and intractable nature of the phenomenon. From an epistemological standpoint, the research findings are considered most likely to be true but still remain subject to falsification. (Guba & Lincoln 1994: 110)

## **3.2. Research methods**

Research methods are generally categorized into quantitative and qualitative. Many researchers ponder between choosing quantitative or qualitative methodology in their research (Sobh & Perry 2006). Because there is no “*absolute basis for scientific knowledge*” (Hughes & Sharrock 1997: 162-163), one theory or methodology cannot be held as more valid than another. In most cases, however, the choice between quantitative or qualitative methodology depends not on the situation or subject but more on what the research is trying to accomplish. The foundation for the chosen research methods in this study is presented next.

### **3.2.1. Research design**

Creswell (2003: 22) argues that where little research has been done on a concept or phenomenon that needs to be better understood, it merits a qualitative research approach. Similarly, Morse (1991) states that qualitative methods are generally used when the research context is poorly understood or the nature of the problem is unclear. As the view

of this research is new and the research area relatively scarcely studied in the particular context, this paper aims to describe the research phenomenon as precisely as possible without limiting it on the findings from earlier studies and applies a qualitative approach in the form of interviews. Conducting a qualitative research is also in line with the strong orientation towards qualitative interviews applied in practice research (Jarzabkowski 2003; Molloy & Whittington 2005; Jarzabkowski & Fenton 2006; Whittington, Molloy, Mayer & Smith 2006; Giraudeau 2008; Hendry, Kiel & Nicholson 2010; Jarrat & Stiles 2010).

Qualitative research is exploratory in nature, which is needed when the topic to be studied is new, has never been addressed with a certain sample, or existing theories do not apply or do not exist with the particular sample (Morse 1991). As a natural influence of a realist approach to research design, the research generally consists of two stages. The first stage is exploratory in nature, while the literature is step-by-step entwined around sequential interview data. The second phase is built by expanding theoretical knowledge along with conducting the interviews and learning from the previous interviews and adjusting the research questions where applicable. (Sobh & Perry 2006)

In realist research, prior theory is considered additional evidence that can be used to clarify the imperfectly apprehensible external reality (Guba & Lincoln 1994: 110) by triangulating on that reality (Riege 2003). This research is carried out as an exploratory study with a (critical) realist viewpoint following the presented two-stage design. This provides an overall picture of the research area, allows for the researcher to gradually build an understanding of the multidimensional research dilemma, and provides a sound basis for practical implications. The exploratory nature of the research is important for gaining a deeper understanding of the Enterprise Architecture practices and praxes that currently exist among those organizations that attest to its use. The exploratory design is more dynamic than that of descriptive research allowing more flexibility in the interview process. This is needed to gain new insight of the complex and academically scarcely studied area of Enterprise Architecture and its connection to strategic management.

### **3.2.2. Research sample and data collection**

The population for the research is made up of all organizations in Finland applying Enterprise Architecture. The target population include those Finnish organizations that possess over two years of practical experience for applying business oriented EA at the time of the study (sampling units, extent & time), and the managers or executives and specialists responsible for implementing, executing and governing EA work within those organizations (elements). The research sample comprises of four large enterprises (sample size), which had at least two years of practical working experience around Enterprise Architecture implementation, execution and governance at the time of the study. Large enterprises in this research are defined as exceeding the thresholds set by the European Commission for medium sized enterprises (EC 2003). Accordingly, large enterprises chosen for the research had over 250 employees, an annual turnover of more than 50 million Euros, and a balance of over 43 million Euros in the latest financial statement. Small and medium sized enterprises were ruled out of the sample due to limited resources for a full scale implementation and execution of EA that might distort the findings.

The studied organizations were chosen from varying environments, thus allowing a more comprehensive understanding of the implications of EA work. This research applied judgemental sampling, a form of convenience sampling where the researcher by exercising expertise chooses the appropriate elements [organizations] to be included in the sample. This approach allows for a low cost, convenient, and efficient way of choosing a research sample, and is considered ideal for exploratory research designs. (Malhotra & Birks 2006).

Previous studies propose that the perceptions of solely the CEO do not give an adequate answer to understanding strategic implementation (Wooldridge & Floyd 1989, 1990; Bowman & Ambrosini 1997; McDermott & Boyer 1999). The shared understanding of middle management and the operational level employees with regard to the top management's goals is critical to effective strategy implementation (MacMillan & Guth 1985; McDermott & Boyer 1999). Research also demonstrates the crucial role of middle managers as creators, interpreters, and communicators of strategy in organizations (Mantere 2005, 2008; Rouleau 2005). Thus the research data was collected by interviewing one manager, executive or upper clerical worker (expert) responsible for EA on the

strategic level and one manager or expert responsible for EA on the operational level from a total of four enterprises. Thus altogether eight interviews were conducted. Choosing interviewees from different organizational levels followed the lead of previous practice based studies (Regéner 2003; Mantere 2005). Two of the studied organizations were from the public sector, and the other two from the private sector, which again supports the SAP tradition of extending the sectoral scope of strategic management research beyond the profit-seeking firm (Vaara & Whittington 2012).

The organizations for the study were chosen based on the length of commitment to Enterprise Architecture work. Information from organizations applying EA in Finland were retrieved from members of the Finnish Enterprise Architecture Knowledge Community (Kokonaisarkkitehtuurin osaamisyhteisö KAOS, [www.sytyke.org/kaos](http://www.sytyke.org/kaos)), which aims at promoting business driven EA vision in the Finnish industrial life (sampling frame). The community has a membership of over 500 EA experts, and for the period of 2011 to 2013 the Board of Trustees is headed by Mr. Mika Helenius from the Aalto University.

Using judgemental sampling, the enterprises retrieved from the KAOS members were narrowed down by choosing those from familiar fields of business, and finally picking eight organizations, which all had over two years of practical experience with EA work and were considered appropriate for the study due to their organizational structure, history and current economic stand. Some inquiries into the suitability of the chosen organizations for the study were made from familiar enterprise architects, and by incorporating their expert recommendations the list was narrowed down to include six organizations, three from both public and private sectors. Experts from all of the named organizations were contacted in December 2011 by telephone, and altogether four interviews from two organizations were scheduled for January 2012. In January and beginning of February, the other four interviews from two more enterprises were arranged. Finally, from the list of six suitable organizations four were selected for the study based on the experts' willingness to participate and the suitability of mutually convenient interview dates.

The chosen eight respondents for the interviews were contacted by telephone. The purpose for the research was explained, and more information concerning the research type, style,

length, and content was sent by e-mail. The actual interview times were confirmed by e-mail and/or electronic calendar appointments. The interviews were all conducted at the respondents' offices, and they ranged approximately from 1 to 1.5 hours in length. The interview settings were kept informal in order to form rapport and receive as detailed answers and personal views from the respondents as possible. The interviews were recorded and transcribed verbatim, which allowed a thorough analysis of the data. The studied organizations and people together with details of the interviews are listed in Table 1 and their demographic factors in Table 2. Short descriptions of the organizations chosen for this study are presented in Appendix 1.

TABLE 1. The studied organizations and interview details

Organization	Interviewee	Date	Length of interview	Length of transcript
Finland's Local Store (Suomen Lähikauppa Oy)	Chief Information Officer (CIO)	25 January 2012	1 h 18 min	7 053 words
	Manager, Head of Enterprise Architecture and PMO	11 January 2012	1 h 4 min	7 379 words
Stockmann Plc	Head of Technology (Process Architecture)	12 January 2012	1 h 1 min	8 442 words
	IT architect	12 January 2012	41 min	5 061 words
The Finnish Transport Agency (Liikennevirasto)	Chief Information Officer (CIO)	19 January 2012	1 h 13 min	8 029 words
	Head of Unit, ICT Development (Architecture)	18 January 2012	1 h 27 min	8 829 words
State Treasury (Valtiokonttori)	IT Architect, Government IT Shared Service Centre	8 February 2012	1 h 20 min	10 423 words
	IT Architect, State Treasury	8 February 2012	1 h 9 min	6 438 words

The interviewees or the enterprises are not referred to directly within the thesis. When presenting direct quotations, people are referred to as respondents or interviewees. The organizations are presented by name but respondents by job title (position) only.



Categorization between the results from public and private sector organizations are, however, made and compared if applicable.

Interviews are commonly categorized as structured, semi-structured and unstructured (Bryman 2004). In this study, the research problem is set based on the studied phenomenon, and the research questions are derived from the academic literature that forms the theoretical framework for the research. The research data needed in order to untangle the set research question has to be broad and multidimensional. An in-depth sample of the thoughts of the interviewees needs to be captured. Furthermore, the background of the managers provides insight into the possible distinction between the interview data. Thus the interviews cannot be controlled too much to allow the interviewees to give an open description of the research area. Accordingly, this study employs loose semi-structured theme interviews as the empirical study method.

Semi-structured interviews follow a lenient structure and the interviewer generally uses a guideline with a set of questions or topics. Yet there is some leeway as to the order in which these questions are asked, and it is even encouraged that the interviewer conducts clarifying questions and gathers more in-depth knowledge on the subject matter outside the scope of the question guideline (Bryman 2004: 321). Still, depending on the source of reference, there seem to be great variations in the degree of structure from rather controlled to very flexible (Robson 1995; Fielding 1996; Eskola & Suoranta 1998).

A *theme interview* is a form of the semi-structured interview method, which allows the interviewer to study the thoughts, feelings, experiences and nonverbal information on experiences of individuals. The term theme interview (*teemahaastattelu*) does not appear in international literature. However, the idea is based on the book 'The Focused Interview' by Merton, Fiske and Kendall (1956). It is a research method most commonly used when the interviewees have encountered a certain phenomenon or gone through an event or change. In theme interviews, the experiences of the interviewees are emphasized and their voices are brought forward. (Hirsjärvi & Hurme 2008: 48) It is also typical that a theme interview is conducted around a specific topic area but allowing the interviewee to bring his or her own ideas forward, and even steer the conversation to his or her preferred direction (Ibid.: 104). According to Eskola and Vastamäki (2001: 33) the themes in a good theme interview

are formed based on earlier academic literature by creatively applying the theoretical framework. Also the use of intuition is allowed when gathering experience-based research data. Based on his or her answers, the interviewee specifies and deepens the themes set by the researcher (Hirsjärvi & Hurme 2008: 66).

In conducting the research interviews, a guideline or template of questions categorized by research question formed according to the themes arising from the theoretical context was used. The design of the template followed the main aims and dimensions of the research, e.g. the central ideas of the studied phenomenon of Enterprise Architecture (what?), the practices and praxis in the studied organizations arising from the SAP theory (how?), and human perceptions and cognitions within the context arising from the theory of managerial cognition (why?). The research did not follow a strict predefined form, and clarification and elaboration with ad-hoc questions were used. More specifically, the themes portrayed the research setting introduced by Jarzabkowski and Spee (2009) of the *practitioners*, i.e. strategists, *practices*, the social, symbolic and material tools through which strategy work is done, and *praxis*, the flow of activity in which strategy is accomplished.

According to the literature, the theme interviews were executed loosely (Hirsjärvi & Hurme 2008: 48), allowing them to continue for as long as there was more information around the research topic to be gathered. As the research is qualitative in nature, the strong subjective nature of the data was taken into account already in the planning phase. The research questions were kept as open as possible and the interviews contained as little steering and control as possible. The interviewees were allowed to bring their ideas forward freely. After all, cognition becomes empirically accessible only when it is communicated (Hendry 2000). However, due to the complex nature of the studied phenomenon and the theoretical base of the study, steering and clarifying questions (or probes) were used where necessary. Methodological aims were considered by conducting research interviews in natural settings, i.e. the respondents' own offices (Guba & Lincoln: 110).

### **3.2.3. Data analysis and interpretation**

Based on the research paradigm, the interview data in this research was analyzed as a realist text using a post-positivist approach. The analysis was, thus, interested in facts about the world, focused on factual and specific accounts of action, beliefs, perceptions and attitudes etc, and looked for statements of information about structures, policies and actions of organizations. The critical realist view allowed for categorizing the data e.g. based on the themes arising from the theoretical frame. This thesis utilized Sobh and Perry's (2006) method for coding the qualitative interview data, which outlines two steps in data analysis in realist research: 1) data reduction, i.e. coding into a manageable form, and 2) data display, i.e. presenting the findings. In the data reduction phase, coding in realist research was done on a general level, and not every detail of all the perceptions of respondents was accounted for. The coding used resembled open coding presented by Bryman (2004: 402) with regard to grounded theory approach where the data is broken down, examined, compared, conceptualized and categorized, and finally grouped into larger contexts.

Connection to the interview outline guided the process and interview transcripts were coded by giving each theme and each research question a specific marker, i.e. a letter combination indicating a specific theme area, a number showing the related research question, and a color indicating the importance of the response. In the data display phase, the answers that shared a common marker were compiled and finally presented as unified textual interpretations. The themes that were derived from earlier enterprise architecture, managerial cognition and strategy-as-practice literature included 1) the perceptions regarding EA within strategic management, 2) the ways of governing EA in organizations, 3) the practices and praxes regarding development initiatives, and 4) the communication of EA to ensure successful strategy implementation. These themes were compiled during the process of writing the theoretical context. They underwent several modifications prior to conducting the interviews but remained constant during the empirical study process. However, the interview template was specified during the interview process based on responses from the respondents. Also, EA communication and training formed a unilateral subcategory or theme as it was given the most attention throughout the studied organizations.

As the data analysis and interpretation occur somewhat simultaneously in qualitative studies, the interviewees' responses were quoted frequently when presenting the research results. This allowed for an in-depth understanding that is crucial to realist research.

### **3.3. Research quality evaluation**

Credibility forms the backbone of any academic research. Practice theorists also emphasize the importance of reflexivity, indicating the need to critically examine the practices of one's own research (Vaara & Whittington 2012). Due to the large number of philosophical schools of thought and the abundance of analysis techniques, there is no one common method for evaluating the credibility of qualitative studies (Dyer & Wilkins 1991). However, generally in the methodology research credibility is examined by using the concepts of validity and reliability. The indicators for validity and reliability according to Yin (1994) are: 1) *Construct validity*: establishing correct operational measures for the concepts being studied; 2) *Internal validity*: establishing explanations and causal relations where specific conditions lead to other conditions; 3) *External validity*: establishing the domain to which a study's findings can be generalized, also indicating the fit between theoretical conclusions and empirical data (Grönfors 1982: 174); and 4) *Reliability*: the notion of repeating the case study and achieving the same results.

Several authors (see e.g. Hirschman 1986; Robson 1995; Riege 2003) argue that traditional measures, i.e. validity and reliability, for addressing the quality in research do not apply in qualitative research. They suggest four corresponding concepts suitable for qualitative studies: 1) conformability, 2) credibility, 3) transferability, and 4) dependability. These concepts are parallel to those presented by Yin (1994) but address credibility from a point of view more suitable for qualitative research, and do not place similar emphasis on generalizability or causality. Instead they focus more on openness, cross verification, and reporting standards. To ensure the quality of this study, the concepts for evaluating the credibility of this study are addressed by applying the following design tests techniques compiled by Andreas Riege (2003).

### **3.3.1. Conformability**

All interviews were recorded for later examination. Interviews are transcribed verbatim to allow direct quotations, and a possibility for cross checks (Hirschman 1986). The interview transcripts and working papers of the thesis are kept available for evaluation during the entire research process. Working papers are reviewed several times throughout the study process by the thesis instructor and opponent(s) (Yin 1994).

### **3.3.2. Credibility**

Triangulation (Flick 2006: 37; 389-390), i.e. using techniques that facilitate validation of data through cross verification from several sources (data triangulation), through several ways, methods or subscales within a method (methodological triangulation), or by combining different theoretical viewpoints (theory triangulation), is used extensively: 1) The study sample includes public and private enterprises to enable the gathering of rich uncolored data, which best represents a multitude of organizations on a general level; 2) Two people from each enterprise, one from the management or strategic planning level and the other from the operational or strategic execution level, are interviewed in order to form a sound understanding of the practices and praxes within the organization; 3) The conceptual framework is comprised of two independent theories bringing different insights into the research setting, interviews, analysis and interpretation phases of the study; 4) Different subscales are used in the data analysis and interpretation phase based on the research categorization.

In the data analysis phase of the research, peer reviews are conducted regularly to foster subsequent credibility (Hirschman 1986). The research paper is made available for the enterprises participating in the research, thus requiring high accurateness and subsequent credibility on the quotations and interpretations. Tables and figures are displayed throughout the work to assist in explanation building. Also, the interview data is cross-checked during the analysis and once reported (Yin 1994).

### **3.3.3. *Transferability***

The scope and boundaries of the research are set clearly in the design phase making the generalization or transferability of the results to another context possible. The research data is coded by using different types of symbols, signs and other categorizations in the data analysis phase (Yin 1994). Following the pre-set themes derived from the theory literature, the empirical structure enables accurate reporting of research results and thus also transferability.

### **3.3.4. *Dependability***

The interview process is described in the research design and data collection phases and evaluated by the instructor, providing mechanisms against bias and thus establishing dependability. The interview findings are stored as concretely as possible by using recorded interviews and verbatim transcriptions (LeCompte & Goetz 1982) and back-up files. The research uses a semi-structured research approach suitable for the research questions and setting (Yin 1994), and peer reviews are conducted throughout the thesis process (LeCompte & Goetz 1982).

## 4. RESULTS

### 4.1. Findings on Demographic Factors

In line with the introduced theoretical context, the thesis looks into the cognitive bases of the interviewed practitioners, which are influenced by their individual backgrounds. The research focuses on three distinctive background characteristics: age, functional background and education. (Hambrick & Mason 1984) The gathered demographic factors indicate that in all studied organizations, Enterprise Architecture work is led by relatively young people, ranging between 30 and 45 years of age with the average age being c. 38 and the median age 39.5 years (see Table 2). Seven out of eight respondents possess a higher education and have on average nearly 6 years of experience regarding EA. The architecture work in the studied enterprises is dominated by men with only one of the interviewees being a woman. This research does not concentrate on investigating the differences between demographics but instead uses them to explain variances in the EA practices. However, the higher number of men occupying EA positions in the studied organizations can attest to the rather IT focused thinking that still dominates architecture work (CAEAP 2011).

According to the Upper Echelons Theory (Hambrick & Mason 1984), youth can be associated with a higher risk tendency, which suggests courage and willingness to adopt new methods and strategies. The average age of the people responsible for EA work in the studied organizations can be regarded as relatively young. Also, in all of the studied organizations, architecture work has been started over two years ago when no formal guidance or obligation with regard to EA existed even in the public administration. Thus the youth of the people responsible for EA implementation, execution and governance within the research sample can be seen as supporting the theoretical framework (FASOP) and the underlying theoretical evidence.

Earlier studies (Becker 1970; Kimberly & Evanisko 1981; Hambrick & Mason 1984) as portrayed in the theoretical framework (FASOP) express a linkage between the amount but not the type of formal education of managers and the innovativeness of the organization.

All but one of the interviewees in this study possessed a higher education with six out of eight respondents having a higher academic degree. As EA can be considered a rather complicated but innovative management method, the results seem to be in line with the prior findings and one can argue that practitioners' formal education acts as one explaining factor in the adaptation of EA as a strategic management method. However, as seven out of eight interviewees possessed a technical degree, based on the research results no new evidence regarding the relationship between the type of formal education and the innovativeness can be made.

TABLE 2. The interviewees' demographic factors

<b>Gender</b>	<b>Age</b>	<b>Education</b>	<b>Employment Status (position)</b>	<b>Length of Experience in EA</b>	<b>Functional Background</b>
male	38	Higher Academic Degree (technology)	Middle Management	7 years	Outside
male	43	Higher Academic Degree (business admin. & technology)	Upper Management	5 years	Outside
male	30	Higher Academic Degree (technology)	Clerical Worker	4 years	Outside
male	41	Studies in University (technology)	Upper Management	8 years	Inside
male	31	Higher Academic Degree (technology)	Middle Management	8 years	Inside
female	45	Higher Academic Degree (technology)	Upper Management	4 years	Inside
male	36	Lower Academic Degree/Bachelor Degree (technology)	Upper Clerical Worker	5 years	Outside
male	43	Higher Academic Degree (applied geography and regional planning)	Upper Clerical Worker	6 years	Outside

Functional background as indicated in Table 2 explains whether a person is hired to the current position from outside or promoted within the organization. According to Hambrick and Mason (1984) and Helmich and Brown (1972) this can affect the way and scope in



which managers solve problems, and the tendency for maintaining status quo. Strategists that have risen solely through the organization will have a more limited view and restricted knowledge base than people hired from outside the organization (Cyert & March 1963). The research results, although not definitive, point in the same direction. Five out of eight interviewees were recruited to their current positions from outside the organization, which can regardless of EA's rather complex implementation process, partly explain its adoption in those enterprises. However, when dealing with something as intricate as Enterprise Architecture, hiring people outside the organization may act as a driving force for EA implementation or development as suggested by the findings, but also shows that without people who have extensive knowledge of the incumbent organization's processes and some knowledge of EA, the entire construct may lose its foundation and fail. This becomes evident also in one respondent's answer:

*"...you recruit some help for [EA], when again it is often times...a question of...whether she understands our business."*

## **4.2. Findings classified by themes**

The themes in this research are formed based on the theoretical framework and its underlying theories. The research findings are presented below accordingly. To form a comprehensive and in-depth picture of the research phenomenon, the findings are compared with and interpreted according to the theoretical literature.

### ***4.2.1. Perception of the role of EA in strategic planning***

Enterprise Architecture is a vast playfield as indicated in the theoretical part of the work. Even though the basic idea that business requirements should drive IT-development in enterprises is rather simple and straightforward, the amount of variables and different types of reference frameworks and models around the subject is overwhelming. According to the cognitive view on strategy development and strategic action, the perceptions of the interviewees regarding the studied phenomenon are guided by their cognitive base (Nadkarni & Barr 2008). From the first encounters with the concept of Enterprise

Architecture, the professionals in this research describe their impressions of it as being *hype, vague, distant* or even *intimidating*. This can be regarded as one key factor explaining the long planning phases preceding the EA implementation processes in the studied organizations.

However, all interviewees have taken notice of the Enterprise Architecture's comprehensive nature. In line with earlier studies (Jonkers et al. 2006), EA is regarded as a means of building communication between the business operations and IT, which comes across well in the following statements from two interviewees:

*"Yes, the idea of getting IT and business talking in the same language and going in the same direction was visible."*

*"I liked the approach...of trying to find specifically such a tool that can be used to clarify the dialogue between ICT and business."*

The research findings indicate that although Enterprise Architecture and its benefits and aims are well known by the people whose work comes to contact with one or several EA domains on the operational level, the concept is still generally poorly known by the top management in whole. EA aspects brought forward in presentations for the top management teams represents a common practice in the studied organizations (Vaara & Whittington 2012) but still architectural issues are mainly treated as a separate function within the organizations.

Even though the business oriented view for Enterprise Architecture work is recognized and valued in the studied organizations, looking at the issue on an enterprise-wide angle shows that EA is still very much regarded as an IT tool or method. Even with support for EA work, the basic idea of development initiatives originating from business needs (strategy) has not been fully grasped by all top level managers and taken into use in the enterprises. The lack of connection between the EA work and the strategic decision making in the top management becomes evident in the respondents' statements:

*"...still it (EA) has not been managed to be implemented as a strategic management method. It has remained a disconnected function."*

*"...there is no clear vision with regard to [EA]."*

The absence of a link between the operational practices and the strategy formulation (Vaara & Whittington 2012) can explain why organizations have difficulties in reaching the desired level in their EA work. It may have created a division of labor where only top managers are regarded as strategists and others as only implementers of strategy (Laine & Vaara 2007; McCabe 2010). The link to business vision and strategy is clearly present in only one of the studied organizations. There EA is seen as being familiar to the top management, support for the work is present and development decisions are done based on recommendations derived from EA work.

*“We have very good support from the top management and it (developing EA work) has been shown a green light...we have an executive development team...that makes decisions on enterprise architecture principles and directions and choices. The executive development team comprises of our actual management team plus [the Chief Information Officer].”*

The effects of the support are evident throughout the data dissemination and are present in the long term view of the organization’s decision making compared to other studied enterprises. Wide-ranging sponsorship from the top management is considered one of the critical success factors in Enterprise Architecture work, and seen as a feedback channel to ensure the management understands the value of architecture work. One can also argue this to be the link between practices and strategy formulation called for in the SAP literature (Vaara & Whittington 2012).

Regardless of the overall state of EA in relation to strategic management, all studied enterprises showed a clear desire to move from the technology-oriented architecture work towards a true business driven development culture. It is apparent that the data administration (IT) cannot be responsible for business architecture or the entire Enterprise Architecture coordination. The interview data support the views of Wagter, van den Berg, Luijpers & van Steenbergen (2005) and suggest that Enterprise Architecture governance should be more dynamic so that EA policies do not dictate enterprise strategy or stop development altogether. With regard to a question concerning the execution, supervision and monitoring of development ideas, two interviewees state:

*“...I see it as... a challenge...how we are going to get dynamism to our [EA] work.”*

*"...we (IT department) cannot be responsible for the operations of departments or the planning of business operations..."*

The need for change in the modus operandi to successfully integrate Enterprise Architecture as a management methodology is recognized. The goal for all studied organizations is to establish and integrate a model where describing business needs or requirements forms the foundation of process and related information systems development, and where EA practices provide direct input for strategy work.

Generally speaking the research findings suggest that existing strategic management methods do not significantly affect the implementation of Enterprise Architecture. Rather, EA is seen as a unique method for increasing and clarifying communication between business operations and IT, and thus acting alongside and supporting the other management methods, models and practices. However, one major External Influencing Factor according to the theoretical framework (FASOP) that is seen as an obstacle for the implementation and usage of EA on a strategic level is the wide range of conventional business management models. These isms or schools of thought are constantly being promoted by various consultants as indicated in the following response:

*"...business management side has so many of its own isms, which are rather highly valued that it is quite hard for Enterprise Architecture to manage...in that conversation..."*

None of the interviewees, however, see actual competing methods for Enterprise Architecture because of its highly comprehensive nature. Other IT and business management methodologies are not considered by the interviewees as providing solutions for the question of how IT can be used to enable business or to develop it, and how the gap between business needs and technological solutions can be crossed. The following answers capture the sentiments well:

*"...developing systems is not just about acquiring an information system but instead one should really think about the business; and it will not be contemplated unless there is some sort of a systematic way for...documenting it..."*

*“...in the specific playfield where EA is in, there are actually no competing models...[I]f we are really talking about organizational and systems development, I cannot see any other approach that is this comprehensive...so it is pretty obvious that it is exactly EA that we will start developing...”*

This unique role of Enterprise Architecture particularly stands out in the research data. EA is seen as a way to support the existing business management methodologies by providing a sound understanding of the internal operational environment of the enterprise and its connections to the surrounding environment. This presents similarities to SAP, which is increasingly focusing on the structuring role of wider social practices (Vaara & Whittington 2012). The long term benefits regarding EA work are valued even though the massive work load in the implementation phase is recognized.

*“...with Enterprise Architecture we are able to show also effects that are not immediately visible. In the short run it may be more profitable to make a certain move but in the long term...it might be better to focus on something else, and that way we can show...issues and business cases, which would not be visible without [Enterprise Architecture].”*

Throughout the study one important issue regarding Enterprise Architecture implementation and governance is present – the way how all the organizations have realized that it is virtually impossible to implement EA to the whole enterprise at once, which substantiates prior evidence (Richardson et al. 1990; Woods 2011) and backs up earlier research (Boster et al. 2000; Veasey 2001) regarding the need for a sequential but dynamic implementation process. Existing EA reference models and frameworks are utilized within organizations. These are applied in parts, adapted to specific needs, or used as basis for forming own models and frameworks for the organization as becomes evident from the following statements:

*“...we did not choose any ready-made frame but instead...familiarized ourselves with these frameworks; what qualities they have, which of them are important to us, and out of that chose the parts relevant to us and thought them carefully through.”*

*“We have to some extent applied these models also to meet our own needs. It is practically a necessity. I would say that there probably is no such organization that can function otherwise.”*

There is an abundance of information on Enterprise Architecture and several reference models and frameworks of it exist, each proposing slightly different viewpoint to the same phenomenon (Veasey 2001; Urbaczewski & Mrdal 2006). Therefore, organizations have chosen the ones that are most convenient and best known, e.g. The Open Group Architecture Framework (TOGAF), the North Atlantic Trade Organization (NATO) Framework or the Finnish Enterprise Architecture Research (FEAR) Governance Model. The models are used by taking those parts into use that are deemed appropriate by the organization and its practitioners (Hambric & Mason 1984; Wiersema & Bantel 1992; Finkelstein & Hambrick 1996). The selective usage of the models does not seem to follow any specific pattern. Instead, it is based on the practitioners' interpretation of the most suitable elements. The following comments describe the thought processes and attention focus behind the choices:

*"We do not have a reference framework per se...we have TOGAF in use...we utilize the ADM (Architecture Development Method)."*

*"...here in TOGAF...there are all these..., but what is it here in our organizations that causes the most...problems."*

Resources (money and personnel) are considered to have been sufficient for carrying out the EA implementation work until now. This Contextual Factor from the FASOP has influenced the continued support for EA by directing managers' attention focus to it as depicted in the following statement:

*"...what I expect from a management point of view is that in the future...more flaws should then arise from this [EA] work. These are then brought to the development team and executive team agenda; like...let's see how foolishly we are organized."*

With regard to environment-strategy causal logics, March and Shapira (1992) argued that available resources of firms affect the managers' attention focus. Although all enterprises in this study have already a long track record in EA work, most of the interviewees consider still being in the beginning phases of an enormous task. In the upcoming steps involving the further execution, governance and development of EA, the resources, especially personnel, are seen as inadequate in all studied enterprises, which may result in

changes in managers' attention focus and affect future development. This is communicated well in the responses:

*"...this is a sector where easily more know-how and resources would be required.*

*And then again, those experts are not that many in Finland after all."*

*"...more hands, feet and mouths will be needed for doing the [EA] work..."*

*"...more resources are definitely needed...now it (EA) is not a part of our daily work..."*

Even though Enterprise Architecture should influence and involve everybody in the organization (Cardwell 2008), the people responsible for architecture work are considered central for its survival. They are seen as having a major influence in increasing awareness of the process and in promoting its benefits. Also they are considered as enabling the implementation and providing visible evidence for the management of its success to support the continuation of the work by indirectly shaping strategy. Setting up and running the EA practices is critical to operating efficiently. Knowing how to startup, grow, mature, market, and brand Enterprise Architecture within the organization helps to gain the necessary credibility across the firm from the lower levels of management to the senior executives. To achieve this, the results suggest that EA requires both doers and sponsors that foster the long development and implementation process. This supports earlier findings from SAP studies, which demonstrate the crucial role of middle managers as creators, interpreters, sellers, and communicators of strategy (Mantere 2005, 2008; Rouleau 2005). Also, the growing appetite among people in the lower operational ranks of organizations for more strategy engagement indicated by Mantere (2005) seems to be in favor of these results.

The continuous nature of Enterprise Architecture work is well grasped. EA is seen as an evolving process that provides increasingly more benefits the further it is developed. The biggest struggles are considered to be in setting measurable goals for the work and basing development decisions on the vision when short term results are increasingly important. This view is strongly biased in especially among the private organizations.

The main external factors behind the choice of Enterprise Architecture are competition, political decisions and legislation. Causal Logics and Attention Focus together with environmental Contextual Factors such as industry velocity explain how these factors differ between the studied enterprises. In the private sector, competitors and customers (task sector) are listed as the main driving forces for EA development, whereas in the public organizations social and political influences (general sector) define the working environment. The same task or general sector factors are seen as the main influences also in the decisions regarding strategic management in general. This is in line with earlier findings by Nadkarni and Barr (2008), Daft and Weick (1984) and Eisenhardt and Martin (2000), which conclude that industry velocity influences the attention focus and causal logics by directing managers attention more towards either the task or the general sector. The same task or general sector factors are seen as the main influences also in the decisions regarding strategic management in general.

#### ***4.2.2. Enterprise Architecture governance***

The starting point for successful EA work is indicated to be in the enterprise or business strategy (Paras 2007). The findings suggest that engaging executives on a subject they care about ensures long term involvement, provides support for EA decisions, and fosters the understanding of EA benefits.

Architecture and process development is handled in various groups and teams at different levels in the organizations. Governance is handled by top level development teams represented by the organizations executives and top managers from the IT functions. These teams are also mainly in charge of portfolio management, i.e. project initiation, budget control and follow up. However, the Project Management Offices (PMO) are mainly integrated to data administration (IT) to prepare standardized project management guidelines, develop, define and maintain the process standards related to portfolio or project management, and to ensure that architectural issues have been taken into account in all phases of information systems projects. The PMOs are also put in charge of initiating change management procedures in case deviations occur to EA standards or principles.



The organizations have architecture teams dealing with Enterprise Architecture related issues. Besides the enterprise architects, the teams comprise of people from service production and risk management. One major role of the architecture teams is support for process development. The architecture teams prepare expert opinions and reports on development initiatives with regard to EA compliance to the management teams, who then make the decisions on initiation, termination or change of the contents of projects accordingly.

A central issue arising from the research results is that Enterprise Architects or the Architecture Teams should not be the ones to decide on standards, top-level business, information, systems or technology architecture models, outsourcing, security policy, or any other issue regarding strategic alignment. The major directional decisions regarding motivation, investments, significant structural approaches, and so on, should be left to the management teams.

Groups comprising of both IT and business personnel have been formed in three out of four studied organizations. This supports the idea behind Enterprise Architecture and the theoretical findings in this research regarding the alignment of business and IT (Ylimäki & Halttunen 2006; Erol et al. 2010). The following statements describe the forms of co-operation present in the studied organizations.

*“...we established this executive development team, and I wanted it also to be a tool we can use to educate business operations regarding EA.”*

*“...we have...this...collaborative group...of IT and business where we go through both systems and...business requirements...”*

Regardless of the cooperative structures between data administration and business operations, and the realization of business driven development, Enterprise Architecture work is done mostly in the IT departments. The Head of Technology or the Chief Information Officer are the main practitioners regarding EA and lead the architecture work in all the organizations. This is evident also in the interviewees chosen for this research as illustrated in Table 1. There is some level of variation between the EA governing structures as some depict a more business oriented or even business driven view whereas others are more prone to IT focused architecture work. An interesting phenomenon present in the

research is that business (process) architecture is partly or fully handled and governed from within the IT functions.

*“Business process development is also our (IT’s) responsibility.”*

*“...one of my architects here [in IT] holds a title of Process Architect.”*

Giving the IT-department responsibility for business driven systems development contradicts the basic standpoint of Enterprise Architecture according to which business requirements (business architecture) drives IT development (Aziz et al. 2005; Paras 2007). Consequently, the role of the business architecture is recognized and more architects have been hired in the studied organizations. Changes to organizational structures and job descriptions to incorporate EA have been made and new roles have been formed to accommodate the new governance structures. The realization that organizational silos do not provide a good environment for implementing EA is recognized, and relevant tasks have been newly assigned in the organizations.

In order to help control architectural compliance, sequential EA execution and development is also coordinated by controlling architectural aspects in projects at set milestones or continuously in project sprints. For a systematic way for enabling EA governance and development, organizations commonly use either a final architectural review stage in projects to make sure all documentation is updated correctly before the project is concluded or make continuous documentation grooming, which is checked at the end of each project sprint. Moreover, one studied organization appoints for each project an Enterprise Architect who takes part in decisions regarding the project’s EA compliance.

The monitoring and measuring of EA work and its results is proven to be one of the most difficult tasks in the process. EA work is not followed up with concrete measures in any of the studied organizations. Standard performance metrics, i.e. Key Performance Indicators (KPIs) are considered or proven unsuitable for measuring EA value. Currently, the only measure applied by the studied enterprises is EA maturity level metrics according to predefined models. Commonly the EA maturity models consist of a four or five-step scale: 1) Uncontrolled/Initial (business silos), 2) Partially controlled/Repeatable (standardized technology), 3) Defined (optimized core), 4) Managed (standardized and part of culture),

and 5) Strategic/Optimized (strategic tool and continuous improvement) (Ross, Weill & Robertson 2006: 87-89; Valtiovarainministeriö 2007).

The studied enterprises rate themselves between levels 1 and 3, which indicate that none of them clearly has a business driven EA culture that is strategically managed according to standardized methods, and where EA is part of everyday work and business culture. Thus based on empirical evidence this research is unable to provide new insight on ways to organize EA measurement or control functions. For this part, the thesis relies on prior theoretical and empirical evidence. Regardless of the poor EA measuring and difficulties in deciding what to measure, it is considered a key component for successful EA execution, and setting up measurement programs are among the most important future development phases in EA work.

#### ***4.2.3. Handling of development ideas***

Lack of communication between business and IT is present in all studied organizations. Ways for communication have been developed throughout by starting teams comprising of both IT and business process experts, and appointing contact persons from the IT department who business people can contact with issues requiring expertise on e.g. systems or technical (architecture) solutions. However, a lack of consistency and clear guidelines has resulted in situations where communication between IT and business functions is handled by several different means without coordination.

A systematic way for communicating and handling new development ideas and delivering them to the management's or the IT department's attention is missing from all studied organizations. The need for a unified manner for business operations to present their needs ('to be' processes) is recognized but the challenges in forming working approaches are not yet overcome. The organizations to some extent make use of integrated management systems and predetermined description standards, which set a good starting point for more elaborate use in the future. Currently, ideas originating in different parts of the organizations are not stored in one place (central database) or handled according to any predefined method. New development ideas may reach the correct people by e-mail, over the phone, from management team memos or orders etc, in an uncontrolled and

uncoordinated manner. Thus accepted and routinized behavior using material artifacts and technologies, i.e. practices (Reckwitz 2002; Molloy & Whittington 2005; Denis, Langley & Rouleau 2006; Jarzabkowski & Spee 2009; Vaara & Whittington 2012) are not formed, which mostly leads to those development ideas that have a good spokesperson being done and others being neglected or postponed as indicated by the following response:

*“...we do not have any active collection process for development ideas. It currently leans on having an active organization where ideas are brought forward as they arise.”*

Systems driven development is also a clear risk as business needs do not reach the IT departments and thus solutions are acquired or built based on incomplete information. Individual groups may start searching for local solutions without building consensus and communicating derived principles throughout the organization (Richardson et al. 2006), which may hinder the entire EA work. Ultimately this may lead to situations where similar ideas are developed by two different groups of specialists, and in the worst case ending up with solutions not supporting the architectural standards set out in the organizations. These types of problems are well present in the following response:

*“...it is not at all uncommon that one part of the organization initiates...a project from their own perspective, which could be...smart to combine, or make it that much more generic that someone else could later make use of it...”*

Once development ideas are brought to the attention of the practitioners responsible for Enterprise Architecture within the organizations, most have a sound processing model in place. Architectural previews provide among other things statements, which indicate if some systems, technical or information architecture planning is needed, how much process or systems integration planning is required, and whether the initiative affects current contractual arrangements. Also, check lists to see the need for either project management or systems maintenance are used. These reports provide a foundation for more detailed planning and definition work, and enable the use of packaged services and internal architectural guidelines for the enterprises.

Regardless of the working processing models and practices in evaluating development ideas, the research results show that the studied organizations do not handle different type

and size ideas in the same manner or evaluate them according to the same criteria. However, most respondents indicate this to be the goal in their EA work. They express that the size or type of proposed ideas should not affect the way they are evaluated or handled. Only after the decision to execute a desired idea, the development process should differ between potentially small or large and simple or complex projects.

Only one of the studied enterprises handles its development ideas in the same manner regardless of their size and complexity. This supports the fundamental idea of EA's systematic development (JUHTA 2011) but also easily leads to 'bottleneck' problems. If all development is evaluated and coordinated by one group of people, it requires much resources, time and dedication to be able to accommodate the large number of cases. Should the process not be planned and tested thoroughly, it may slow down development or in the worst case, seize it altogether. However, bottleneck problems in the enterprise in question are partially solved by using a clever, standardized method for the initial evaluation prior to project planning.

The initial evaluation practice includes going through a standard form that helps to point out whether the development idea includes parts that need architectural development, i.e. is it possible to utilize existing service components, systems or infrastructure, do the security, privacy or data protection solutions need updating, how does the idea affect data storage or registry compilation etc. This initial stage evaluation is made so easy that it can be done ad hoc without the need for long meetings, and the permission to proceed (current structures can be utilized) or the statement that the idea needs more thorough EA development can be given almost instantly as indicated by the following response:

*"...based on the preview we can issue a statement in fifteen minutes...indicating whether some special planning is needed..."*

Information systems supporting the Enterprise Architecture work are considered important and used by all studied enterprises. The extent to which the systems are used vary between the organizations but commonly they include functions such as electronic work spaces for document sharing, process modeling, document archives, report generation, systems and process mapping and linkages between processes and systems, process and system ownership descriptions etc. All organizations use to some extent also repository solutions

available for describing EA disciplines, linking descriptions, and visualizing EA for business functions. These tools (practices) are a central component of SAP as they possess the power to stimulate and communicate new insights visually, especially when presented graphically (Eppler & Platts 2009).

Material supporting both the EA work and its marketing are scarce. Mostly they include Excel spreadsheets, Word documents or other similar material directed only to a small number of active architects. The material is not made available to the broader public and general EA material is nonexistent. Thus practices are not formed as there is a clear lack of material mediation shared between actors and routinized over time (Schatzki 2001; Reckwitz 2002). Furthermore, no systematic way for keeping architecture documents up-to-date is present, which contradicts the iterative nature of EA work described in the literature (Andary & Sage 2010). However, the need for keeping things simple is evident in the results. The EA systems are considered too complicated to be used throughout the enterprises. There is a desire to keep other supporting material separate from the complicated IT-systems and provide them only as Word documents and PowerPoint slides when necessary. The general sentiments of the respondents regarding these practices are captured well in the following statement:

*"...they (EA systems and descriptions) are too massive and technically complicated, at least for the business people, so we must just bring the whole architecture issue to a more simple level."*

#### **4.2.4. EA communication**

In support of recent developments in EA frameworks, the studied organizations indicate a clear desire to form practices and praxes towards a more dynamic direction where architecture standards change in line with organizational and market requirements and stakeholder demands or ultimately shape them (Wagter et al. 2005). However, only one of the organizations has been able to take EA to a strategic level, and even there EA is not present in all decision making. There are, however, distinctive patterns and actions that show the enterprises are pursuing more business oriented development, promoting dynamism, and increasing the linkage to strategy work through communication.

To boost awareness and know-how on Enterprise Architecture outside the IT functions, enterprises organize communication and information sharing and provide both basic and more detailed information collaboratively by the communications units and architecture teams. The information is shared by using the intranets and other internal communications channels, and to some extent it is even directed to specific audiences. Notably, EA is included in the organization's communication plan in one of the studied enterprises.

Job rotation is seen as an effective practice for transferring current business knowledge to the IT-department and vice versa. However, only one of the studied organizations attests to its regular employment, whereas others are still in the planning phases or employ it only irregularly. Still, this type of movement between positions is regarded as increasing the awareness of Enterprise Architecture, the overall understanding of business and IT interconnection, and the ability of the data administration to acquire or develop better information systems and services tailored to specific business needs. Furthermore, job rotation facilitates smoother communication between IT and business operations as both can better relate to the other's points of view.

Training on architectural matters and process and IT development is organized or facilitated in all studied enterprises. However, the problem of directing the trainings only for the practitioners directly involved with EA work is acknowledged. In one organization, the strategy connection to EA has been sorted by starting the entire EA work from top down. The first people educated on EA have been the top executives and thus it has been easier to direct EA work from the strategic level and from a business point of view. Due to this unique approach, the organization has been able to turn the commonly very IT dominant EA conversation to more business and information specific, as the following comment indicates:

*"...if we have major business challenges, the first thing that surfaces is not that some IT-system needs to be replaced but instead...what are the business requirements..."*

Educating and training the strategic management on EA can positively affect their attention focus. Among the abundance of information the top managers constantly receive, they develop selective attention by concentrating on the current and most relevant issues, which

affects their strategic decisions (Hambrick & Mason 1984; Nadkarni & Barr 2008). Again, the increased knowledge and understanding of the concept adds to its importance in the managers' minds and directs more attention to it in the long run.

EA development and action plans are systematically presented to the top management in three out of four studied organizations. The most common way for communicating architectural issues to management is a PowerPoint presentation or an Excel sheet that is presented by the chief enterprise architect or one of the respondents. Earlier SAP findings support the use of PowerPoints or flipcharts due to their stimulation and communication power (Eppler & Platts 2009). Initiating and coordinating information sharing on EA developments overall and specific to the organization for architects, management, and all people involved in process or systems development and maintenance is seen as the architecture team's responsibility but under the top management team's sponsorship.

Overall, communicating Enterprise Architecture to the whole enterprise or to a broader audience has been proven difficult. One studied organization is launching an intranet based web school that can be used to educate anyone in the organization about EA in general and to provide information on enterprise-specific EA protocols, practices and praxes. The web school includes general and enterprise specific documents, presentations, diagrams, other visual material and links to information outside the organization. The web school also includes tests for the organization's staff, which provide information on their level of knowledge regarding EA. Based on the test results, more information, and education can be directed to specific people or groups of people. Also, the results can be used to tailor very specific types of material or events to employees so that resources are allocated efficiently, e.g. not keeping everyone tied up in training seminars when only a part of the people need it. Furthermore, enterprise-wide information may be used in recruitment to indicate the need for specific know-how. In the future, also videos on specific issues may be posted on the site, and live feed from training seminars could be shown for those employees that cannot be physically present.

Clear strategic initiatives regarding Enterprise Architecture in the studied enterprises include the addition of EA training for relevant staff, and the increase in both monetary and personnel resources around Enterprise Architecture. More people have been hired on a



regular basis in recent years, and a larger portion of the organizations' budgets have been allocated to EA work. This has helped in forming the necessary practices and praxes that enable the entire architectural work in the organizations. Larger working budgets have helped in acquiring tools, and in developing systems and technical infrastructures to meet the needs from the new business process development initiatives. The increase in personnel, again, has made it possible to describe the organizations' current functions and processes, systems, information, and technological solutions by applying the acquired information systems. These EA descriptions act as the basis for EA communication, information sharing and process development (Tang et al. 2004; Aziz et al. 2005).

### **4.3. Comparison between public and private enterprises**

The research sample comprises of four organizations; two from the private and the other two from the public sector (see Appendix 2). In this section the differences between the enterprises are presented by looking at the Demographic Factors and Contextual Factors of the theoretical framework (FASOP). Distinctions between the practices and praxes related to Enterprise Architecture work in the public and private sectors are also contemplated.

#### ***4.3.1. Characteristics of Demographic Factors***

The interviewees represent the people responsible for Enterprise Architecture within the studied organizations. Overall, demographics for the two studied groups – private and public enterprises – do not present any noticeable differences.

The gender distribution is biased towards men with seven out of eight respondents being male. Educational background in the sample does not give leeway for comparison as seven out of eight respondents have a higher education with a technical degree, and three interviewees from both private and public organizations have a higher academic degree.

The age distribution together with the length of experience in Enterprise Architecture is even in both groups. The public sector respondents are on average 38.75 years old and the private sector employees 38 years of age respectively. Similarly the experience on EA in

the public sector is on average 6 years among the respondents, whereas in the private sector the average is 5.75 years.

Based on the findings, Enterprise Architecture seems to be dominated by relatively young, technically oriented men possessing higher education and an extensive experience on Enterprise Architecture. Based on earlier research, the findings indicate a strong bias towards innovation (Becker 1970; Kimberly & Evanisko 1981; Hambrick & Mason 1984) and increased risk tendency (Hart & Mellors 1970; Child 1974; Hambrick & Mason 1984) and suggest openness to new ways on managing business. However, no distinction between the private and public sector organizations or respondents can be drawn from the research results.

#### **4.3.2. Characteristics of Contextual Factors**

Both of the studied enterprises from the private sector are in the retail and daily consumer goods (grocery store) business, and the other two organizations in the public sector. The speed of the business, i.e. *industry velocity* is one major factor separating the grocery store sector from the rest of the retail business and other business sectors. This becomes evident in the following description by one of the respondents.

*“...in the daily consumer goods...orders cannot be made half a year beforehand or from China. Instead, it is predicting taking place on a rapid cycle so that there is exactly the right amount of goods available in the store when the consumers want them, because the goods get spoiled, which causes waste...and that looks bad then on the margins.”*

Accordingly, industry velocity becomes a central focus point in explaining the differences in attention focus, causal logics, and the formation of practices and praxes between the studied organizations.

While the different standpoint of private and public enterprises partly explain differences in management styles and focus, industry velocity offers a narrow but concise explanation on the different weightings the studied organizations put on matters with regard to EA implementation, execution and governance. The two studied private

organizations coming from high velocity industries describe the most important influencing factors in their Enterprise Architecture work and overall strategic management to be the competitive environment, customer needs and shareholder satisfaction. The public sector organizations, on the other hand, list politics, legislation, and end-customer welfare (society) as their main drivers for strategy formulation and EA work. The differences are clearly recognizable from the respondents' statements:

Low velocity environment (public sector):

*"...with us, specifically, legislation mainly acts as the most central control mechanism in strategic management...then of course political decisions to some extent, and which...new services are planned for us..."*

High velocity environment (private sector):

*"...the profitability of the enterprise's operative business...and actions required accordingly have been a clear driver strategically...[and] of course in the background the competitive situation."*

*"...returns...how we can tune the engine that brings...profit to shareholders..."*

The results substantiate the theoretical background represented by the research framework FASOP and offer support for earlier findings on the effects of industry velocity on attention focus and indirectly on strategy formulation and causal logics. The low velocity environment's effect on environment driven causal logics (Nadkarni & Barr 2008) is apparent in the following statement from one of the public sector respondents:

*"...the challenge and pressure lies in how efficiently taxpayers money are used...The incumbent agency should in the middle of all expectations and pressure be able to steer...development and maintenance to the direction, which is smart for the society, and allocate investments correctly."*

Overall, the structures between the private and public organizations regarding Enterprise Architecture and strategic management appear alike. Both have in place teams or groups dealing with process development and architectural issues, and have involved both people from the business operations and data administration (IT) in the architecture work. Although, EA descriptions, guidelines and frameworks are more complete in the public

sector, and the plans on how things should be organized is notably more formulated than in the private sector. However, the differences among the two groups are most apparent in the decision making models. In the private organizations more power is handed down in the organizations from the top management. Experts or groups comprising of specialists or lower level managers are given authority to decide on the best course of action also on major issues. Decisions are reported to the top management in regular meetings where the relevant specialists are present.

In the studied private organizations, top management deals regularly also with operational issues in connection with strategic issues in the board room. This differs from the public organizations where executives are rarely in touch with the actual operational practices and praxes. The difference can be partly explained by industry velocity and its effects on managers' causal logics. In low velocity industries where changes are predictable (Eisenhardt & Martin 2000) managers develop strategies in response to environmental demands (Nadkarni & Barr 2008) thus affecting their attention focus and creating environment driven deterministic causal logics, opposite to the private organizations. Consequently, the focus in studied public enterprises in low velocity environments is turned to larger societal issues, like citizens' welfare (Nadkarni & Barr 2008) instead of the operational details. These distinctions between the studied public and private organizations provide insight into the dynamism called for in the EA work.

As stated by Fligstein (1991) and Leblebici et al. (1991), innovations seem to be distinctive to those organizations that have people who do not follow standard teachings or ways of conduct. Thus, the arrangements apparent in the studied private organizations are likely to eventually lead to the formation of innovative strategies that in line with findings by Daft and Weick (1984) corroborate earlier actions. This also reflects characteristics common to the formation of so called blue ocean strategies (Chan & Mauborgne 2005). Ultimately, testing and probing can result in strategy to environment beliefs and development of proactive causal logics (Fahey & Narayanan 1989). This anticipates EA developments arising from the private sector best practices and calls for extended research in the future.

The results on industry velocity are similar to earlier empirical evidence (Bourgeois & Eisenhardt 1988; Brown & Eisenhardt 1997; Eisenhardt & Martin 2000), which support

the formation of the described praxes. The increased middle management involvement and strict profit targets in the private sector enterprises enforce the SAP research findings by Mantere (2005, 2008) and Rouleau (2005), which indicate a central role of middle management in strategy work.

The resources allocated to Enterprise Architecture work do not pose reportable differences between the studied private and public organizations.

#### **4.4. Findings on EA Practices and Praxes**

In relation to the main research question, the following is a compilation of the working practices and praxes in place in the studied organizations regarding the implementation, execution and governance of Enterprise Architecture, and more specifically business architecture. The results are presented in the form of twelve guidelines, and divided into structure and process specific aspects. Practices and praxis are not presented separately due to their interdependence (Vaara & Whittington 2012). Together they form a principle and practical starting point for organizing business architecture in enterprises on the way to strategic level EA management.

##### ***4.4.1. EA structural aspects***

###### ***Lay the Ground for EA***

Establish and recognize the role of Enterprise Architect in the organization and rank it as a top expert level position due to the highly complex and versatile skills needed in the job.

Be ready to make changes to organizational structures and job descriptions to incorporate Enterprise Architecture in an efficient manner. Organizational silos do not provide a good environment for implementing EA principles. Tasks and responsibilities may need to be moved from one part of the organization to another, and new roles need to be formed as EA frameworks and development models are taken into use.

###### ***Commence EA Work from the Business Operations***

Make business function(s) responsible for coordinating development initiatives and in relation Enterprise Architecture. Make business architecture governance a part of the

business operations, not the data administration (IT). Start work from the business strategy to engage business executives on a subject they care about and to ensure that architecture supports the business goals. Ensure counterparts between business operations and data administration (e.g. business architect vs. system architect). The root of decision-making authority for EA rests with the same body that makes all other policy and investment decisions for the organization.

### ***Form Clear Governance Structures***

Establish an Architecture Team to coordinate EA work in the organization including training and information sharing, and to provide EA principles and standards. Make the team responsible for providing guidelines on how to prepare architecture descriptions and architectural statements regarding development ideas, initiatives or projects. Have the team comprise of enterprise architects and people from business functions, such as service production (if not the same).

Establish Steering Groups where business and IT personnel can discuss issues regarding business needs and systems. Have architect(s) present in these groups and set them up process wise. Taking into account the business strategy, requires knowing the thinking processes of the business experts from whom future business requirements are elicited. Collaborative groups that include business process representatives and IT personnel are effective in the early life-cycle phases of planning as well as for ongoing architecture process improvement.

Establish Solution Group(s) within data administration (IT) comprising of IT-personnel and dealing with technical issues handed to them by the steering groups. The solution group(s) handle(s) more specific issues regarding the effects of business needs to IT systems and technology (information, system and technical architecture).

Form an Executive Development Team that acts as a governance organ for Enterprise Architecture work, supports efforts to increase EA awareness in the organization, and makes decisions on EA principles, directions and choices. Make the team also in charge of portfolio management, i.e. project initiation, budget control and follow up. Comprise the team of top level executives and practitioners who are in charge of implementing the decisions. Gather the team approximately every other month or ad hoc on request by the secretary.

Integrate Project Management Office (PMO) to data administration (IT) to develop, define and maintain the process standards related to portfolio or project management within the organization, and to ensure that architectural issues have been taken into account in all phases of a project. Make PMO in charge of initiating change management procedures in case deviations occur to EA standards or principles.

#### **4.4.2. EA process aspects**

##### ***Obtain Management Team Sponsorship***

Recognize that the support of the organization's top management is critical for successful Enterprise Architecture implementation and execution. The support from an individual manager, executive or other practitioner is not enough. Sponsorship ensures that the management understands the content, objective and value of architecture work.

##### ***Facilitate Change in Modus Operandi***

Recognize that the need for change is critical in EA work. A process description in itself is not important but rather the change in modus operandi towards a state when describing business needs is a natural way of doing things and the process descriptions are formed as a by-product. Create a model (course of action) in which EA is an automatic part of business and its development. Only then can EA reach the desired level as a strategic management method.

Organize the extensive EA work to be done piece by piece. Initiate the change by making EA methods and techniques a part of a pilot development project where the employees will receive beneficial architectural descriptions as a result. Employ EA reference frameworks and models selectively and adapt them to the specific organizational environment.

Do not stop EA work even if support from the business operations is not initially available. When needed, continue EA development by controlling it entirely from within the data administration (IT). By employing business/process architects in the IT department, EA development can continue as long as they have counterparts in the business operations, such as process or development managers.

### ***Incorporate a Process Perspective in Development***

Recognize that EA is not a project but a process that is never finished. Therefore, EA results may become evident only after several months or even years of consistent work. However, make sure goals in terms of deliverables and timeframe are set for each step in the process.

In today's busy business environment where short term results are increasingly important, the long term perspective (vision) needs to be taken into account with every decision made regarding development ideas, initiatives or projects to ensure longevity, the survival of EA structures and enterprise resilience.

### ***Standardize Development Protocols***

Describe a unified manner for business operations to describe their needs ('to be' processes), and use it for planning the execution of the development idea. This can be achieved in the organization by implementing an integrated management system and using given description standards.

Have the Architecture Team produce a short standardized preview for all development ideas, which indicates whether architecture development is needed or if the development idea is not supported by the current architecture. If execution entails risks, bring the information to the top management's (Executive Development Team's) attention for approval. Also, have PMO produce a project check-list for determining which development ideas need to be organized as projects and which can be handled through systems maintenance.

### ***Formalize Development Paths***

Categorize projects into different levels (e.g. A, B, C) based on agreed aspects such as budget, personnel requirements, and systems dependency. Make PMO prepare standardized project management guidelines for the different project levels. These can incorporate basic waterfall project structures or agile methods depending on the level of complexity. Hire a professional manager outside the organization for larger projects or initiatives to ensure adequate resources and competence for the work.

Enable sequential doing in development initiatives or projects to help in controlling architectural compliance. Include architecture reviews at set milestones, intervals or sprints



to control EA aspects and update documentation. This can be incorporated in all types of project management models, including agile development.

Appoint each project an Enterprise Architect who takes part every time decisions are made regarding the project's EA compliance. Should deviation to EA principles or standards arise, take them to the Architecture Team or Solution Group (depending on areas of responsibility) for closer examination. Have the Team/Group give a suggestion on how the proposed architecture should be changed or how existing architecture standards should be developed. Also, have the Team/Group issue a statement for the project management indicating the risks if current principles or standards are not followed in the project. The Architecture Team/Solution Group comments also issues that may have larger impacts, e.g. on other projects. Refer decision making regarding project seizure or major changes to current plans to the Executive Development Team or other formal decision-making authority.

### ***Harness Technology to Your Advantage***

Take electronic work spaces into use to enable sharing of up-to-date EA documentation. Make use of the many repository solutions available for describing EA disciplines, linking descriptions, developing principles and standards, and visualizing EA for business functions. Based on assessed needs and requirements, acquire systems that assist in showing what EA has produced or made possible in the organization.

### ***Extend the Modes and Channels of Communication***

Include EA on the organization's communication plan. Organize and execute information sharing and communication regarding EA collaboratively by the communications unit and architecture team. Decide on the audience, the key message to get through, the means of communication, and the time frame for the execution.

Launch a web school (extranet/intranet) to educate employees or other interest groups about Enterprise Architecture. In the web school provide information on enterprise-specific EA practices and praxes, share general and enterprise specific documents, presentations, diagrams, other visual material, and links to information outside the organization. Also include tests for the organization's staff to indicate their individual and the organization's overall maturity level regarding EA. Based on the test results, direct more specific information and education to identified groups of people and tailor specific types of

material or events to employees for efficient resource allocation. Post videos on specific issues on the site, and provide live feed and recordings from training seminars for those employees that cannot be physically present.

### ***Increase and Deepen EA Knowledge and Expertise***

Organize regular training and information sharing regarding EA developments overall and specific to the organization for architects, management, and all people involved in process or systems development and maintenance (Architecture Team's responsibility). Make sure the top management is among the first ones to receive extensive training regarding Enterprise Architecture. This way management can more easily partake in decision making regarding EA and the work can get the necessary sponsors needed for successful implementation, execution and development.

Execute job rotation, which enables current business knowledge to transfer into the IT-department and vice versa. This type of movement between positions increases awareness of Enterprise Architecture and the ability of the technology units to develop better systems and services from a business point of view. Moreover, the communication between business and IT becomes flexible and natural when both sides have people that understand the nitty-gritty in the overall picture.

### ***Standardize and Employ EA Measurement***

Forget about typical Key Performance Indicators (KPI) as EA does not produce products in the inventory or information systems for the organization. EA facilitates process and IT development by decreasing overlapping systems and aligning business requirements and IT capabilities. Therefore, concentrate instead on three things: 1) *the focus of the metrics*, i.e. whether the metrics contribute by increasing information regarding the specific EA venture (internal) or by providing information on the benefits to others (external), 2) *the subject to be measured*, i.e. the status or deliverables of the EA venture, or benefits provided to either data administration, business operations or stakeholders, and 3) *the deliverables of the metrics*, i.e. what are the deliverables or benefits to different subjects (Gartner 2012).

Measure the maturity of the organization's EA program as part of continuous improvement. Focus on the critical (business) constraints, which are preventing the organization from being effective and delivering the desired results.

## **5. DISCUSSION**

### **5.1. The perception of external factors' effect on practices**

The concept of Enterprise Architecture in the studied enterprises is not familiar enough to the top management. Regardless of communication efforts, EA has not been integrated in the organizations' day-to-day business operations or governance. Instead it remains central only in the IT domain. Information systems development in enterprises rests on the notion of acquiring a well-known information system and then changing the way business is done to accommodate the new software, or developing an information system according to suggestions from technology firms. A major challenge to overcome is to find processes in which initiatives are launched according to strategic focus points (Paras 2007) set by the management. The lack of strategic business aims in development belongs among the major risks for failure identified for software projects (Schmidt et al. 2001).

Support for the findings become evident particularly in one line of information systems development. It involves not only users and technical designers but also top managers, external vendors and consultants, and other interested parties by focusing on differences among the expectations and interests of stakeholders, and attributes system failure to unmet stakeholder expectations (Lyytinen & Hirschheim 1987; Schmidt, Lyytinen, Keil & Cule 2001). With regard to the studied organizations, one can also argue that because presentations and reporting of Enterprise Architecture for the management are done too seldom, and the issues are mainly presented by people from the data administration (IT), it endorses the technical perspective to EA. The situation indicates a need for organizations to recognize the critical aspect of business management support in successful EA implementation and execution. The situation calls for increased and broadened communication and training starting from the top management team, since the understanding of the strategic connection and business focus of EA and the willingness to move from system focused to business driven development is clearly prevalent in the findings. In order to cause managers' attention to focus on EA, it needs to stand out from the abundance of information they face on a day-to-day basis as depicted in the theoretical framework.

The first impressions among the interviewed practitioners describe EA as hype, vague, distant or intimidating, which is in line with earlier findings by Urbaczewski and Mrdal (2006), and offers insight into why organizations have relatively long planning and implementation phases regarding EA. Richardson et al. (1990) conclude that implementing Enterprise Architecture is a long-term process requiring consistency and time for building consensus and for communicating the derived principles throughout the organization. Thus the rather short-lived phase EA has been present in Finland and the studied organizations further explains why it has not yet been fully integrated on the strategic level within those organizations employing it. Recognizing the process perspective in EA work, establishing the role of the Enterprise Architect, and being ready to make changes to organizational structures and job descriptions to incorporate Enterprise Architecture in an efficient manner, are among the first elements in need for extended work as concluded in the research results.

Those resources that managers can actually manipulate (Priem and Butler 2001), i.e. money and personnel, are in the studied organizations considered to have been sufficient for carrying out the EA implementation work until now. As indicated in the theoretical framework (FASOP), this Contextual Factor affects managers' attention focus in line with environment-strategy causal logics by directing it to EA as a result of financial backing (Daft & Weick 1984; Hambrick & Mason 1984; Nadkarni & Barr 2008). Therefore increased resources partially explain the underlying causal logics of how managers have formed and adapted their strategies accordingly, resulting in risen interest and focus on Enterprise Architecture due to its prevalent support from data administrations. Moreover, the extended work around EA further increases its presence and attractiveness in the enterprises, which further directs managers' attention focus and provides even more support for its development.

The continued financial backing for EA work is crucial to avoid changes in the managers' attention focus, which could have potentially serious affects in future development. However, sufficient resources are not enough, as suggested by the results. Recognizing the need for change is among the first steps to successful Enterprise Architecture. The change in modus operandi towards a state when describing business needs is a natural way of doing things, paves the way for reaching the desired level of EA as a strategic management

method. Following the FASOP process, this requires changes not only in management attention focus but also in causal logics leading to new innovative practices and praxes.

According to the research findings, other strategic management methods do not impede Enterprise Architecture work in enterprises due to its unique approach for bringing business operations and data administration together. Enterprise Architecture is considered to provide support for the other management methodologies used in organizations. This reinforces the SAP message of the need to look at the practitioners who execute and reshape strategy through daily praxis (Geertz 1973: 5; Whittington 1996; McCabe 2010). However, the constant promotion of conventional business management models directs executives' attention away from EA, which limits the possibility of a strategic level connection. This External Influencing Factor as pictured in the theoretical framework partly explains why Enterprise Architecture is still mostly treated as an IT tool and not as a true strategic management method. The effects of the external factors behind managers' attention focus, causal logics and strategic action merits further research.

The research findings explicate the linkage presented in the theoretical framework (FASOP) between the Demographic Factors and managerial cognition. Accordingly, demographic factors like youth, amount of formal education and functional background can be viewed as important factors influencing causal reasoning and thus the decision regarding the choice of a strategic management method, e.g. Enterprise Architecture. The results in this research regarding the age, education, and background of practitioners are in line with earlier findings (Cyert & March 1963; Becker 1970; Hart & Mellors 1970; Helmich & Brown 1972; Child 1974; Kimberly & Evanisko 1981; Hambrick & Mason 1984; Ionescu 2011) and provide insight and partial explanation into why EA is adopted in the enterprises. However, due to the qualitative nature of this research, no specific conclusions on the causality between youth, higher education or functional background of practitioners and the adaptation of Enterprise Architecture can be drawn from the results.

In line with the theoretical framework (FASOP), the research results confirm earlier empirical evidence according to which managerial cognition is influenced by the industry context (Sutcliffe & Huber 1998). The research results are unambiguous regarding task and general sector biases influenced by the industry velocity, indicating that the studied private

organizations direct their attention to the task sector, i.e. competitors and customers, whereas the public sector organizations look at the larger picture concentrating on the general sector, i.e. social, demographic, political and legislative influences (Brown & Eisenhardt 1997; Nadkarni & Narayanan 2007). This suggests that the more predictable environment and to some extent slower pace in the public sector enables practitioners to have a more comprehensive view on the environment, thus allowing them to take a long term view on things instead of concentrating on short term operational details. However, this again diminishes their possibilities for innovativeness (Fligstein 1991; Leblebici et al. 1991) that arises from increased middle-management pressure (Mantere 2005, 2008; Rouleau 2005) or trial and error (Eisenhardt 1989; Weick 1995).

The research results offer substantiation to prior findings, which state that industry velocity influences top managers' attention focus and causal logics and filters how strategists form and adapt their strategies according to changes in the environment (Nadkarni & Barr 2008). Private and public enterprises show clear differences in their managements' decision making models. The top management in the private sector enterprises is aware of the day-to-day business and the effects of the decisions on the actual operational level work. Therefore, more power and authority to decide on larger issues is handed down in the organizations from the top management. Control is maintained through regular reporting to the management. In the low velocity public sector organizations, the top management is not as in touch with the operational level issues but instead concentrates on the broader general sector. Therefore, control of the high level decisions is kept in the board room, and operational level decisions do not commonly even reach the top management.

The increased pressure and responsibility with the middle management is in line with the formation of blue ocean strategies (Chan & Mauborgne 2005). In the studied private organizations that operate in the rapidly changing environment, the managers due to their higher authority feel the pressure and need to show concrete results and thus proactively test new courses of action. This proactive manner results in more failures but also in new and profitable solutions or even innovations. In the more stable public sector environment, the practitioners indicate a focus on serving customers impartially, and form their plans based on reactions to individual incidents or to known events, e.g. changes in legislation, in

the surrounding environment. Thus the low velocity of the industry affects the managers' attention focus and creates environment driven deterministic causal logics, whereas the high velocity environment shows signs of the formation of proactive causal logics. With regard to EA implementation, execution and governance, the above is evident in the level of EA and the formed practices. In the public sector, the overall EA structures are clearly more visible and ready, whereas in the private enterprises the individual solutions needed in the day-to-day operations are working well and provide new and exciting ways for organizing parts of EA as presented in the guidelines for working practices and praxes.

The above research findings are central as they support prior research results regarding industry velocity and causal logics (e.g. Bourgeois & Eisenhardt 1988; Eisenhardt 1989; Fahey & Narayanan 1989; Lyles & Schwenk 1992; Weick 1995; Brown & Eisenhardt 1997; Eisenhardt & Martin 2000; Nadkarni & Barr 2008), provide exciting new evidence of differences in strategic management between public and private organizations, and confirm the linkage of industry velocity, managerial cognition and the formation of practices and praxes expressed in the theoretical framework.

## **5.2. From EA governance structures to working practices**

In the studied enterprises, architecture work and process development are governed in various types of groups and teams at different levels of the organizations. The co-operation in groups comprising of both IT and business personnel increase the chances of success in EA ventures as the business operations have a channel for communicating their needs and requirements. Both parties also simultaneously increase their knowledge bases, thus enabling improved systems development performance, efficiency and effectiveness (Tiwana 2012). Based on these, the IT personnel can build supporting infrastructure and systems, which again help in reaching the organizations' desired goals. The formed practices and the praxes within them enforce the SAP message regarding middle managements' role in interpreting and selling strategy at the micro-level (Rouleau 2005), and the engagement of a wide range of people in strategy work (Vaara & Whittington 2012).

The main practitioners regarding EA in the studied organizations comprise of people in the data administrations. These practitioners against the basic notion of EA (Paras 2007) also partly of fully handle the business architecture, even though this anomaly is recognized and understood in the studied organizations. The cumbersome initial stages of setting up Enterprise Architecture in organizations provide some insight into why these types of arrangements seem common in the studied enterprises. In the past, EA has been more focused on the technical and systems architecture, leaving information and business architecture aspects aside. The governing role of business architecture is only in recent years started to gain momentum (Morganwalp & Sage 2003; Steen et al. 2005). In the meanwhile, IT has needed means to continue systems development so process architects have been needed. Thus as presented in the theoretical framework available resources affect the attention focus of the managers by directing the emphasis on things that are available to them (March & Shapira 1992), i.e. business savvy people within the IT department. In the future, these people can form a natural continuation for the work by forming a bridge for communication with the business functions. This new evidence suggesting that EA work should not be stopped even if support from the business operations is not initially available provides an important practice for a large number of organizations to investigate.

According to one of the central findings in this research, Enterprise Architects or the Architecture Teams should not have decision-making power on issues regarding strategic alignment. Instead, these decisions should be left to the management teams. Thus, this indicates that decisions on EA should not be handled differently from the organization's normal decision-making process. This supports standard business management doctrines, and is also in line with EA guidelines by Paras (2007), which state that in order to integrate EA at the strategic level, the root of decision-making authority needs to rest with the same body that makes all other policy and investment decisions for the organization. However, differences in where the decision-making authority rests in the organization, affects the formation of causal logics, practices and praxes as indicated above by the differences between private and public enterprises.

The findings indicate that although measuring EA value is considered a critical success factor, it is proven very difficult due to the unsuitability of standard KPIs. Therefore, no



new empirical evidence on ways to organize EA measurement or control functions can be given, and the thesis relies on prior research for introducing working practices as described in the findings on EA practices and praxes.

### **5.3. Shared understanding for successful strategy realization**

It is a common assumption that corporate strategy is clearly mandated, immediately accepted, and correctly understood by members in the organization (Mintzberg & Waters 1985; Guth & Macmillan 1986). Yet, the reality is that strategies consist of ongoing, short-lived decisions that are interpreted in a diverse set of ways. Thus a key task for top management is to consistently and accurately communicate the goals and strategic priorities to practitioners for implementation. (Rapert, Velliquette & Garretson 2002) However, the process is often disrupted, resulting in a lack of alignment between the top management's view of the strategy and the views of the operational level employees (Hambrick 1981) in business operations and data administration.

Top management is often dependent on their operational level practitioners for technical information and knowledge or functional skills. Therefore it is imperative that common understanding of the corporate vision and strategy is achieved throughout the organization. Adequate and consistent communication with functional managers about the reasons for the selected course of action is central in reaching this goal (MacMillan & Guth 1985; McDermott & Boyer 1999). If the same information is not available and known to all members of the organization, differing consensus at various levels of the organizations may be formed. Ultimately, this impediment in information sharing and lack of shared understanding may lead to unsuccessful strategy implementation (Dess & Origer 1987; Noble 1999). This notion is supported by the research findings. However, information storage and classification together with communication is not yet at the required level and more work is needed.

Enterprise Architecture provides the necessary tool for enterprises to organize their functions, classify and store their information, and govern the business-driven work by utilizing supporting information technology. Information architecture as one dimension of

EA, identifies, documents and manages the information needs of the enterprise, suggests (and assigns) ownership and accountability for the information, and describes how data is stored (Aziz et al. 2005). However, in line with the CAEAP statements, the research results indicate that the current state of EA work in Finland portrays a technology focused picture, which is disconnected from the business (CAEAP 2011). Furthermore, the communications gap between the people working in the business processes and the IT experts designing the software systems or installing proprietary software packages is in line with Cardwell's findings (2008).

Accordingly, when dealing with something as complex as Enterprise Architecture, without people who have extensive knowledge of the incumbent organization's processes and some knowledge of EA, the entire construct may lose its foundation and fail. This suggests that hiring EA experts from outside the organization is not adequate but instead there is a need for internal education and communication regarding EA.

It is argued in earlier strategy researches that too much emphasis is placed on the formulation of strategy when the real challenge lies in implementation (MacMillan & Guth 1985; Wooldridge & Floyd 1989; Noble 1999). A parallel indication of strategic consensus is provided in the organizational learning literature by recognizing that organizations progress through the sharing of knowledge, beliefs, or assumptions (Shrivastava 1983). When members of the organization do not possess the same information, or if the information must pass through several layers in the organization, it may result in a lower level of shared understanding. The importance of shared understanding is acknowledged also in the theoretical framework as it affects the formation of strategy-aligned practices and praxes. Following this notion, based on the empirical results this thesis introduces findings on central working practices and praxes regarding EA and data dissemination, including organization wide communication plans and top-down EA training, continuous job rotation protocols, systematical reporting to management, and usage of electronic means for sharing information.

## 5.4. Theoretical implications

Traditionally strategic management research has leaned on the notion of rational managers (Ansoff 1965, Nadkardni & Barr 2008) who exercise power through strategic choices or political action (Porter 1980), which has led to the common view that strategy is the work of top management (Bordean, Borza & Maier 2011). Practice theories, however, have become increasingly visible within studies of management (Gherardi 2009; Tengblad 2012), organizations (Miettinen, Samra-Fredericks & Yanow 2009), marketing (Korkman, Storbacka & Harald 2010), and technology (Orlikowski 2007). The practice perspective allows one to focus on individuals and their actions or behaviors (Vaara & Whittington 2012). In this thesis the strategy perspective is combined with another significant school of thought, managerial cognition, which enables the formation of a broad but at the same time in-depth understanding of strategy work and the formation of strategic practices.

Accordingly, this thesis contributes to the theoretical discussion by introducing the generic theoretical *Framework for Analyzing Strategic Organizational Practices (FASOP)*, which forms the theoretical background and context for the research. In line with the set objectives, the framework incorporates central elements from two important theoretical fields, managerial cognition and strategy-as-practice research. By merging the two significant theories, the FASOP offers a completely new perspective for studies on organizational practices and praxes. It describes the link between the organizations external environment and management demographic factors, the managerial decision making process, and the causal relationship behind strategic action, which manifests as organizational practices and praxes.

The strong connection between cognitive studies and strategy formation is evident in earlier research (e.g. Schendel & Hofer 1979; Daft & Weick 1984; Stubbart 1989; Walsh 1995). Also, the interrelatedness of managerial cognition and strategy-as-practice schools has been previously recognized (Hambrick & Mason 1984; Jenkins & Johnson 1997; Eden & Ackermann 1998). However, no indication of merging the two theories or investigating their congruence is evident prior to this study. These theoretical fields combined offer a new and unique perspective in the study of organizations and strategy implementation, and provide a broader and more extensive framework for the study of practices and praxes.

The FASOP illustrates how managerial cognition theory and strategy-as-practice theory are interconnected and entwined. The framework depicts the (environment-strategy) causal logics and explains how external Contextual Factors such as industry velocity and resources affect the attention focus of managers and other practitioners, thus influencing strategic decision making. Furthermore, the framework supported by the research findings provides new insight on the prominent process for organizational performance described by the Upper Echelons theory by adding practices and praxes into the equation between strategic choices and organizational performance.

The findings from this study confirm the linkage between contextual factors (e.g. industry velocity), managerial cognition (i.e. attention focus and causal logics) and the formation of practices and praxes as expressed in the theoretical framework. The results are notable as previous findings combining SAP and managerial cognition aspects are not available, they provide concrete proof of the process described in the theoretical framework and show the interconnection of managerial cognition and strategy-as-practice theories. According to the findings, the cognitive and practice perspectives complement each other by extending understanding on different parts of the process in strategy formulation, strategic action and the formation of organizational practice and praxis. They also express the need for extending earlier research and theoretical frameworks on strategic thinking and action. The FASOP provides a sound basis for future research on the topic.

Academic literature on EA is limited and studies with a focus on business architecture or EA practices are not evident in Finnish or international business journals. Therefore, the research and its findings offer an initial portrait on working practices and praxes regarding the arrangement of Enterprise Architecture in large organizations, and lay the ground for further examination around the topic.

## **5.5. Managerial implications**

Reading the Strategic Management Journal does not help anybody organize a successful strategy-making event (Whittington 2002). Therefore, in line with SAP research, this thesis

concentrates on finding working approaches to actually help managers do their work differently, and allowing the accumulation of practical knowledge (Johnson et al. 2003).

Consistent with earlier evidence indicating the formation of barriers in strategy implementation due to lack of consensus (Dess & Origer 1987; Noble 1999), this thesis offers some central practices to support information dissemination in order to reach shared understanding of goals and strategy and the related EA disciplines and guidelines. These include e.g. regular training and information sharing on EA developments overall and within the organization, and the use of electronic work spaces to enable sharing of up-to-date (EA) documentation. Making use of repository information system solutions for describing and linking EA disciplines, storing them, visualizing EA for business functions, and assisting in showing what EA has produced or made possible in the organization is considered crucial in efficient EA implementation and execution in all studied enterprises.

To further improve the shared understanding, the results indicate the need for job rotation between business operations and data administration and the establishment of groups where business and IT personnel can discuss issues regarding business needs and systems. This supports earlier research findings (Tiwana 2012), which show that greater business knowledge in the IT department and technical knowledge in line departments engender improved systems development performance, which in turn enhances systems development efficiency and effectiveness. Moreover, including information sharing on Enterprise Architecture in the organization's communication plan is encouraged. Launching a web school in the organization's intranet or extranet to educate employees or other interest groups about Enterprise Architecture has also been proven successful.

In relation to the current and important topic, this thesis provides concrete examples to practitioners on how to change organizational structures and processes to foster strategy implementation. The practices and praxes employed successfully by the studied organizations are introduced as a series of easy-to-follow guidelines in the results section of the paper. The practices consist of acts that people repeatedly engage in, and thus deal with such things as resource allocation, monitoring, control, documentation, briefing, use of analytical frameworks, communication and strategic planning routines.

The research findings suggest that Enterprise Architecture should lean towards a more dynamic direction where business initiated needs and requirements act as the driving force for process and IT development, but where EA policies do not dictate enterprise strategy or form a bottleneck in the development process. The former is an indication of the fact that often the extensive Enterprise Architecture work starts to dominate in organizations and does not act as a means to execute strategy but rather as a tool to shape it, which may lead to a situation where EA work hinders development by setting strict working boundaries. The latter refers to the common problem with Enterprise Architecture work where too strict and formal procedures slow down or completely stall all development initiatives with cumbersome description requirements, too broad standpoints and unrealistic goals.

This thesis adds to its managerial contribution by introducing the Dynamic Enterprise Architecture Model (see Figure 7) that is formed based on the research findings. The Dynamic Enterprise Architecture Model (DEAM) utilizes the basic components of the Dynamic Architecture for modeling and development (DYA) (Wagter et al. 2005) but incorporates all basic EA disciplines and raises the role of business architecture according to the findings from this study and the latest developments in EA frameworks (e.g. TOGAF and FEAR). The Dynamic Enterprise Architecture Model capitalizes on all the aspects of business driven development but still remains flexible and agile, which is necessary in today's changing environment.

The research findings indicate that not all development can be shaped to fit certain pre-set standards, but still they need a formal approval, documentation and execution path like the architecture compliant development initiatives. In the Dynamic Enterprise Architecture Process (DEAP) depicted in the DEAM, through strategy work the organization's management describes the mission and sets the vision and enforces the strategy for the organization, which is then broadly communicated to the organization as depicted by the arrows stretching along the figure. Vision feeds strategy formulation and in parts provides the requirements that set the business architecture work in motion. According to Vaara and Whittington (2012) strategy-making does not require intention and purposeful goal orientation but instead dispositions to act in a manner congruent with past actions and experiences. This notion is incorporated in the DEAM as the everyday practices feed strategy work illustrated by the double-sided arrows. When development ideas arise from

the business operations of the organization, they are mirrored against the strategy, thus acting as the first milestone in the process. If the development idea meets the strategic goals, it will be measured against the EA policies and standards.

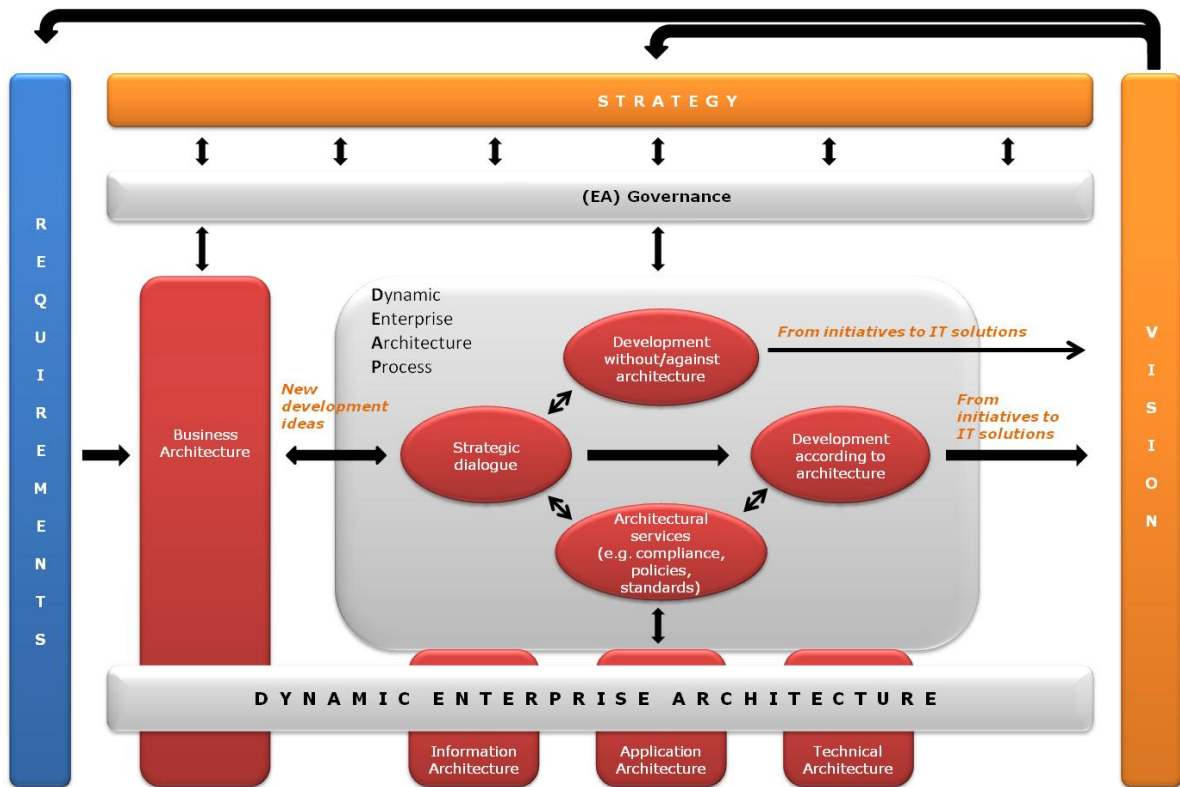


FIGURE 7. The Dynamic Enterprise Architecture Model (DEAM)  
(Modified and extended from Wagter et al. 2005)

The EA services also include comparison of similar concurrent or prior development plans in order to take advantage of similar process, information, application or technical solutions. If the development plan complies with the organization’s EA standards in this second milestone, the development idea can proceed to IT development. However, should the development idea be against the EA standards or policies, the organization’s architects issue a statement of the possible effects of non-compliance in line with the study findings. This is then handled in the appropriate forum (strategic dialogue) and if deemed important enough, permission for IT-development is granted. Here middle-management involvement in strategy creation, interpretation and communication (Mantere 2005, 2008; Rouleau 2005) is present through a delicate mix of formal and informal mechanisms (Mantere 2005; Hoon 2007) that take very specific forms in organizations and conceptualize not as a

unified body but rather as fragmented autonomous discourses (Seidl 2007). These development initiatives, which are done against EA guidelines of the enterprise, are then compared to the existing policies and standards, and may result in amendments or broader developments in the Dynamic Enterprise Architecture or some of its disciplines. Feedback from all phases of the DEAP is given to management. This information is used to shape the organization's policy and strategies similar to the JUHTA model (see Figure 2.).



## 6. CONCLUSIONS

### 6.1. The 'as-is' state of business

In today's rapidly changing business environment, organizations are concerned with how to increase efficiency and profitability, and be able to adapt quickly to a plethora of business opportunities. This has led to quests on how to successfully transition to an organization utilizing information technology and aligning it with the strategy work. One solution empowering the co-operation between business and IT functions in organizations is Enterprise Architecture (EA). Enterprise Architecture provides a plan for moving from the current (as-is) situation to the envisioned future (to-be) state of an organization (Hite 2004). It allows enterprises to have integrated business, organizational, informational and technological design that links strategy to execution (Hoogervorst 2004). This notion is the main driver for this research and hopefully the inspiration for future business research around EA practices.

Enterprise Architecture is first and foremost a method for strategically managing and describing an organization's systems, operations and structures in order to execute the strategic decisions of the organization (Hite 2004; Jonkers et al. 2006). Accordingly, this thesis relies on two significant theoretical fields: the cognitive view and the practice perspective. Managerial cognition theories allow the research to form a more comprehensive picture of the thought processes and perception of practitioners, and of the reasons for the executed structures, tools and activities in the studied enterprises (Hambrick & Mason 1984; Wiersema & Bantel 1992; Finkelstein & Hambrick 1996; Nadkarni & Barr 2008). Strategy-as-practice research, at the same time, is concerned with the actual operational implications of strategy work (Whittington 1996, 2002; Chia 2004; Jarzabkowski & Spee 2009). By combining the two schools of thought, this thesis introduces a generic theoretical *Framework for Analyzing Strategic Organizational Practices (FASOP)* that lays the theoretical foundation for the research. The framework enables the formation of a broad and still in-depth understanding of strategy work and presents a completely new perspective for studies on organizational practices and praxes.

By investigating Enterprise Architecture, this thesis addresses the recent discussion on PEST challenges that are leading to growing pressures for higher productivity and more precise collaborative decision making in both public and private sectors (Peristeras & Tarabanis 2000). EA places business requirements in the frontline of all development, addressing the problem of system failures due to unmet stakeholder expectations (Lyytinen & Hirschheim 1987; Schmidt et al. 2001).

The research findings indicate that a technology oriented EA culture is still present in organizations. However, the benefits of an Enterprise Architecture guided by business needs with a strong strategy connection (Aziz et al. 2005) are understood, and there is a desire to move from the current state towards a more dynamic, business driven modus operandi. This coincides with the findings of Ocasio and Joseph (2008) showing strategic planning to be a dynamically evolving practice. According to the results, the starting point for successful EA work is in the enterprise or business strategy. Engaging executives on a subject they care about fosters the understanding of EA benefits, provides support for EA decisions, and ensures their long term involvement. The results further show that obtaining sponsorship from the top management in the very beginning of the work is needed to find the strategic link between business and IT. Accordingly, forming decisive governance structures are central to finding longevity needed in EA work.

In the studied enterprises, architecture and process development is handled in various groups and teams at different levels in the organizations. These identified practices support the SAP message regarding the importance of engaging a wide range of people in strategy work (Vaara & Whittington 2012) and understanding the middle management's role in interpreting, selling and communicating strategy at the micro-level (Rouleau 2005). However, a key finding is that the Enterprise Architects or the Architecture Teams in the studied organizations do not decide on any issues regarding strategic alignment. Instead, in line with earlier evidence, the authority rests with the same body that makes all other decisions for the organization (Paras 2007). This again supports the underlying premise of the theoretical framework.

The study results suggest that overall the structures between the private and public organizations regarding Enterprise Architecture and strategic management appear alike,

although EA structures are clearly more visible and ready in the public sector, and top level plans are notably more formulated than in the private sector. The differences become evident in the decision making models where in the private organizations more power is handed down in the organizations from the top management. The top management in the private sector enterprises is on top of the day-to-day business and hands out more power and authority to decide on larger issues down in the organizations. In the low velocity public sector organizations, on the other hand, the top management is not as in touch with the operational level issues but instead concentrates on the broader general sector and keeps a tight control on top level decisions. The results indicate that this leads to differences in the related causal logics, where managers in high velocity private industries develop strategy to environment beliefs and form proactive causal logics, and practitioners in low velocity public sector organizations develop deterministic environment driven causal logics.

This central finding is significant as it provides exiting new evidence of differences in strategic management between public and private organizations, demonstrates the linkage of industry velocity, managerial cognition and the formation of practices and praxes expressed in the theoretical framework, and supports the underlying theoretical evidence regarding industry velocity and causal logics (e.g. Bourgeois & Eisenhardt 1988; Eisenhardt 1989; Fahey & Narayanan 1989; Lyles & Schwenk 1992; Weick 1995; Brown & Eisenhardt 1997; Eisenhardt & Martin 2000; Nadkarni & Barr 2008).

## **6.2. Moving from chaos to business value**

Even though the organizations have faced difficulties in integrating EA on the strategic level, distinctive patterns and actions showing that the enterprises are pursuing more business oriented development, promoting dynamism, and increasing the linkage to strategy work through communication are present. EA development and action plans are systematically presented to the top management, more EA training for relevant staff is organized, and both monetary and personnel resources around Enterprise Architecture are increased. Also, different technological aids are used to help in illustrating EA benefits and supporting information dissemination. The findings show the positive impact these

changes have had on the attention focus of the managers, and the effect it has had on the formation of causal logics.

The research offers notable theoretical implications by suggesting a linkage between the cognitive and practice perspectives, which is substantiated by the research results. Accordingly, the two fields of research complement each other by extending understanding on different parts of the strategy formulation and strategic action process and by illustrating how these affect the formation of organizational practices and praxis. The results anticipate future successful EA developments to arise from the private sector best practices, as they express a relationship to innovation and the formation of proactive causal logics.

The findings from this thesis have extensive managerial implications. The paper introduces the Dynamic Enterprise Architecture Model (DEAM), which is formed based on the research findings. The DEAM provides enterprises considering or already employing EA with an easy-to-follow, top-level structure for organizing their EA governance and development processes. Most importantly, based on the empirical findings and backed up by the earlier theoretical evidence, this thesis introduces twelve business oriented practices and praxes related to the implementation, execution and governance of Enterprise Architecture. They are categorized into structural and process related aspects depending on which they most contribute. Presented in the form of guidelines, they provide businesses with much needed practical insight into working approaches in Enterprise Architecture organization, and can act as a basis for providing business value on the way to strategic level EA management.

### **6.3. Limitations**

Work on organizational practices and praxis requires a close engagement with practice rather than a reliance on surrogate measures. The challenge is to uncover strategic activities in their real rather than just their reported form. Furthermore, when investigating cognitive structures and thought processes, even the slightest thing can alter the responses and provide incorrect or inadequate data. According to Nadkarni and Barr (2008)

*“Measuring top managers’ cognition is a difficult task; cognitive structures cannot be measured directly and the very act of asking individuals to reveal their beliefs can change them.”* Thus, research methods in the study of practices and related managerial perceptions should follow an activity-based approach that directly involves practitioners. (Johnson et al. 2003) Interviewing managers and other strategy practitioners, as done in this study, therefore sets limitations to the results gained. An observation study in selected case organizations would allow for a more specific and rich understanding of the routines and activities within organizations.

The data analysis according to the general realist approach chosen for this thesis entails two challenges: 1) some patterns, which could be relevant, may be missed if the conceptual framework is insufficient, and 2) the researcher’s own biases may corrupt the process by making her own background known. The first risk is, however, minimized through a thorough literature analysis behind the constructed framework. The second risk is evident in all research, especially in qualitative research. Subjectivity and biases cannot be completely ruled out in human science research. Still through careful consideration of research rigor, the effects remain minor or even negligible.

The judgemental sampling technique applied in this research does not necessarily allow direct generalizations to a specific population due to its subjective nature and the fact that its value depends entirely on the researcher’s judgment, expertise and creativity. However, in this research, it serves as a useful tool since broad population inferences are not required. (Malhotra & Birks 2006) Also, as this research is qualitative, tries to gain understanding of a phenomenon that is scientifically scarcely studied, exploits an exploratory research design and is thus subjective in nature, judgemental sampling technique can be considered an appropriate and even necessary choice.

The empirical study included two seemingly similar private organizations from the daily consumer goods industry, and in total only four enterprises. Further research must be undertaken to validate the generalizability of the results across multiple settings.

## 6.4. Suggestions for future research

This study does not contribute in the discussion on mapping mental models (Porac & Thomas 1989) but rather concentrates on the influences of external factors on cognitive patterns and how these manifest as practices and praxes. Further research on the area of mental models or cognitive maps could shed light on the similarities between managers and organizations choosing a certain strategic management method, e.g. Enterprise Architecture. Moreover, research could also investigate the relationship between managers possessing similar mental models and the formation of strategic groups, i.e. symmetry of operations (Porter 1980: 129) and practices and praxes in the related organizations.

The Framework for Analyzing Strategic Organizational Practices (FASOP) introduced in this thesis provides a possibility to study the relationship between a strategic management method, the organizational practices and praxis and the enterprise performance. The framework does not place any emphasis on the strategic management method employed in the studied organizations, and thus can be used in varying environments. In this research, the effects of different elements in the framework on enterprise economic performance are not studied, which leaves room for extensive future research. From the research data, the influence of industry velocity on strategic choices and especially on the choice of a strategic management method stands out and awaits more extensive research. The framework provides also leeway for further research called for by Scott (1995) addressing the practitioners' cognition and mental structures as influential factors in organizational processes.

The research findings support earlier results regarding the relationship between management demographics and managerial cognition. Based on the FASOP framework, future work could investigate the relationship between Demographic Factors and strategic action through a large quantitative study, thus providing more insight on the subject matter and allowing more extensive generalization of the results.

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# APPENDICES

## Appendix 1. Description of the studied organizations

**The State Treasury** (Valtiokonttori) is a multidisciplinary government agency. It produces internal corporate services for central government, such as financial, personnel administration and IT services, administers state funds and loans and is responsible for the government's central bookkeeping. The Government IT Shared Service Centre is a part of the State Treasury. Their task is to integrate IT services into public administration and produce secure, easy-to-use and cost-effective IT services in order to make the working day of public administration organizations easier. One important part of this work is to produce guidelines for the government enterprise architecture work. ([www.valtiokonttori.fi](http://www.valtiokonttori.fi))

**The Finnish Transport Agency** (Liikennevirasto) is a government agency operating under the Ministry of Transport and Communications, and it is responsible for maintaining and developing the standard of service in the transport system's traffic lanes overseen by the government. Taking into account the former agencies that were joined to form the Transport Agency, the organization's enterprise architecture work dates back some ten years. ([www.liikennevirasto.fi](http://www.liikennevirasto.fi))

**Finland's Local Store** (Suomen Lähikauppa Oy) is the third largest retail store in Finland. According to the company's philosophy, it is not enough for a store to be geographically close; it also has to serve the customers' needs well and allow them to feel at home. Finland's local stores develop to meet the changing needs and different situations of people. ([www.lahikauppa.fi](http://www.lahikauppa.fi))

**Stockmann Plc** is a Finnish listed company engaged in the retail trade. It has approximately 55,000 shareholders and over 16,000 employees with operation in fourteen countries. The development of the company's Enterprise Architecture work started as early as 2004. ([www.stockmann.fi](http://www.stockmann.fi))

## Appendix 2. Original direct quotations in Finnish

*“...hankit siihen (KA-työhön) apua, kut sit taas monesti...kysymys onkin siinä..., et ymmärtääks se meidän liiketoimintaa.”*

*...käynnistettiin tämä kehittämisen johtoryhmä ja määhä halusin sen myös semmoseksi välineeksi, jolla me tuodaan KA:sta tietoisuutta myös liiketoiminnan suuntaan.*

*“Kyl siin oli nähtävissä se ajatus, että...saatais IT ja liiketoiminta puhumaan yhtä kieltä ja menemään samaan suuntaan.”*

*”Mä tykkäsin siitä lähestymisestä, että...haettiin nimenomaan semmosta työkalua, jolla voidaan sitä vuoropuhelua ICT:n ja liiketoiminnan välillä selkeyttää.”*

*“...sitä (KA:ta) ei oo saatu silti strategisen johtamisen välineeksi. Se on jäänyt irralliseksi tekemiseksi.”*

*“...ei oo selkeetä tahtotilaa tähän [KA:n] suuntaan.”*

*“Meil on erittäin hyvä tuki ylimmäältä johdolta ja siihen [kokonaisarkkitehtuurin kehittämiseksi] on näytetty vihreetä valoa...meil on kehittämisen johtoryhmä..., joka tekee päätöksiä kokonaisarkkitehtuuriperiaatteista ja suunnista ja valinnoista. Kehittämisen johtoryhmään kuuluu meidän varsinainen johtoryhmä plus [tietohallintojohtaja].”*

*“...mä nään sen...haasteena...miten me saadaan dynaamisuutta siihen meidän toimintaan.”*

*”...ei me (IT osasto) voida toimialojen toiminnasta tai sen toiminnan suunnittelusta vastata...”*

*“...yritysjohtamisen puolella on taas niin paljon omat ismit, jotka on aika kovassa ja vahvassa huudossa, että aika vaikee on kokonaisarkkitehtuurin pärjätä...siinä keskustelussa...”*

*“...järjestelmien kehittäminen ei oo vaan sitä, et hankitaan tietojärjestelmä, vaan oikeesti pitäis sitä toimintaa miettiä; ja se ei tuu mietityks ellei oo jotain systematiikkaa millä se...kuvataan auki...”*

*“...just se tehtävärooli mikä tällä KA:lla on, niin oikeastaan sillä kentällä ei tällä hetkellä kilpaile mikään muu malli...[J]os puhutaan oikeesti organisaation kehittämisestä ja järjestelmien kehittämisestä, en näe, et on mitään muuta näin kokonaisvaltasta lähestymistapaa...et se on aika selvä asia, et se on just KA mitä lähetään työstään...”*

“...me ei valittu mitään valmista kehikkoa, vaan enempikin...tutustuttiin näihin kehikoihin; mitä ominaisuuksia niis on, mitkä niist on meille tärkeitä ja valittiin sielt meille oleelliset osat ja mietittiin ne tarkkaan.”

“Kyllä me ollaan näitä malleja jossakin määrin sovellettu myöskin omiin tarpeisiin. Se on melkein käytännössä pakko. Mä sanoisin, että ei varmaan ole olemassa semmosta organisaatiota, joka pystyy muuten toimimaan.”

“Meillä ei oo ihan suoraa...referenssiframeworkkia...meillä on käytössä TOGAF...me hyödynnetään sitä ADM:ää.”

“...täällä TOGAFissa...löytyy kaikkii tällasii...mut mikäs tästä on nyt se, mikä aiheuttaa meillä organisaatiossa tällä hetkellä kaikkein eniten...ongelmia.”

“...mitä mä odotan taas johtamisen näkökulmasta on se, että kyllähän tän työn kautta pitäisi jatkossa...enemmän sitten epäkohtia nousta esiin. Näitä tuodaan sitten sinne kehittämis- ja johtoryhmän agendalle; että...katsotaas miten hölmösti me ollaan organisoiduttu.”

“...tää on osa-alue, jossa tarvittais osaamista ja resursseja helpostikin enemmän. Ja toisaalta niitä osaaajia ei hirveesti Suomen markkinoilla loppujen lopuksi ole.”

“käsiä, jalkoja ja suita tarvitsisi enempi...tekemään sitä [KA] työtä...”

“...tarvis enemmän resursseja ehdottomasti...nyt se [KA] ei oo meidän päivittäistä työtä...”

“...kokonaisarkkitehtuurilla me pystytään näyttämään myös sellaisia vaikutuksia, jotka ei ihan heti tuu ilmi. Lyhyellä välillä saattaa olla kannattavampaa tehdä joku tietty move, mutta pitemmällä aikajaksolla...kannattaskin perehtyä johonki toiseen ja me pystytään sitä kautta näyttämään...asioita ja business caseja, joita ei näkis ilman [kokonaisarkkitehtuuria].”

“...me käynnistettiin tämä kehittämisen johtoryhmä, ja mää halusin sen myös välineeksi, jolla me voidaan tuoda KA tietoisuutta myös liiketoiminnan suuntaan.”

“...meil on...tämmönen...IT:n ja liiketoiminnan...yhteinen ryhmä, missä käydään läpi sekä järjestelmiä että...liiketoiminnan tarpeita...”

“Liiketoimintaprosessikehityskin on meidän (IT:n) vastuulla.”

“...yks näistä mun arkkitehdeistä [IT:ssä] on tittelillä Process Architect.”

“...ei meillä mitään aktiivista ideoiden keruuprosessia ole. Se nojaa tällä hetkellä siihen, että on aktiivinen ja vastuullinen organisaatio, että kun asioita tulee esille, niin niitä nostetaan esille.”

*“...ei oo lainkaan harvinaista, et organisaation tietty taho tekee...omasta näkökulmasta jonkun projektin, joka taas vois olla...järkevää yhdistää tai tehdä siitä sen verran geneerisempi, et joku muukin vois myöhemmin käyttää sitä...”*

*“...prewievn pohjalta me voidaan antaa lausunto viidestoist minuutis...ja näkemys, että tarviiko tää jotain erityissuunnittelua.”*

*“...ne (KA järjestelmät ja kuvaukset) on liian raskaita ja teknisesti monimutkaisia, ainakin toiminnan ihmisille, että täytyy vaan...entistä yksinkertasemmaks sitä koko arkkitehtuuriasiaa viedä.”*

*“...ensimmäiseksi ei nouse esille, jos meillä on isoja liiketoiminnallisia haasteita se, että joku järjestelmä pitää uusia, vaan...se, että mitkä ne on ne liiketoiminnalliset tarpeet...”*

*“...päivittäistavarapuolella...niit tilauksii ei voi tehdä puolt vuotta aiemmin ja tilata Kiinasta, vaan se on aika nopeella syklillä tapahtuvaa ennustamista, ett siell on just oikea määrä asioita siell kaupassa saatavilla sillon, kun kuluttajat sen haluaa, koska ne menee vanhaks ja tulee hävikkiä ja se näyttää huonolta sitte katepuolella.”*

*“...meillähän aika pitkälti nimenomaan lainsäädäntö toimii keskeisimpänä ohjausmekanismina strategisessa johtamisessa...sitten tietysti jossain määrin poliittiset päätökset ja mitä...uusia palveluita meille ollaan suunnittelemassa...”*

*“...yrityksen operatiivisen liiketoiminnan kannattavuus...ja sen edellyttämät toimenpiteet on ollut selkeä ajuri strategisesti...[ja] siellä taustalla sitten tietysti kilpailutilanne.”*

*“...tulos...et miten me pystytään virittämään se koneisto, jolla...tuotto osakkaille saadaan...”*

*“...haaste ja paine on siinä, että miten tehokkaasti veronmaksajien varoja käytetään...[V]iraston pitäis pystyä kaikkien odotusten ja paineiden keskellä kuitenkin ohjaamaan...kehittämistä ja ylläpitoo siihten suuntaa mikä on yhteiskunnan kannalta fiksua ja kohdennettua investointeja oikein.”*