Leveraging Organizational Performance Through Enterprise Business Architecture

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ABSTRACT

Enterprise architecture is a conceptual IS architecture and management framework used to describe and organize and control an organization's IS/IT structure, processes, applications, systems and techniques in an integrated and cohesive way. The IS framework helps organizations to create synergy and achieve strategic alignment and consequently create business value to the organization and its shareholders and stakeholders. This thesis presents a qualitative research study addressing the concepts of enterprise architecture, enterprise business architecture, strategic alignment, organizational performance and business value / business benefits. Based upon the literature, the concepts of enterprise business architecture, business value and investment have been identified, and an analytical study of the well-known enterprise architecture frameworks has been demonstrated. It investigates the link between the IS/IT investment and organizational performance. This perspective is developed theoretically and illustrated empirically with a research framework that has been developed, and supported with empirical data from two big international organizations use IS/IT extensively to support their business practices. The empirical data from the two organizations are presented and analyzed, and research framework has been empirically verified. The result of the study shows that IS/IT facilitates significant growth in productivity and gains in profitability, and creates business value to the organization and consequently satisfies its customers, shareholders and stakeholders.

Keywords: Enterprise architecture, enterprise business architecture, alignment, strategic alignment, business value, IS/IT investment, productivity, profitability.

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CONTENTS

1. INTRODUCTION

Enterprise architecture is a blueprint of an organization's vision and a management framework that includes various business methods and tools to understand and document the structure of an enterprise, and help the enterprise to organize its business processes and Information Systems (IS) / Information Technology (IT) resources to achieve strategic alignment between its business processes and IS/IT capabilities. This Master Thesis in Information Systems is a course in partial fulfillment of the requirements for a Master of Science degree in Applied Information Technology at IT Faculty, University of Gothenburg. The title of this master thesis is "**Leveraging Organizational Performance Through Enterprise Business Architecture**". In this project I developed a research study in the subject of enterprise architecture to present the basic concepts and theory of enterprise architecture, strategic alignment, and the concept of business value and investment. The goal of this thesis is to address and link between the IS/IT investment and the organizational performance. It identifies the organizational performance in terms of the concept of business value (business benefits) of the IS/IT investment as an output result of achieving strategic alignment between business processes and the IS/IT resources through using an enterprise architecture framework.

1.1 Background and context

In recent years and since 1980s there has been a great attention and vigorous debate on the development of Information Systems (IS) and Information Technology (IT) in business and industry. The emergence of IS/IT in business since the 1960s as they became important and integral parts of business as they rapidly developed and emerged in business, IS/IT becomes an essential business resource that represents the heart of most organizations in all sectors that include business, industry, health care, education, governments, etc. [Earl, 1989; Weill and Broadbent, 1998]. IS/IT became a large capital expense in many big firms today and represents substantial financial investment and integral to achieving business goals [Weill and Broadbent, 1998; Willcocks and Lester, 1999; Willcocks, 1999; Henderson and Venkatraman, 1991 &1993]. With the emergence of IS in most business sectors that increased both in size and complexity of the implementation of IS, it became necessary to use some logical construct (or architecture) for defining and controlling the interfaces and integration of all the components of the system [Zachman, 1987].

The term or concept of architecture in general basically refers to the way how a system is designed, and how its components are organized, connected, and interrelated with each other. It refers to a very special art that creates a framework around our life through the shaping of space so it creates opportunities for certain kinds of views, movements, and actions while constraining others [Rasmussen, 1959; Tenkasi et al., 1997]. In IS management literature, it has been used to refer to a framework that shows the logical construction of IS with their major parts and connections of those parts [Rood, 1994]. Basically in IS discipline, there no one single commonly agreed-upon definition of architecture in relation to enterprise or IS/IT discipline. The IS architectures differ in style, focus, and level of detail, though in a broad sense, they are all alike. The main theme of IS architecture is to represent an IS in a conceptual framework or model (in the abstract) and organized in an orderly arrangement of the components that cohesively integrate multiple business processes. This makes up the system under question and the relationships or interactions of these components with their multiple business processes,

all together create the concept of enterprise architecture, which shows the primary components of an enterprise and depicts how these components cohesively interact or related to each other [Zachman, 1987; Rood, 1994; Goikoetxea, 2007]. Enterprise architecture creates the business innovation and enhances the business efficiency. Lately, organizations use enterprise architecture initiatives across the enterprise to stay competitive – to improve their organizational and business agility and efficiency [Hoogervoorst, 2004; Bernard, 2005; Schekkerman, 2004 & 2005; Goikoetxea, 2007]. It is concerned with the business-IT strategic development of the enterprise.

An outstanding example of a very well known IS architecture framework is the Zachman Framework of enterprise architecture which was originally developed in 1987 by John Zachman. This framework has been introduced to business to develop complete enterprise architecture. As a matter of fact, it has been accepted as an industry standard and used widely in industry to organize and describe IS standards in different business areas such as government or healthcare, etc. It offers a taxonomy for relating the concepts and terms that describe the real world of IS business to the components and elements that identify IS constructs, views, models, and its implementation in business and industry [Zachman, 1987; Sowa and Zachman, 1992]. The importance of enterprise architecture is a key motivation issue for many business managers and leaders to capitalize on IT. Enterprise architecture as an emerging profession and management practice in business that is devoted to improving the performance of enterprises by enabling them to use their SI/IT capabilities in terms of a holistic and integrated view of their strategic direction, business practices, information flows, and technology resources [Bernard, 2005; Galliers and Leidner, 2009]. It is one of most upcoming fields in business and industry to facilitate new business processes, and innovate new ways of business to enable new products and services to meet growing customer needs. It raises a broad range of economic, social, and technical issues in business and industry. As a matter of fact, enterprise architecture has evolved tremendously and it is expected to grow and adapt to new market conditions and business opportunity [Galliers and Leidner, 2009; Bernard, 2005; Ross, et al, 2006; Schekkerman, 2004 & 2005].

1.2 Purpose

The purpose of this master thesis is basically to address the concept of enterprise business architecture to achieve strategic alignment and investigate its impact on the organizational performance in terms of business value or business benefit. The study seeks to contribute to the literature in IS strategy, IS/IT architecture, IS/IT management by pursuing three specific goals. First, it intends to analyze some of the well-known enterprise architecture framework to address how these frameworks identify the concepts of strategic alignment and business value. Second, it aims to address the process of achieving strategic alignment between business processes and IS/IT resources through adopting enterprise architecture framework. Third, the study identifies the impact of achieving strategic alignment on the organizational performance in terms of added business value (business benefits) as an output result of achieving strategic alignment. The materials in this research project are presented in a manner that emphasizes the characteristics and benefits of enterprise business architectures and the advantages that can be achieved through the proper and efficient use of IS/IT resources by creating a synergy between the business processes and IS/IT capabilities to fully optimize organizational performance.

1.3   Scope

The scope of this thesis project is mainly concerned with enterprise business architecture and strategic alignment concept – with specific attention to focus on business architecture and IS/IT application and information architecture. Recently, many views and models presented in literature to gain a better understanding of the management of the business processes and their relation with IS/IT resources. My main focus in this study will be delineated to specific frameworks of enterprise business architecture initiative and the strategic alignment concept of the Strategic Alignment Model [Henderson and Venkatraman, 1991 & 1993; Luftman et al., 1993; Venkatraman et al., 1993]. This way of organization provides a new approach for organizing business architecture with IS/IT applications and information architecture properly that will help firms face new business challenges.

1.4   Research questions/problem statement

Given the objective of this thesis the following research questions are formulated:

- *What are the key attributes that characterize enterprise business architecture?*

- *How does the IS literature theorize the concept of business value?*

- *How do enterprise architecture frameworks identify the concepts of strategic alignment and business value, and how do they address the issue of achieving strategic alignment?*

- *Why is strategic alignment critical to leveraging organizational performance*?

1.5   Research approach

A qualitative research approach was followed in this research project based on an intensive literature study, and empirically supported with two case studies to identify the practical approach of this master thesis. A methodological study was conducted to analyze enterprise architecture frameworks to find out how these frameworks achieve strategic alignment and identify the concepts of strategic alignment and business value. The empirical data in this project has been developed through semi-structured interviews to two companies in different industries that include Computer Science Corporation (CSC) and Volvo Group AB to develop the case studies.

1.6   Thesis structure

This research report is initiated with this introduction chapter that presented a general overview of the research subject of enterprise business architecture and organizational performance, presenting the background, the purpose and scope of the research study, research questions, and research study design. Chapter 2 addresses the theoretical background and chapter 3 presents the research framework. Chapter 4 introduces the research approach. Chapter 5 shows an overview of analytical study of some of the well known enterprise architecture frameworks. Chapter 6 presents the empirical data and findings of the thesis project. Chapter 7 presents the discussion, and chapter 8 shows the research conclusions.

2. THEORETICAL BACKGROUND

Chapter 1 presents a general overview of the research subject of this master thesis. This chapter addresses the basic concepts and theoretical background of the main subject of this research project. It introduces the basic terms of IS and IT and how they are related to each other as they constitute the general interrelated terms of this thesis. The chapter presents the basic concepts of architecture, enterprise architecture, enterprise business architecture, enterprise architecture framework and strategic alignment. It presents the basic definitions and components of enterpriser architecture, and the concepts of business value and investment. In addition, it introduces the strategic alignment framework as an approach to achieve strategic alignment.

2.1 Business, IS and IT

The concept of business as defined in the Dictionary of Economics in Economic & Business refers to "*All forms of industrial and commercial profit-seeking activity. The business cycle refers to fluctuations in the aggregate level of economic activity, and the Business Expansion Scheme in the UK used 'business' in this sense*" [Oxford Reference Online]. It is a mix of activities a company (enterprise or firm) or companies, group(s) or someone can perform to accomplish a mission and achieve a goal (i.e., such as earning profit/money). Business can be defined as the legal activity identifies an organization established to provide or supply goods and/or services to its customers and this activity may include financial, commercial, and/or industrial prospect to earn profit or benefit. It is defined as "*Economic system in which goods and services are exchanged for one another or money, on the basis of their perceived worth. Every business requires some form of investment and a sufficient number of customers to whom its output can be sold at profit on a consistent basis*" [Business Dictionary – Business].

The constructs of IS and IT are two terms that are often used interchangeably and are indispensable to the business operation of most modern organizations. IS existed and used in organizations to manage business long before the advent of IT [Ward and Peppard, 2002], and most IS were exclusively data-oriented with the primary purpose to store, retrieve, manipulate, and display data [Andriole, 2002]. IS can be defined as a system that includes persons and data records and management activities for managing and processing information, usually computer-based data processing system (computer-based information systems) [Andriole, 2002; Ward and Peppard, 2002].

The construct of IS refers to the systems that include computer hardware, software, and people and management policies and procedures, and that systems use the IT to store, manage, and process information which often relies on databases. The UK Academy of Information Systems (UKAIS) defines information systems, whether automated or manual as the means by which people and organizations, utilizing technology, collect and process, store and disseminate information to complete business tasks. IS involves the planning, analysis, design and maintenance of computer-based information systems used to process information. It is, therefore, an organized structure of interrelated components that concerned with the purposeful utilization of information technology [Ward and Peppard, 2002].

The construct of IT is an engineering term has been defined as – "*IT refers to a wide variety of items and abilities used in the creation, storage, and dispersal of data and in-*

formation as well as in the creation of knowledge. Data are raw facts, figures, and details. Information refers to an organized, meaningful, and useful interpretation of data, while knowledge is the awareness and understanding of a set of information and how that information can be put to the best use" [Senn, 2004]. It is an engineering discipline that refers specifically to modern technology, essentially computer-based hardware and software systems, telecommunications networks, database management, and other information processing technologies and know-how used in computer-based information systems to create or enable the acquisition, representation, storage, transmission, and manage and use of information [Ward and Peppard, 2002; Sage, 2002].

The IS literature shows that data and information, which represent vital components of IS and IT, are in fact widely recognized as the most valued enterprise assets [Senn, 2004; Alter, 1999]. Enterprise architecture is an approach that helps organization to effectively implement these assets and properly link it to the business processes, which consequently help it to leverage investment in these vital assets to achieve its business goals. The quality of data and information and proper management of these assets will certainly impact the organizational performance. Managing these key assets properly with IS architectures frameworks or enterprise architecture frameworks such as TOGAF (8) enable organizations to survive and stay competitive in the new economy and dynamic business environment that IS/IT plays a very important role in it [Alter, 1999; Senn, 2004; Ward and Peppard, 2002; TOGAF (8)].

2.2   The concept of architecture

The term of architecture refers to "*the art or science of building or constructing edifices of any kind for human use. Regarded in this wide application, architecture is divided into civil, ecclesiastical, naval, military, which deal respectively with houses and other buildings (such as bridges) of ordinary utility, churches, ships, fortification* [Oxford English Dictionary]." The basic definition of the concept "architecture" has been defined in general as the organizational structure of a system(s) or component(s), their relationships, and the principles and guidelines governing their design and evolution over time [IEEE 610.12; Rasmussen, 1959]. It is the discipline that identifies the overall design of a building, structure or a system, how this building/structure/system is conceptualized and created, and how its components are organized, connected, and interrelated into a coherent and functional altogether. Architecture is the art and science that deal with the principles of design and construction of designing buildings and other structures such as physical constructions (of bridges and buildings), cities or towns. It is a discipline and profession that uses mathematics and aesthetic in the planning, designing of building, and construction of building and other structures in civil engineering [Rasmussen, 1959; Tenkasi et al., 1997]. Architecture refers to "*the structure of components, their interrelationships, and the principles and guidelines governing their design and evolution over time*" [CIO Council, 2001].

The construct of "architecture" is defined as " *is the art or practice of designing and constructing building, the style in which a building is designed and constructed, especially with regard to a specific period, place, or culture: Georgian architecture*" (*From The Oxford Dictionary of English (2nd edition revised) in English Dictionaries & Thesauruses*) [Oxford Dictionary Reference]. It is a general term used in many different disciplines such as civil engineering "architectural engineering", system architecture, computer architecture and software architecture as well as IS architecture. Civil engineering refers to "*A branch of engineering that encompasses the conception, design,*

construction, and management of residential and commercial buildings and structures, water supply facilities, transportation systems for goods and people, as well as control of the environment for the maintenance and improvement of the quality of life. Civil engineering is a people-serving profession; it includes planning and design professionals in both the public and private sectors, contractors, builders, educators, and researchers who strive to meet the needs and desires of the community" [Lazuruk and Palevsky] In fact, the construct of architecture used generally in building architecture, town architecture and landscape architecture, which is usually called architecture engineering.

Architecture engineering is a branch of civil engineering deals mainly with designing building or constructing edifices and other structure such as physical structures or heavy structures (such as bridges or fortification), building materials and elements, and with design structural systems for buildings. It is defined as "*a discipline that deals with the technological aspects of buildings, including the properties and behavior of building materials and components, foundation design, structural analysis and design, environmental system analysis and design, construction management, and building operation*" [Dean]. Town or city architecture can be defined as the conceptual structure that defines the overall logical organization and structure and/or behavior of the systems and its essential components of the city/town that include buildings, streets, roads, bridges etc., as well as the essential utility (i.e., service which is used by the public, such as electricity or gas supply or train service etc.). It is a practical process starts from the planning and design process, goes through implementation, and maintenance and innovation. Building architecture is much simpler than the city/town architecture as building architecture has limited dimensions, has less components and demands less work comparing with the city architecture. City/town architecture is a very complex system that includes many different components and their elements and the complexity of their integration [Dean; Rechtin, 2002].

The ANSI/IEEE Std 147-2000 defined architecture as: "*The fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution*" [ISO/IEC 42010:2007]. TOGAF (8) presents two meanings to the construct architecture depending upon its contextual usage:

- *A formal description of a system, or a detailed plan of the system at component level to guide its implementation.*

- *The structure of components, their interrelationships, and the principles and guidelines governing their design and evolution over time.*

Nonetheless, there is no single commonly agreed-upon definition of the term "architecture" in relation to concept of enterprise or IS discipline. Furthermore architectures differ in style, focus, and level of details and complexity, however, in a broad sense they are almost the same towards achieving a business goal to the organization. In addition as it has been mentioned previously that the main idea of all architectures is to represent the IS and business processes in a model or structure to be organized in an orderly organization of the components that cohesively integrate multiple business processes. This way of arrangement makes the system under question and the relationships or interactions of these components to achieve an identified goal(s) to the organization, which consequently leads to deliver business benefits to the organization [Rood, 1994].

2.3 Enterprise architecture

Enterprise architecture is an integrated framework of both business and IT solutions and practices developed to help enterprises meet their business needs and stay competitive in dynamic business environment in today's agile, efficient, and highly responsive business and industrial organizations [Goikoetxea, 2007; CIO Council, 2001; Ross et al., 2006; Bernard, 2005] .

With the emergence of IS/IT in business and industry, and the increased scope of design and levels of complexity of IS implementations, there is a necessity demand to use of some logical construct (architecture) for defining and controlling the interfaces and the integration of all of the components of the system [Zachman, 1987]. Most organizations depend on an effective integration of a number of businesses and IS/IT systems in order to quickly adapt to changes of all types, such as changing technology, changing customers and customer needs, and changing business partners and business environment. To accomplish this, an organization's systems must form an enterprise architecture that is in effect a system of systems (SOS) or systems family. The perspectives of all the stakeholders, from the chief executive to the technology developer to various implementation contractors, must be considered in developing the architecture. The systems that constitute the system family must be evolvable and adaptive in order to enhance the ability of the organization to cope with emerging business needs [Rechtin, 2002].

Enterprise architecture, therefore, shows the primary components of an enterprise and depicts how these components interact with or relate to each other. It is a conceptual framework that describes how an enterprise is constructed by defining its primary components and the relationships among these components [Rood, 1994]. The basic idea of enterprise architecture begins with a conceptual model, (a top-level abstraction) which is an essential tool of communication between stakeholders, client, architect, and builder or developer, each viewing it from a different perspective. Therefore the enterprise architecture is a model-based (or meta-model-based) approach to business and IS management. Enterprise architecture models are abstractions and simplifications of the real world.

Enterprise architecture facilitates the mechanism to enable communication and interactions among the essential elements and functioning of the enterprise [Goikoetxea, 2007; Hoogervoorst, 2004; Bernard, 2005; Schekkerman, 2005]. The quality of data and information that enterprise architecture can provide facilitates the quick response and easy and efficient way for organizations to respond to the rapid changes in the business market and take the right decisions in the right time. Furthermore enterprise architecture helps organizations to reduce duplication and inconsistencies in information and data; which obviously will improve the business progress in the enterprise and consequently improves the productivity and profitability of the organization [Schekkerman, 2005]. It has been defined by many different authors and scholars both in academia and industry and among these definitions that are presented in literature are:

Enterprise architecture – "*Enterprise architecture (EA) is a set of business and engineering artifacts, including text and graphical documentation that describes and guides the operation of an enterprise-wide system, including instructions for its life cycle operation, management, evolution, and maintenance. Specific content of these artifacts can include a vision or mission statement, a set of system requirements, a Business Process Architectural View, a Business Systems Architectural View, a Data Architectural View, an Applications Architectural View, and a Technology Architectural View*" [Goikoetxea, 2007].

Enterprise architecture – "*is a strategic information asset base, which defines the mission, the information and technologies necessary to perform the mission, and the transitional processes for implementing new technologies in response to the changing mission needs. Enterprise architecture includes baseline architecture, target architecture, and a sequencing plan*" [CIO Council, 2001]. It is an approach to identify the strategy for the transition process of the enterprise from its current baseline architecture to the target architecture [CIO Council, 2001].

Enterprise architecture – "*The enterprise architecture is the organizing logic business processes and IT infrastructure, reflecting the integration and standardization requirements of the company's operating model. Enterprise architecture provides a long-term view of a company's processes, systems, and technologies so that individual projects can build capabilities – not just fulfill immediate needs. Companies go through four stages in learning how to take an enterprise approach to designing business processes: Business Silos, Standardized Technology, Optimized Core, and Business Modularity. As a company advances through the stages, its foundation for execution takes on increased strategic importance*" [Ross et al., 2006].
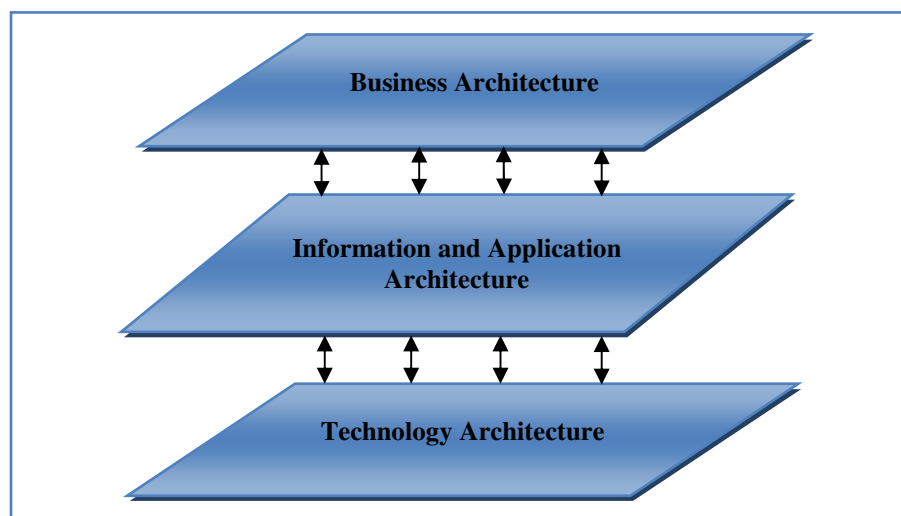
Enterprise architecture – can be defined as an emerging profession and management practice that is devoted to facilitate efficient management practices to improve business performance of enterprises. This can be managed by enabling them to view enterprises in terms of a holistic and integrated view of their strategic direction, business practices, information flows, and technology resources. It is a roadmap that assists enterprise to manage a transition from its current state to future desired state [Bernard, 2005].

In light of these definitions of enterprise architecture, it can be noticed that there is not that a big difference between them. In fact these definitions presented by different scholars and authors support each other and show that the topic is an advanced subject that combines business processes and management practices, information flows, and technology resources. Basically, they imply in their meaning the concepts of alignment, integration and change. Moreover, it is still growing and evolving discipline.

Enterprise architecture is important because it manages IS-business complexity and achieves the integration and alignment between business processes and IS resources. Achieving an alignment is an important issue in most organizations as it directly impacts on the organization's agility and flexibility to accommodate change and rapid response to the business needs [Hoogervoorst, 2004; Bernard, 2005; Schekkerman, 2005]. It is a strategy and business-driven activity that support management planning and decision-making by providing coordinated views of an entire enterprise [Goikoetxea, 2007; Bernard, 2005]. Enterprise architecture sets up the organization-wide roadmap as an approach to accomplish an organization's mission through best performance of its essence business processes within an efficient IS/IT environment. This highlights that enterprise architectures are basically drafts and IS-roadmaps for systematically and entirely specifying an organization's current (baseline) or future desired (target) business environment. Enterprise architectures are vitally necessary for building up IS and developing new systems to achieve organization's mission and optimize its business performance. As can be seen, this can be achieved in logical or business terms that entail (i.e., mission, business functions, information flows, and systems environments) and technical terms that entail (i.e., software, hardware, communications), and includes a transition plan (strategy for changing the enterprise) to successfully establish the transition process from the baseline business environment to the target business environment [CIO Council, 2001].

2.4 The main elements of enterprise architecture

The main components of enterprise architecture as identified by TOGAF (8) include four components that are represented in business architecture, data architecture, application architecture, and technology (IT platform) architecture. The data architecture and application architecture sometimes refer to the IS architecture (information and application architecture) as presented in Figure (2.1).The distinction between the different architectures (Business, IS, Technology…) in the enterprise architecture will make the enterprise to realize the full potential of its architecture. Modeling architecture of enterprises has become a common practice in most business organization which impacts their success. Models help enterprises to identify common architectural patterns that help people in business understand existing structures. These architectures provide a medium for transferring knowledge from one domain to another and support alignment practices [Aerts, et al., 2004; TOGAF (8); Goikoetxea, 2007]. Aerts et al. (2004) identify a multitiered framework that consists of three sub-architectures in which architecture matters:

Figure (2.1) Enterprise architecture components

- The business architecture defines the business system that describes the work enterprise performs in achieving its business mission in its environment of suppliers and customers. The system consists of humans and resources (including IS), business processes, and rules. It belongs to the disciplines of industrial engineering and management science [TOGAF (8); Aerts et al., 2004; Goikoetxea, 2007].

- The application architecture details the automated systems and the software application components and their interaction that support the enterprise's business areas. Its details can be described using object or component models, or application frameworks. It belongs to the disciplines of computer science and software engineering [TOGAF (8); Aerts et al., 2004; Goikoetxea, 2007].

- IT platform architecture is the architecture of the generic resource layer that includes the IT infrastructure. It describes the platform that includes computers, networks, peripherals, operating systems, database management systems, UI frameworks, system services, middleware, etc. that will be used as a platform for the construction of the system for the enterprise. Its description includes various platform paradigms such as mainframe terminal, n-tier client–server, and mobile or wireless architectures. It belongs to the disciplines of computer systems engineering and software engineering [TOGAF (8); Aerts et al., 2004; Goikoetxea, 2007].

In such a multi-tiered framework, the overall enterprise architecture consists of three distinct but highly interrelated sub-architectures (business, IS, and technology domains), each of which can be conceptualized as having its own distinct architecture as depicted in Figure (2.1). These three sub-architectures belong to three different disciplines that need people to be highly professional and skilled in their specialized business areas in each discipline to success in business. The business architecture concerns with business issues such as defining the business strategies, processes, and functional requirements, how business is structured, and what does it need to achieve its business goal, and etc. The application architecture identifies the application required to support the business requirements, and allows efficient management of information entities. The technical architecture describes the structure and behavior of the technology infrastructure of the enterprise. It identifies the set of technology standards and services needed to execute the business mission [Aerts et al., 2004; Hugoson et al., 2008; TOGAF (8); Goikoetxea, 2007]. However, these three different disciplines in the multi-tiered framework need to be very cooperative, and very highly integrated and harmonized between each other, as their sub-architectures are highly interrelated.

This approach will help the enterprise to maximize flexibility, adaptability, and stability of both business and IS processes and resources. It provides the ability to create and maintain common vision and understanding of the future shared by both the business and IT management people. Moreover, it integrates and harmonizes the business processes with IT capability of the enterprise. This helps the enterprise to efficiently achieve alignment between its business processes and IT capability, which directly impacts on the enterprise's agility and flexibility to change according to business needs, which consequently lead the enterprise to achieve and sustain business-IT alignment.

2.5 Enterprise business architecture

The construct of enterprise business architecture is used here in thesis to refer to business structures and processes within the context of enterprise architecture emphasizing on the business perspective in terms of business architecture, process, capabilities, governance structure, and business information. These business processes and structures determine what the enterprise must develop to achieve its business goals and satisfy its stakeholders and shareholders. It represents the components of business architecture and information and application architecture in Figure (2.1) [Aerts et al., 2004; Goikoetxea, 2007; Hugoson et al., 2008; TOGAF (8)]. It can be defined as a management framework that emphasizes the business perspective and architecture that identifies the practical issue in designing the business architecture and processes based on the organization's IS architecture. This management framework can be used to describe and organize and control an organization's structure, processes, applications, systems and techniques in an integrated way. Enterprise business architecture helps the organization to achieve alignment between business processes and IS capabilities that facilitates agility and flexibility in business processes in the organization.

2.6 Enterprise architecture framework

An enterprise architecture framework is a management tool for enterprise architecture – that defines how to organize the structure and the viewpoint models or frameworks that are associated with enterprise architecture [Zachman, 1987, Aerts et al., 2004; Goikoetxea, 2007]. An architecture framework is a tool which can be used for developing a broad range of different architectures. It should describe a method for designing an IS in terms of a set of building blocks, and for showing how the building blocks fit together.

This framework should contain a set of tools and provide a common vocabulary. It should also include a list of recommended standards and compliant products that can be used to implement the building blocks [TOGAF (8)]. Some of the well known architecture frameworks, which are used both in business and industry, are Zachman Framework, TOGAF, MODAF, DoDAF, and NIST and FEAF frameworks. These frameworks are useful to retain and provide organizations in different industries an overview of the different architecture components, and also are used to show the relationships between the different architecture components [TOGAF (8)].

2.7 Strategic Alignment Model (SAM)

In the previous sections, the concept of enterprise architecture and its basic components have been introduced and discussed. Achieving strategic alignment is a crucial issue in enterprise architecture. Nonetheless, there isn't any clear evidence to show how enterprise architecture achieves alignment/strategic alignment. This section presents the general model of business-IT strategic alignment developed by Henderson and Venkatraman (1991 & 1993) presented in Figure (2.2), where this model will be used as a management framework to achieve strategic alignment. In fact this section is discussed by the author of this thesis previously and the definitions and usage adopted in this master thesis are consistent with approach presented in previous report [Shamekh, 2008].
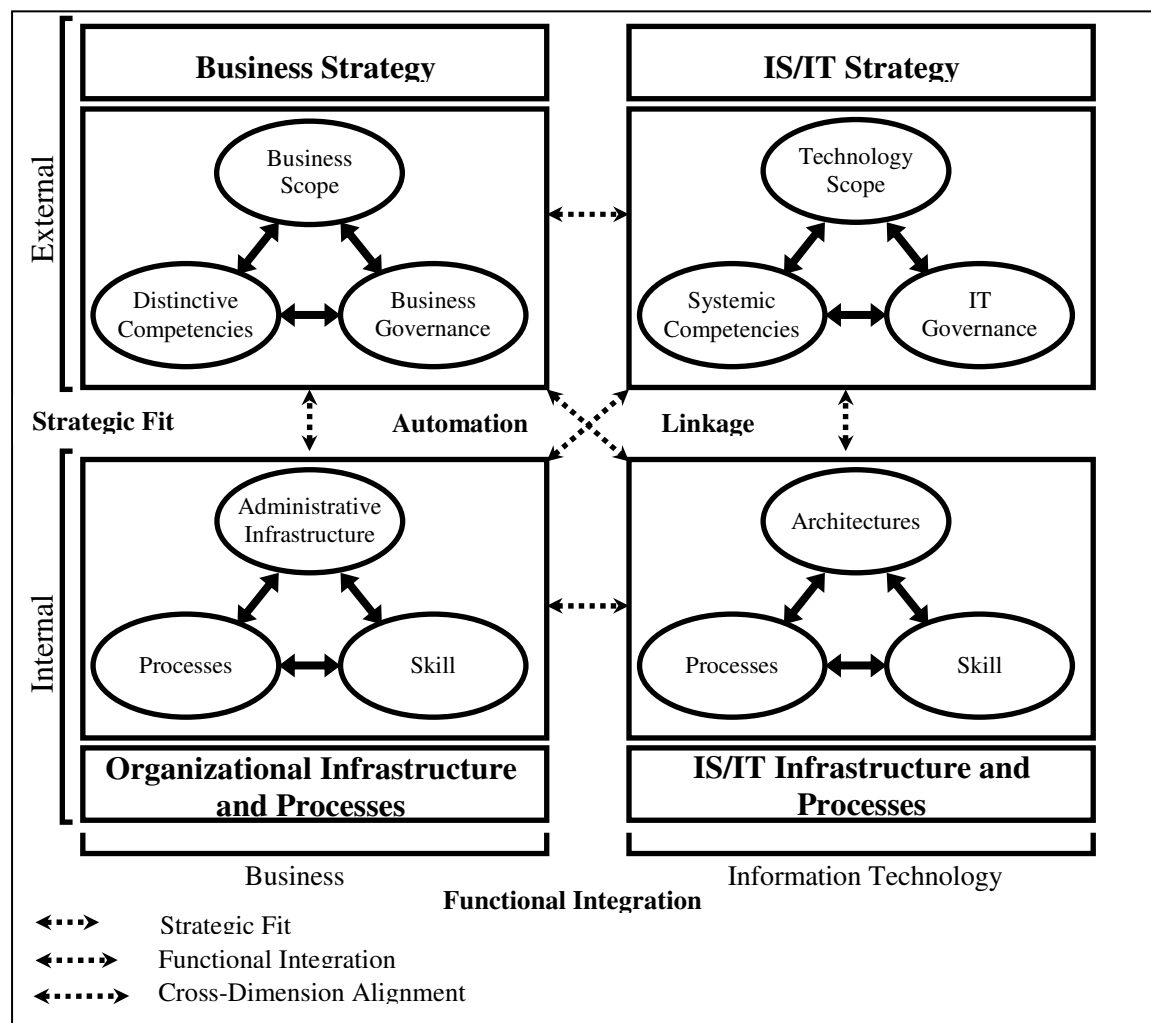

Figure (2.2) Strategic Alignment Model [Henderson and Venkatraman 1993]

The Strategic Alignment Model (SAM) can be defined as a business-IT management framework to enable successful implementation of business and IS/IT and their corresponding infrastructure components [Henderson and Venkatraman, 1991 & 1993; Luftman et al., 1993; Venkatraman et al., 1993]. It represents the dynamic alignment between the business strategic context and the IT strategic context. The SAM framework is based on the building blocks of strategic fit and functional integration. The strategic alignment model is defined in terms of four fundamental domains of strategic choices that consist of: business strategy, information technology strategy, organizational infrastructure and processes, and information technology infrastructure and processes. Each domain has its own underlying dimensions that consist of three components as presented in Figure (2.2) [Henderson and Venkatraman, 1991 & 1993]. The components of the strategic alignment model are twelve components that further define business-IT strategic alignment [Luftman et al., 1993; Luftman, 2000]. These components as outlined by Luftman (2000) are as follows:

- **Business strategy**:

    1. *Business scope*: *Includes the markets, products, services, groups of customers/clients, and locations where an enterprise competes as well as the competitors and potential competitors that affect the competitive business environment.*

    2. *Distinctive competencies*: *The critical success factors and core competencies that provide a firm with a potential competitive edge. This includes brand (type of product made by a particular firm), research, manufacturing and product development, cost and pricing structure, and sales and distribution channels.*

    3. *Business governance*: *How companies set the relationship between management, stockholders or shareholders, stakeholders, and the board of directors. Also included are how the company is affected by government regulations, and how the firm manages its relationships and alliances with strategic partners.*

- **Organizational infrastructure and processes**:

    1. *Administrative structure*: *The way the firm organizes its businesses. Examples include central, de-central, matrix, horizontal, vertical, geographic, federal, and functional.*

    2. *Processes*: *How the firm's business activities (the work performed by employees) operate or flow. Major issues include value added activities and process improvement.*

    3. *Skills*: *H/R considerations such as how to hire/fire, motivate, train/educate, and culture.*

- **IT strategy**:

    1. *Technology scope*: *The important information applications and technologies.*

    2. *Systemic competencies*: *Those capabilities (e.g. access to information that is important to the creation/achievement of a company's strategies) that distinguish the IT services.*

    3. *IT governance*: *How the authority for resources, risk, conflict resolution, and responsibility for IT is shared among business partners, IT management, and service providers. Project selection and prioritization issues are included here.*

- **IS/IT infrastructure and processes**:

  1. *Architecture*: *The technology priorities, policies and choices that allow applications, software, network, hardware and data management to be integrated into a cohesive platform.*

  2. *Processes*: *Those practices and activities carried out to develop and maintain applications.*

  3. *Skills*: *IT human-resource considerations such as how to hire/fire, motivate, train or educate and culture.*

The SAM framework can be used to assess the range of strategic choices facing managers and explores how they interrelate [Ward and Peppard, 2002]. The power of this model is presented in terms of two fundamental characteristics of strategic management: strategic fit (the interrelationships between external and internal components) and functional integration (integration between business and functional domains) [Henderson and Venkatraman, 1991 & 1993; Venkatraman et al., 1993; Luftman et al., 1993].

2.8 Strategic alignment

The concept of strategic alignment refers to the state of congruence that can be achieved when the power of business management (business strategy and organizational infrastructure and processes) and IS/IT capabilities (IS/IT strategy and IT infrastructure and processes) are combined together, which reflects the high state of synergism and harmonious relationship that leverage the IS/IT capabilities to achieve competitive advantages and gain business value [Shamekh, 2008; Henderson and Venkatraman, 1991 & 1993; Luftman et al., 1993; Venkatraman et al., 1993].

2.9 The concepts of business value and investment

Business and IS/IT investments and achieving business value represent very vital issues in business [Renkaerna and Berghoust, 1997] as IS/IT becomes an inseparable part of organizational practices and core business activities [Ward and Peppard, 2002; Ward and Daniel, 2006]. In short, this section identifies the concepts of investment, IS/IT investment and business value as they represent important parts and issues in business-IT management discipline.

2.9.1 The concept of investment

The concept of investment is a very well known and used business term with several closely-related ideas and meanings particularly in business management, economics and finance. It refers to the process of putting out assets such as amount of money or capital, effort, time etc. into a business project or a business organization such as a bank in order to give rise to the future cash receipts with the expectation to make a profit or get an advantage [Bierman and Smith, 1993; Levy and Samat, 1994; Tennent, 2008; Keat and Young, 2009]. Investment has been interpreted in business and economics literature in many different perspectives. In business management, investment refers to the purchase of the tangible assets such as building or equipment, and intangible assets such as patents in the hope to create business value or improving future business. In economics, it refers to the act of placing tangible goods such as a building or equipments into a project or business with the hope that the business will create a profit. In finance, it is the use of money or capital to create more money. It refers to the process of purchasing financial

assets or other items of value from the capital market in a business project with the intent of gaining profit [Levy and Samat, 1994; Tennent, 2008; Keat and Young, 2009].

2.9.2 IS/IT Investment

The IS/IT investment is not that different from the investment in business, economics or finance. IS/IT is a business asset or resource in the organization. The investment in IS/IT can be defined as the use of IS/IT resources to increase or improve the output or income of the productions or service of the organization. Capital investment in IS/IT becomes very important and represents essential financial investment for many business and industrial organizations in the modern world [Lin and Pervan, 2001]. Therefore, based upon the definitions of IS/IT presented previously, an investment in IS/IT refers to the acquisition of software and/or hardware of the computer systems and communications systems and networks, which is anticipated to increase or expand the possibilities of an organization's IS/IT resources to achieve strategic advantage, and generate long-term benefits that deliver business value to the organization [Apostolopoulos and Pramataris, 1997].

2.9.3 The concept of business value

The notion of "value" is a general term that has been defined and interpreted by different scholars and researchers in many different perspectives. It is an attribute which refers to the quality that shows something is valuable (of great importance) and highly desirable. The concept of value is an ambiguous concept that refers to a measure of tangible and/or intangible assets that evaluates the quality that renders something valuable or significance to someone, organization, or society. In general, it refers to the (great) importance, usefulness, or worth of something for someone or organization. It has been specified and presented in different perspectives such as in societies or organizations as social or cultural values, and in business such as economical and/or market values. The concept of value has been addressed in both IS and business and management literatures, and it may has both qualitative and quantitative perspectives [Cronk and Fitzgerald, 1999; Bannister and Remenyi, 1999; Frisk, 2007; Ward and Daniel, 2006].

Another perspective of the concept of value is that some researchers and scholars view the construct of value in IS/IT context as it refers to the acquisition of IS/IT to enhance the business performance of the organization. Nevertheless, Bannister and Remenyi (1999) view that there is a lack of discussion about the concept of value by itself in the evaluation of IS/IT investments in the IS literature. They argue that the concept has not been presented well nor defined properly. They believe it is often absent from the discussion completely or not considered as an important issue. This consequently escalates any IS/IT evaluation technique that uses it as a (foundation crumbles) base [Bannister and Remenyi, 1999].

Based upon literature, different authors and scholars present different views on the concept of value. For instance, Renkema and Bergout (1997) specify the concept of value as an output of the difference between financial and nonfinancial impacts of the IT investment. To be clearer, the authors argue that the financial impacts refer to the output results that are presented or expressed in financial terms. Nonfinancial impacts refer to the output results that are not expressed in financial terms. The term impact here in this discussion represents an event or consequence that arises due to launching of IS, initiating with the decision and to proceed with investment. The authors related the financial and nonfinancial impacts collectively to determine the business value of the IS implemented in the organization [Renkema and Berghout, 1997]. This view agrees with what has

been presented previously that the concept of value refers to acquisition of IS/IT to enhance the business performance of the firm [Bannister and Remenyi, 1999].

Furthermore going from a generic definition to the concept of value, and elaborate it and incorporate it with the IS, which creates the concept of IS business value. In this consideration, it has been argued that *"IS business value" is the sustainable value added to the business by IS, either collectively or by individual systems, considered from an organizational perspective, relative to the resource expenditure required*" [Cronk and Fitzgerald, 1999].

In IS discipline, the concept of value is an interchangeable term with the concept benefit. Nevertheless, some researchers view that the construct of value is larger and more important than the construct of benefit [Bannister and Remenyi, 1999]. Business value is the benefits for business units and the organization as a whole, represented in economical terms which is a result of IS solutions or services, as shown by the investment in technology that improves the quality of business performance and customer needs, and shareholders and stakeholders satisfaction [Ward and Daniel, 2006; Ward and Peppard, 2002].

Cronk and Fitzgerald (1999) addressed the concept of IT business value in many research papers [Cronk and Fitzgerald, 197a & 1997b & 1998] and examined it in depth. The authors argue that the concept of IT business value has not sufficiently identified. With this in mind, they tried to establish an IT business value construct by introducing the concept of dimensions of value. Within the context of IT business value, the authors suggest three basic dimensions to address the concept of value that include: system dependent, user dependent and business dependent, which they claim are uncorrelated. They further argue that these three dimensions may help in addressing the concept of business value, and are to be considered in evaluating the business value [Cronk and Fitzgerald, 1999; Bannister and Remenyi, 1999; Frisk, 2007].

In a conclusion point, the concept of value is an ambiguous concept that has not an adequate definition. This also applies to the IS/IT business value that has not been adequately defined in a clear way. Moreover, the lack of proper definition, recognition and understanding to the concept of IS business value could escalate the evaluation techniques of IS/IT investment that use the concept of IS business value as a base for evaluation [Bannister and Remenyi, 1999, Cronk and Fitzgerald, 1999].

Summary

This chapter introduced the basic concepts and theoretical background of enterprise business architecture and its related components that include IS and IT, the strategic alignment model, and the concepts of enterprise business architecture and strategic alignment. It introduced the constructs of IS/IT investment and business value. It can be noticed that the term architecture has been recognized as a very important concept in the IS discipline as it facilities the logic organization and structure of the IS in business to organize and integrate the business processes with the IT capabilities to create synergy and achieve strategic alignment.

3. RESEARCH FRAMEWORK

The previous chapter presented the basic concepts and theoretical background of enterprise architecture, enterprise business architecture. It introduced the enterprise architecture frameworks, the concept of strategic alignment and strategic alignment model, and IS/IT investment and business value. The discussion will now be narrowed down to a more specific research model as a framework entails the link between the components of the enterprise business architecture to achieve a strategic alignment. This research framework represents the theoretical basis to identify the impacts of achieving strategic alignment on the organizational performance – and to answer the research question of: *Why is strategic alignment critical for leveraging organizational performance*? – It identifies the different components of the proposed research framework that constitute the business architecture and application and information architecture.

The main focus of this research project is on enterprise business architecture that includes business architecture and application and information architecture components of the enterprise architecture components of Figure (2.1). Business architecture in the enterprise architecture entails the link between business strategy and the other major architectures that include IS/IT application and information architecture. A practical approach to achieve a strategic alignment is to use the SAM framework presented in Figure (2.2) with the focus on the internal components that are represented in organizational infrastructure and processes, and IS/IT infrastructure and processes [Henderson and Venkatraman, 1991 & 1993; Luftman et al., 1993; Venkatraman et al., 1993].
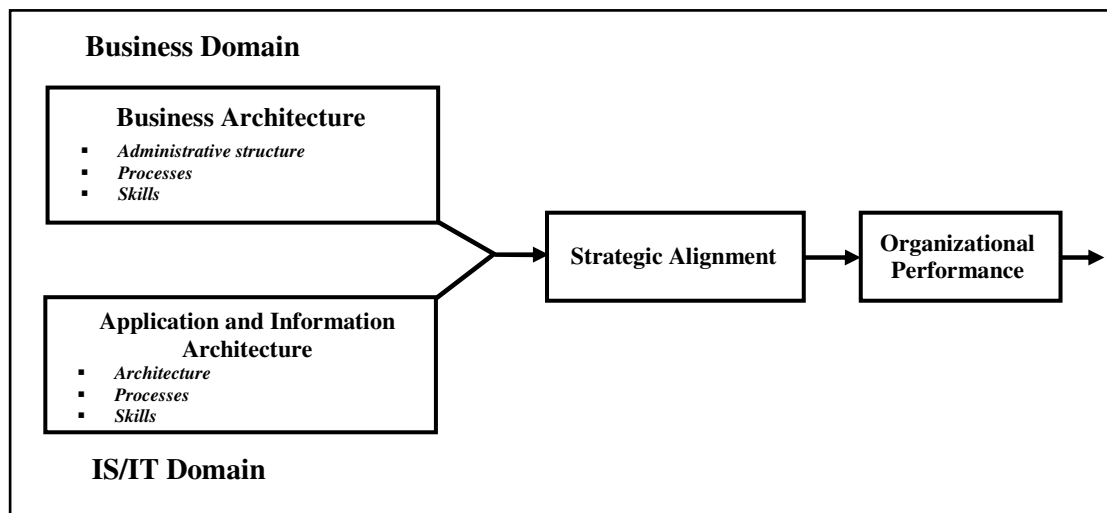
Figure (3.1) The research framework

The proposed research framework in this thesis is presented in Figure (3.1), which is a framework that includes the business architecture components of Figure (2.1) that will be represented by the components of organizational infrastructure and processes of Figure (2.2), and the application and information architecture components in Figure (2.1) that will be represented by IS/IT infrastructure and processes of Figure (2.2). With this proposed research framework in Figure (3.1), I will try to explore the interrelationship between business architecture and application and information architecture. The proposed framework identifies the relationship between *Business Architecture* (that includes the components of administrative structure, processes, and skills) and the *Appli-*

cations and Information Architecture (that include IT architecture, processes, and skills). The strategic alignment in this model applies the same meaning in the definition of strategic alignment presented in previous chapter to create strategic harmony that can translate the deployment of IS/IT into an actual increase in business performance as an output result of achieving strategic alignment.

3.1 Business Architecture:

1. *Administrative structure*: This entails the way the firm or enterprise organizes its businesses, which may include central, de-central, matrix, horizontal, vertical, geographic, federal, and functional, etc.

2. *Processes*: Refer to business process of how the organization's business activities and processes (the work performed by management and employees) operate or flow. Major issues include value added activities and process improvement.

3. *Skills*: Entail the attributes that impact the business processes and performance. This item may include human-resource considerations such as how to hire/fire, train/educate motivate, and culture, which will improve the business performance.

3.2 Applications and Information Architecture:

1. *Architecture*: This entails the technology priorities, policies and choices that allow applications, software, network, hardware and data management to be integrated into a cohesive platform.

2. *Processes*: Refer to IS/IT processes and practices that facilitate activities carried out to develop and maintain applications to demonstrate efficient business performance

3. *Skills*: Entail the attributes that impact business processes and performance. This item may include IS/IT human-resource considerations such as how to hire/fire, motivate, train or educate and culture.

3.3 Strategic alignment

Strategic alignment refers to the state of congruence between business strategy and IS/IT strategy in the firm to support the overall business purpose that influences the firm's business performance [Shamekh, 2008]. It is an approach to bridge the alignment gap between the business strategy domain and IS/IT strategy domain to leverage the business value of IS/IT and create business value [Shamekh, 2008; Henderson and Venkatraman, 1991 & 1993; Luftman et al., 19993; Venkatraman et al., 1993].

3.4 Organizational performance

Based on literature, the impact of strategic alignment between business strategy and IS/IT strategy should have a constructive impact on the business performance of the firm. This performance is defined as the measures of growth in productivity and profitability of the firm through its business endeavors and deployment of organizational and technological resources [Croteau and Raymond, 2004; Croteau et al., 2001; Croteau and Bergeron, 1999; Chan et al., 1997; Smith and McKeen, 1993; Venkatraman, 1989]. It has been argued that increasing operational effectiveness of IS/IT in business through the right use of IS/IT as a service and business-driven exploitation will impact the busi-

ness performance of the firm, and create business value [Henderson and Venkatraman, 1991 & 1993; Venkatraman et al. 1993]. Business performance represents the ultimate dependent variable [Kefi and Kalika, 2005] of the research framework presented in Figure (3.1).

Organizational or business performance is a very important task in strategic management and it can be enhanced significantly by achieving strategic alignment. It has been identified and discussed by different scholars and researchers both in business and IS disciplines that showed its strong connection with the business-IT strategic alignment that creates business value or business benefits to the organization [Croteau and Raymond, 2004; Croteau et al., 2001; Croteau and Bergeron, 1999; Chan et al., 1997; Reich and Benbasat, 1996 & 2000; Sabherwal and Chan, 2001; Venkatraman, 1989; Henderson and Venkatraman, 1991 & 1993; Smith and McKeen, 1993]. In this thesis assignment, I will try to address the process of achieving strategic alignment according to Henderson and Venkatraman's (1993) approach as presented on SAM paradigm and analyze its impact on organizational performance using two cases studies presented in chapter 6.

Summary

This chapter introduced the research framework that has been developed from the theories presented in chapter 2 to be used with empirical data to identify the impacts of achieving strategic alignment on the organizational performance. The different components of the proposed research framework have been described. An emphasis on the business performance of the organization has been addressed in this chapter as a very important issue in business. It is introduced as an output result of achieving strategic alignment, which will be addressed practically in the empirical study in chapter 6.

4. RESEARCH APPROACH

This chapter presents how the work in this thesis project in Information Systems was carried out. It presents the research process and practical approach that are used in developing this thesis. These include the research approach, research design, and the systematic approach of literature review, data collection techniques, and the empirical study.

4.1 Research Approach

Business and academic scholars and researchers categorize research methods into two paradigms that are represented in the quantitative and qualitative research methods which are the research tools of the researcher's trade [Collis and Hussey, 2009; Berg, 2009]. These two research approaches are used to collect the needed data to answer a stated research question [Ghauri and Gronhaug, 2005]. "*Quantitative research refers to counts and measures of things*" [Berg, 2009], which is an empirical research that identifies relationships using statistical processes and numeric data. It is usually pertained the process of gathering and analyzing measurable data to establish quantitative relationships among variables [Punch, 2005; Creswell, 2009]. "*Qualitative research is an approach to address researcher's question(s) and design a study that involves collecting qualitative data and analyze them using interpretative methods. It refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things*" [Berg, 2009]. Qualitative research refers to an in-depth research process that seeks insights through loosely structured data to provide detailed in-depth results and data. It is an empirical research that derives data from observation, interviews, or verbal interaction to gain insight into the underlying research issues surrounding a research problem. Qualitative research is an approach that investigates relationships using textual rather than statistical or numerical data [Collis and Hussey, 2009; Berg, 2009; Hyde, 2000; Punch, 2005; and Creswell, 2009].

The two general research approaches to reasoning that may lead to the acquisition of new knowledge as presented by Hyde (2000) are represented in inductive and deductive research approaches which are most often associated with the qualitative and quantitative research methods [Collis and Hussey, 2009; and Hyde, 2000].

- *Inductive research approach* is a study in which the theory is developed from observation of empirical reality. It is a theory building process that starts by making observations of specific instances which usually seeks to develop a new hypothesis or establish generalizations about a phenomenon under investigation. Inductive research is referred to as moving from the specific to the general [Collis and Hussey, 2009; and Hyde, 2000].

- *Deductive research approach* (sometimes labeled 'conventional' empirical research) refers to a study in which a conceptual and theoretical structure is developed and then tested by empirical observation. It is a theory testing process which commences with an established theory or generalization using facts, definitions, and accepted properties. This approach seeks to see if the theory applies to specific instances, usually by trying to provide evidence for or against a pre-specified hypothesis to that specific instance. Deductive research is referred to as moving from the general to the particular [Collis, and Hussey, 2009; and Hyde, 2000].

The research approach followed in this thesis assignment is a deductive research approach, where the literature of the IS discipline and related disciplines to an adequate coverage possible was read. Based on this, the theoretical framework of the thesis was synthesized. From this, a conceptual structure was developed which was then verified by the empirical observations.

4.2 Research Design

Initially, scholar or researcher in business or academia has to determine the type of research he/she intends to use in the research study. These may include exploratory, confirmatory, descriptive, or explanatory to be conducted in his/her research study. Exploratory research refers to the research process that researcher seeks to learn more about a topic or a problem, which is usually undertaken to collect data for designing a descriptive or explanatory investigation. Confirmatory research refers to the research process when a researcher seeks to support (confirm) a pre-specified assumption or theory. Explanatory research refers to the research type that is used mainly to explain or make clear understanding about a certain phenomenon, or why a relationship exists for instance. Descriptive research refers to the research type that investigates and provides a precise description about a certain issue or phenomenon such as a business performance or market share and competitive activities for a business firm [Collis and Hussey, 2009; Ghauri and Gronhaug, 2005].

The research design of this thesis assignment is commenced with an exploratory research process followed up with a deductive research process in enterprise architecture and strategic alignment with the purpose to broaden and deepen my knowledge and understanding of the concepts of enterprise architecture and strategic alignment, and practically to identify the impact of achieving the strategic alignment on the organizational performance as an output result of the efficient implementation of the IS/IT resources through using the enterprise architecture frameworks.

4.3 Method and Data Collection

Data collections in qualitative research approach can be managed through observations, interviews, and documents analysis. The Interview method is one of the main data collection tools in qualitative research approach, which is a good way of accessing people's perceptions, meanings, definitions of situations and constructions of reality [Punch, 2005]. Triangulation of data collections refers to the use of multiple sources of data and the use of more than two methods in a research study to obtain a wide range of perspectives about one case or phenomenon through different methods [Collis and Hussey, 2009]. Each research method reveals slightly different facets of the same symbolic reality, and every method is a different line of sight directed toward the same point, observing social and symbolic reality. By combing several lines of sight, researchers obtain a better, more substantive picture of reality; richer, more complete array of symbols and theoretical concepts; and a means of verifying many of these elements. The use of multiple lines of sight is frequently called triangulation [Berg, 2009]. Through the triangulation ethnographers can improve the accuracy of judgments and thereby results by collecting data through different methods or even collecting different kinds of data on the subject matter of their study [Berg, 2009; Ghauri and Gronhaug, 2005].

The data collection in this master thesis has been initiated with a thorough study of the companies presented in this study from the websites of the CSC and Volvo Group AB and their venders and business partners. After that three questionnaires were sent by e-

mails to business and IT managers in these two companies. Semi-structured interviews have been conducted both by phone and in personal meetings. Clarifications and confirmations were attained by several contacts through phones and e-mails. The time that I had for the interviews and phone contacts for clarifications and conformations last about 4 hours in total.

4.4 Literature Review

An extensive literature study concerning the enterprise architecture, strategic alignment, and organizational performance had been carried out before writing this master thesis. In fact, in this thesis project, I surveyed many different journal articles, conference papers, and reference books to address the basic theory and concepts of enterprise architecture, strategic alignment and organizational performance. This approach helped me to identify the relationship between the enterprise architecture frameworks to the process of achieving strategic alignment, which consequently leads to the organizational performance. This way has helped me to deepen and elaborate my knowledge, and enhance my learning process and writing skills in developing this master thesis.

The empirical work in this thesis was preceded by a survey study in literature review about enterprise architecture and business-IT strategic alignment to get a general view of the subject and insight, and account of what has been published on this subject by accredited scholars and researchers. This helped me to clarify the relation of this topic and research aims to significant literature (and recent) research in enterprise architecture and strategic alignment between business strategy and IS/IT strategy, and I have to make a qualitative judgments concerning the literature in enterprise architecture, strategic alignment, and organizational performance.

A literature review has been initiated with a reiteration of the purpose of the research study. This was followed by a preview of what is to come in the literature review. It laid out the overall organization of specific topics in enterprise architecture and strategic alignment that I covered in this research project.

The purpose of the literature review in this research assignment was to gather an overview of the research area of enterprise architecture and strategic alignment in general. Moreover its aim was concisely to demonstrate my level of understanding to the concept and theory of the enterprise architecture and the philosophy of the strategic alignment between business strategy and IS/IT strategy related to my research project. I could not discuss all of the literature in-depth. Rather I grouped my literature review according to some general topics in my research area and I discussed specific studies in the three main topics that include: enterprise architecture, business-IT strategic alignment, and organizational performance conducted by accredited scholars and researchers. I included some in-depth reviews with mini-review of studies to the work presented by Weill and Broadbent (1998), Zachman (1987), Sowa and Zachman (1992), Henderson and Venkatraman (1991 & 1993), Venkatraman, et al. (1993), Luftman, et al. (1993), and Ward and Peppard (1999 & 2002), and Galliers and Leidner (2009).

In terms of a literature review in this study, the 'literature' means the works I referred and consulted in order to understand and investigate my research problem. As the theoretical study in this thesis is based on an intensive literature study, literature review represents a systematic review of what has been published on the enterprise architecture and strategic alignment by accredited scholars and researchers. Literature review represented a vital part in my work to create and develop the body of knowledge of this

thesis project. The systematic approach that has been used in this master thesis for the literature review in enterprise architecture and strategic alignment to create and develop the body of knowledge of the thesis is a proposed framework follows the systematic data processing that included three major stages: [***Input***] – [***Processing***] – [***Output***] [Levy and Ellis, 2006]. The ***input*** stage includes literature gathering and screening ways to find applicable literature, qualifying the literature, ways to read research literature, and how to know that one is done with the literature search. The ***processing*** stage includes sequential steps of activities that consist of sequential steps to collect, know, comprehend, apply, analyze, synthesize, and evaluate quality literature in order to provide a firm foundation to a topic and research method [Levy and Ellis, 2006; Krathwohl, 2002; Leach, 2007]. These sequential steps are known as Bloom's Taxonomy which is a classification of thinking that identifies six types of knowledge organized by the level of complexity: knowledge, comprehension, application, analysis, synthesis, and evaluation. This taxonomy was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago in the USA [Krathwohl, 2002; Leach, 2007]. Finally, the ***output*** (writing the literature review) should demonstrate that the proposed research contributes something new to overall body of knowledge [Levy and Ellis, 2006].

Basically I managed to follow this approach and wrote a reasonable and valuable literature review about enterprise architecture, enterprise business architecture, enterprise architecture frameworks, strategic alignment, and the concepts of business value and investment. This helped me to demonstrate my awareness of significant similar or relevant research in enterprise business architecture and strategic alignment where I noticed the different ways that had been followed by different scholars. The literature review is an expanding process that subjects to changes and improvements during the research work and will continue to expand and update as the research progresses where I could locate new publications in the literature review of this master thesis based on the progress and work needs to elaborate and enhance my presentation to the body of knowledge of the research topic during the work process [Levy and Ellis, 2006; Punch, 2005; Crewell, 2009]. Although literature review is a very high professional academic research process, it is not an easy work to be done within this short time for this master thesis. Nevertheless, it was a very good experience as a learning process and knowledge development to broaden and deepen my knowledge in enterprise architecture and strategic alignment.

Library Catalogue and Databases: I used Chalmers University Library and Gothenburg University Library catalogues to find books on performing the literature review. The databases used in this thesis were Science Direct, Engineering Village and Emerald Library, Harvard Business Review, MIT Sloan Management Review, Wiley Interscience, Academic, and many other sources are available at the e-journals through the electronic resources of Chalmers University Library [http://www.lib.chalmers.se/]. I used JSTOR and Business Source Premier Database of Gothenburg University Library [http://www.ub.gu.se]. These helped me to locate earlier journal articles, conference papers, and proceedings using the keyword terms, title, or author/s of the research topic of my thesis project, as I may find a good quality literature review which I can then update.

Books, and articles and papers: Due to the fact that I have a great interest to study and learn in general, and my eagerness to develop a very good work in this thesis in particular, I surveyed tremendous amounts of literature in business management and IS management to develop this master thesis. These included books, journal articles, conference papers, as well as online encyclopedias, and some of the web sites of the business

and industrial firms. The books represent one of the good sources of information in this work; however, they don't give updated and specific information. The more specific and up-to-date information were mainly determined from journal articles and conference papers. These articles and conference papers usually provide a preliminary review of the literature, as well as a clear explanation of the purpose of the research, how authors went about it and their reporting process, together with summary of the results and conclusions. One of the great advantages of using journal articles and conference papers, they provide updated information and a more contemporary data source than the book, as journal and conference are usually published several times a year. However, they may not provide the most up-to-date view due to the lengthy referring process adopted by many journals [Collis and Hussey, 2009].

4.5   Empirical study

Empirical-based study is a central term in scientific research in general and in business and IS/IT management in particular, where theory needs to be backed up with solid empirical evidence. It is based on experience or observation rather than reasoning. The empirical research is a class of research in which empirical evidence, observation, or data are collected from real-world observations in order to answer a particular research question or to test or verify a hypothesis (about certain phenomenon). It involves the scientific use of quantitative empirical data and/or qualitative empirical data that offer deep analysis to understand and interpret the output result of the research [Punch, 2005; Ghauri and Gronhaug, 2005; Yin, 2009].

As I mentioned previously, a qualitative research approach is used as a research method in this thesis project. The most common qualitative methods are case study and action research. Case study refers to a research strategy which focuses on the in-depth, holistic and in-context study of one or more cases; which typically use multiple sources of data. It is often associated with a descriptive or an exploratory research. Action research refers to a research strategy that uses empirical procedures, in iterative cycles of action and research, to solve a practical problem [Punch, 2005; Ghauri and Gronhaug, 2005; Yin, 2009].

The qualitative empirical study used in this master thesis consists of two case studies. It concentrated on the enterprise business architecture as an approach to achieve strategic alignment between business strategy and IS/IT strategy disciplines in two different industries. The study investigated the two case studies to determine the validity and reliability of the research framework in this master thesis assignment. In these two case studies, observation carried out in real world settings that included two big international and modern organizations in two different industries. This approach helped me to get in real situations and gain a holistic understanding of the business management, IS/IT management, and business-IT activities in two different firms in their natural settings. Moreover, that offered me the opportunity to gain an in-depth understanding of how business-IT strategic alignment has been achieved, and how the strategic alignment does impact the organizational performance in the firms under study.

The first step in collecting empirical data for this thesis assignment was to find the suitable firms that could provide me with the required information that fit my research framework of discussion. One of the most important issues that I had to find was that the targeted firms for the empirical study use IS/IT to run their business or the IS/IT has an important role in business. As a matter of fact I had a hard difficulty to find cooperative firms to help me develop my study more efficiently as I had planned. Nevertheless,

the two firms presented in this research project are very big and modern organizations and use IS/IT very extensively, where IS/IT systems embedded in the organizations and these systems are inseparable parts of their businesses.

Therefore the primary source of information of the empirical study in this thesis was the explorative two case studies based on qualitative analysis about enterprise business architecture, achieving strategic alignment, and to identify the impact of achieving strategic alignment on the organizational performance. The project used a qualitative methodology. The two companies that have been used in the empirical study in this thesis are:

- **Volvo Group AB**

The Volvo Group AB is a Swedish diversified company deals with the manufacture, development and a supplier of commercial vehicles such as trucks, buses, and construction equipment, drive systems for marine and industrial applications, aerospace and financial services. It is a publically-held company headquartered in Gothenburg city in Sweden, and services worldwide in more 180 countries in different part of the world. The company has been found for more than 80 years ago, where it was initially incorporated in the year 1915 as a subsidiary of the SKF (Svenska Kullagerfabriken AB) AB, the Swedish Bearing company founded in 1907 [SKF – Homepage]. In the 14th of April 1927, the auto manufacturer was officially founded and the first car rolled out of the factory in Gothenburg [Volvo Group - Homepage].

Volvo shares are listed on the stock exchanges in NASDAQ OMX Stockholm (STO: VOLVA) (STO: VOLVB). The customers of Volvo Group Worldwide are active in more than 180 countries. It has production facilities in 25 countries and sells their products in more than 180 markets, mainly in Europe, Asia, and North America. Volvo Group sales of products and services are conducted through wholly owned and independent dealers. The global service network handles customer demands for spare parts and other services. The work force of Volvo Group during the year 2008 amounted to around 100,000 employees. The majority of employees are based in Sweden, France, Japan, US, China, Brazil and South Korea [Volvo Group Homepage & Volvo Group – Annual Report - 2009].

- **Computer Science Corporation (CSC)**

The Computer Science Corporation (CSC) is a leading global IT and business service firm was founded in April 16, 1959 in Nevada, USA. CSC is headquartered in Falls Church, Virginia, USA. It is specialized in the IT and business service and offers an array of services to clients in the business and industrial and government markets. CSC deals with delivering business results to clients worldwide and helps customers achieve business value. CSC's mission is to provide customers in industry and government with solutions crafted to meet their specific challenges and enable them to profit from the advanced use of technology. The core capabilities of the CSC are in the areas of IT outsourcing, systems integration, and management consulting. Strategic alliance and IT outsourcing are among the important business features of this firm [CSC Homepage].

CSC is $16.7 billion total revenue with more than 94,000 employees in offices worldwide and 50 years of experience delivering technology-driven solutions to commercial and public sector clients in 90 countries worldwide. The stock information of the CSC is presented as: Common Stock Symbol: CSC and the stock is listed and traded on the New York Stock Exchange (NYSE). Shares Outstanding of the CSC were 154,240,124 shares as of May 3, 2010 [CSC Homepage & CSC – Annual Report – 2010].

Summary

The aim of this chapter is to present how the work in this thesis has been developed and organized. This chapter has sought to show the readers the research approach that has been followed. It presented how I used a systematic process in developing this master thesis by using the existing theory of research process and methods. The next chapter presents the empirical data and research findings of the two case studies presented in this research project.

5. ANALYSIS OF ENTERPRISE ARCHITECTURE FRAMEWORKS

Chapter 2 presents the theoretical background and basic concepts of enterprise architecture, which includes the basic concept of enterprise architecture framework. This chapter addresses some of the well-known enterprise architecture frameworks and it highlights the main characteristics and organizations of these frameworks. It analyzes and identifies how these frameworks address the concepts of alignment and business value.

5.1 The Zachman Framework

The Zachman Framework is an approach presents a set of models and concepts presented in a matrix structure of architecture views and perspectives and products to identify IS architecture and its contexts [Zachman, 1987; Sowa and Zachman, 1992]. It was first introduced in 1987 for IS architecture (ISA) that has been widely adapted by systems analysts and database designers as an approach to manage enterprise ISA. The Zachman Framework provides much of the foundations for enterprise architecture frameworks [CIO Council, 1999 & 2001; TOGAF (8)]. This framework offers a systematic taxonomy of concepts for relating the components that describe and represent the real world system and its implementation. Zachman Framework was expanded in 1992 as an extension to the first version that the extended version included new features that lead to different perspectives on an ISA [Zachman, 1987; Sowa and Zachman, 1992].

The Zachman Framework is a two-dimensional organization and classification tool for architecture related documentation as illustrated in Figure (5.1). It is a classification structure often used in IT departments by the teams responsible for developing and documenting enterprise architecture. The framework is considered as a resource to define enterprise wide architectures for IS management systems. It is used for organizing architectural "artifacts" in a way that takes into account both who the artifact targets (for instance, business owner and builder) and what particular issue (for instance, data and functionality) is being addressed. These artifacts may include design documents, specifications, and models [Sowa and Zachman, 1992; TOGAF (8)].
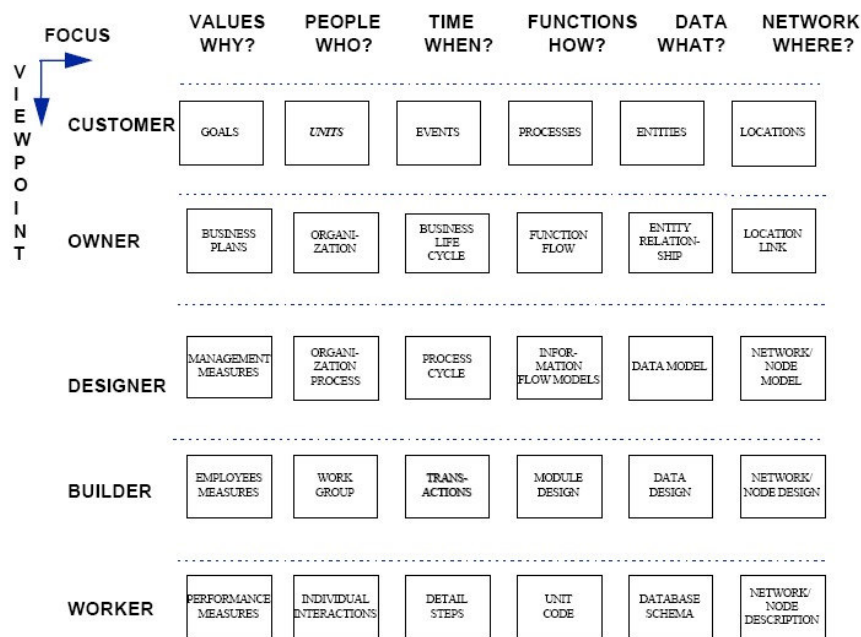

Figure (5.1) Zachman Architecture Framework [Sowa and Zachman, 1992]

The Zachman Framework is defined using two dimensions: perceptions and abstractions. The perceptions are linked to parties (roles) that have a function in the realization of IT systems. The abstractions are in fact questions that are referenced to the perceptions listed earlier (what, how, where, when and why) as depicted in Figure (5.1).

5.2 TOGAF

The Open Group Architecture Framework (TOGAF) is an industry standard architecture framework – a framework for enterprise architecture, which entails a set of method and supporting tools for a broad range of different IT architectures. It provides a comprehensive approach to the design, planning, implementation, evaluation, enterprise management and governance of enterprise information architecture [TOGAF (8)]. The first version of TOGAF was presented in 1995, which was based on the Technical Architecture Framework for Information Management (TAFIM), developed by the US Department of Defense (DoD). The Open Group obtained explicit permission and support from the DoD to use TAFIM as a reference and create TOGAF, which was an output result of many years of work and development effort, and enormous financial support (many millions of dollars) from US Government investment towards the development of TOGAF. TOGAF has been developed and continuously evolved since 1995. The first version of TOGAF Version 1.0 was presented in 1995. TOGAF version 8.0 titled "Enterprise Edition" was presented on 2002 and TOGAF version 8.1 was first published in 2003, and latest version of TOGAF 8 is version 8.1.1. The current version of TOGAF is version 9.0 "TOGAF Version 9.0". TOGAF, presented in Figure (5.2), considers an architecture framework as a resource for developing a broad scale of different architectures [TOGAF (8)].
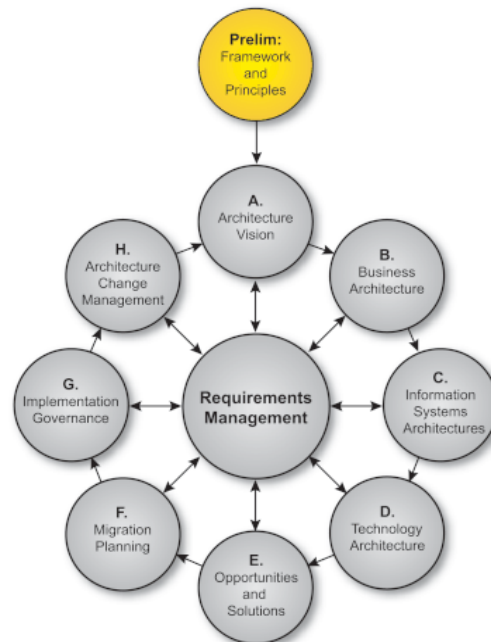
Figure (5.2) Preliminary Phase Framework and Principles [TOGAF (8)]

Enterprise architecture is basically classified to four levels or domains that include business architecture, applications architecture, data architecture, and technology architecture as described in chapter 2. The concept of TOGAF was originally designed as an approach to develop the technology architecture for organization, which has evolved into a methodology for analyzing the overall business architecture. It provides a com-

mon-sense and effective method of developing an enterprise architecture. TOGAF consists of three main parts:

1. The TOGAF Architecture Development Method (ADM), which shows how to drive an organization-specific enterprise architecture that deals with business requirements. It is an iterative sequence to develop an enterprise-wide architecture. It defines business needs and develops architecture that meets those business needs, utilizing the elements of TOGAF and other architectural assets available to the organization [TOGAF (8)].

2. The Enterprise Continuum, which is a "virtual repository" of architecture assets that include models, patterns, architecture descriptions, deliverables, industrial assets, etc., which facilitate the development of the architecture [TOGAF (8)].

3. The TOGAF Resource Base: refers to a set of resources cover a broad range of topics used to develop an architecture – which include guidelines, processes, templates, checklists, essential information, etc. – to assist the architect in the use of the ADM and to be used as a reference during application of ADM [TOGAF (8)].

The TOGAF is thus an enterprise architecture framework – that is considered as a general-domain framework of integrated set of components that can be adapted and applied in all types of business industries. It enables architects to properly plan, design, implement and evaluate, and build the right architecture for their organization. TOGAF attempts to provide organizations with a practical and industry standard method to create synergy by incorporating strategic business processes, IS/IT assets and capabilities, and IT infrastructures of the enterprise - leveraging all assets in the business processes across the enterprise [TOGAF (8)].

5.3   FEAF

The Federal Enterprise Architecture Framework (FEAF) is a conceptual framework that starts with defining a documented and coordinated structure for cross-cutting business and design developments in government. FEAF is defined as "*an organizing mechanism for managing development, maintenance, and facilitated decision making of a Federal EA. The framework provides a structure for organizing federal resources and for describing and managing federal EA activities*" [CIO Council, 2001]. It was issued in September 1999 by the Federal CIO Council for developing enterprise architecture within any federal agency or for a system that transcends multiple inter-agency boundaries. It was launched in 2002 as an initiative of the United Office of Management and Budget (OMB) [CIO Council, 1999 & 2001].

FEAF consists of essential architectural components that are represented in business, data, application and technology architecture as presented in Figure (5.3). It can be noticed that the FEAF's foundation is basically built on Zachman Framework, where it consists of the three columns of Zachman framework. FEAF builds on common business practices and designs that across organizational boundaries. It provides guidance for describing, developing, maintaining, and facilitating architectures for multi-organizational functional segments of the federal government. These federal architectural segments collectively form the concept of FEAF. It provides a structure to guide, develop, maintain, and implement top-level operating environments and support implementation of IS/IT systems to facilitate business processes, and transitional processes for implementing new technologies in response to the business needs [CIO Council, 1999 & 2001].
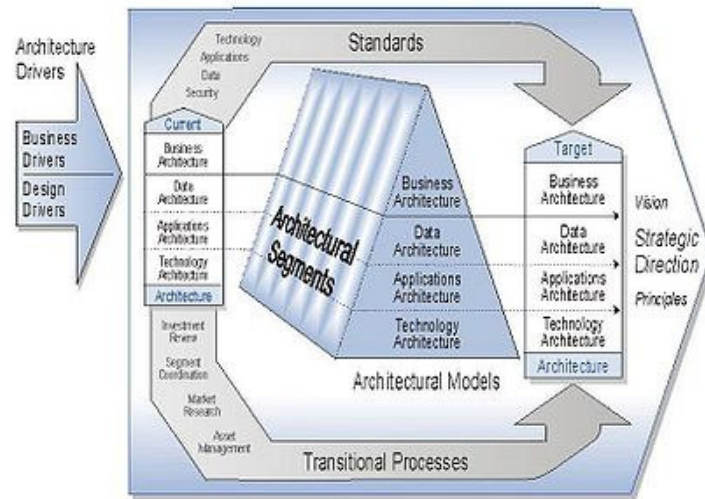
Figure (5.3) Structure of the FEA components [CIO Council, 2001]

5.4   NIST Enterprise Architecture Model

The National Institute of Standards and Technology (NIST) model is a reference model for enterprise architecture developed by the U.S. National Institute of Standards and Technology (NIST) in 1989. In the 1990s the U.S. federal government accepted and promoted the NIST model within the federal government as an enterprise architecture management tool that depicts and explains the interrelationship of enterprise business, information, and technology environments [CIO Council, 1999 & 2001]. The NIST en-terprise architecture framework is presented Figure (5.4).

Figure (5.4) NIST Architecture Framework [CIO Council, 1999]

The NIST enterprise architecture framework is a five-layered model that allows for or-ganizing, planning, and building an integrated set of information and information tech-nology architectures [CIO Council, 1999]. The five layers are organized and defined

separately but are interrelated and linked closely. These layers are represented in: ***Business Architecture*** drives information architecture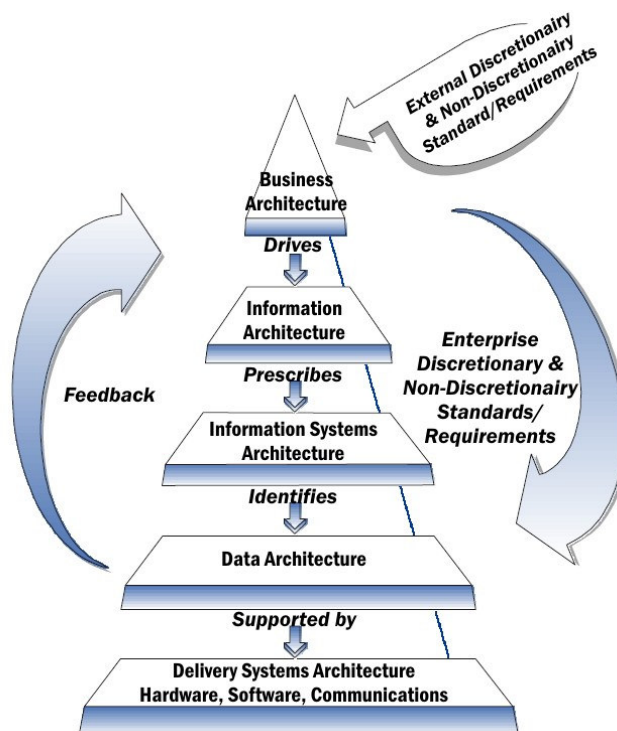; ***Information Architecture*** prescribes information systems architecture; ***Information Systems Architecture*** identifies data architecture; ***Data Architecture***, which is supported by delivery systems architecture, pertains the data that supports information systems structure; and ***Delivery Systems Architecture*** (***Hardware, Software, Communication***s) describes IS/IT required to support the data and information systems architectures and meet requirements of higher levels [[CIO Council, 1999; Fong and Goldfine, 1989]. The NIST enterprise architecture framework has been used as a basis for developing of other U.S. enterprise architecture frameworks such as the FEAF presented in the previous section [CIO Council, 1999].

5.5 DoDAF

The US Department of Defense (DoD) is among the organizations that considered the development and implementation of enterprise architecture extensively in the DoD business. The Department of Defense Architecture Framework (DoDAF) is a conceptual model developed by the US Department of Defense (DoD) as a guide for the development, usage, and management of architectures to effectively employ sophisticated systems and technologies. DoDAF is "*a set of abstractions, models to simplify and communicate complex structures, processes, rules, and constraints to improve understanding, implementing, forecasting, and resourcing*" [DoDAF (2009)].
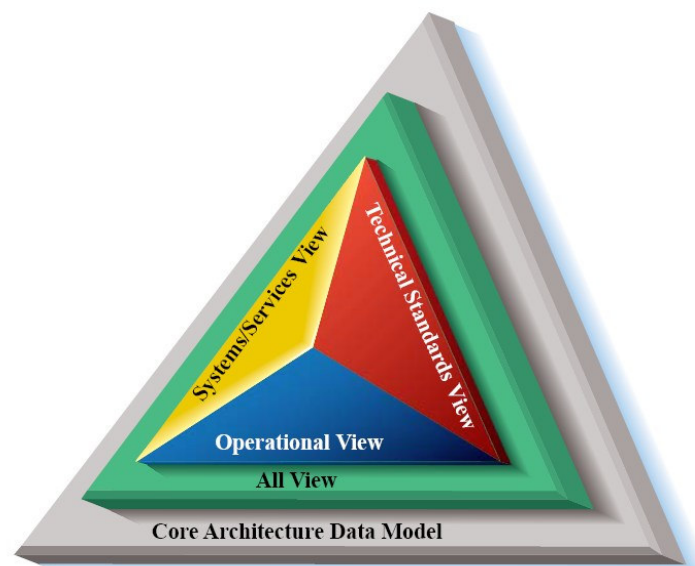
Figure (5.5) DoDAF [DoDAF (2007-I)]

DoDAF provides the guidance and rules for developing, representing, and understanding architectures based on common denominator cross DoD, Joint, and multinational boundaries [DoDAF (2007-I)]. It provides a set of architecture products (models) that are organized into four views, which include overarching view all view, operational view, systems view, and the technical standards view as illustrated in Figure (5.5). The operational view describes the business aspects of the organization, the systems view prescribes the supporting systems, and the technical standard view prescribes technical standards and conventions [DoDAF (2007-I)]. The DoDAF (2007) consists of three versions that include DoDAF Volume I [DoDAF (2007-I)], Volume II [DoDAF (2007-II)], and Volume III [DoDAf (2007-III)]. The latest version of DoDAF is version 2.0 [DoDAF 2009].

5.6 MODAF

The UK Ministry of Defense Architecture Framework (MODAF) is an architecture framework facilitates the creation of enterprise architecture to support defense planning, business processes and change management activities for the Ministry of Defense (MOD). MODAF builds upon the US DoDAF to provide a framework specifically designed for MOD business practices. It has been designed to keep compatibility with the core DoDAF viewpoints in order to facilitate exchange of architectural information with the US, for instance, in cases of conducting international interoperability analyses. The main purpose of MODAF is to assist and enable the successful delivery of Network Enabled Capabilities (NEC) and assists in managing complexities in business process in the MOD. "*NEC is a key component of efforts to meet changing requirements. NEC enables the military to federate systems, sensors, and effectors and, hence, to improve overall military effectiveness*" [MODAF (V.1.2 – 2008)].
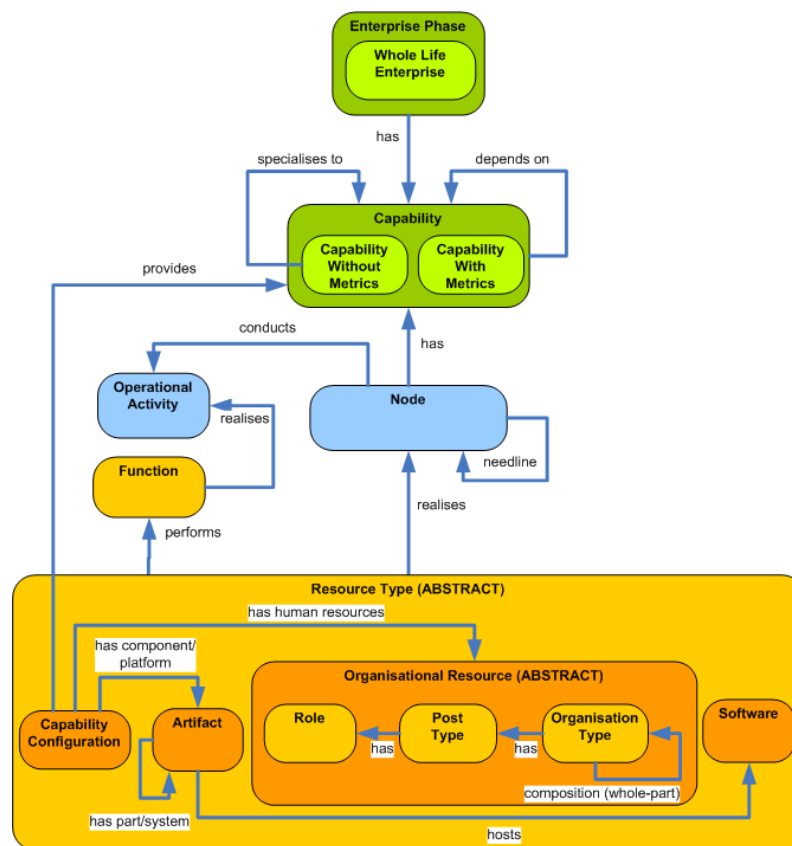
Figure (5.6) MODAF [MODAF (V.1.2 – 2008)]

MODAF as depicted in Figure (5.6) identifies a coherent set of templates and rules, known as architectural views that cover the strategic goals of the enterprise, and the people, processes and systems that deliver those goals. By covering both the operational and technical aspects across the enterprise, MODAF-compliant Architectures enable stakeholders to have the essential information and common understanding that will be necessary to deliver the benefits to be derived from NEC [MODAF (V.1.2 – 2008)]. "*As an enabler for managing complexity, MODAF provides a specification of how to represent an integrated model of an enterprise, from the operational / business aspects to the systems that provide capability, together with appropriate standards and programmatic aspects. It assists in managing complexity by providing a logical, standardized way to present and integrate models of the enterprise*" [MODAF (V.1.2 – 2008)].

5.7 Results of the analysis

The development of IS architecture has been initiated as an active research discipline for more than two decades and it is still in evolving process. Many frameworks have been developed for different organizations to manage their IS portfolios [CIO Council, 2001; TOGAF (8)]. The previous sections present some of the well-known enterprise architecture frameworks. These architecture frameworks are used as a practical approach to facilitate how to organize the structure and views or models and other business entities that are associated with enterprise architecture. This approach facilitates efficient and effective coordination of common business processes, and information flows and systems to achieve the enterprise's mission through the optimal performance of its core business processes within an efficient IS/IT environment [CIO Council, 2001].

These frameworks differ and/or agree in contrast to each other such as emphasizing on architecting processes, where some of them may focus on a strict set of models (performance, business, and technical models) or a strict model. Also some of them are abstract with respect to architecture models, such as TOGAF, which is more detailed framework with respect to the processes of enterprise architecting [Sessions, 2007; Johnson and Ekstedt, 2007]. Moreover, some of these architectures are not directed to special kind of organization such as the Zachman framework, which is more or less is taxonomy rather than a framework as it is self-.described. In fact, although the language of the Zachman framework is mainly considered commercial enterprises, it is a general framework and still one of most commonly referred proper framework approaches to enterprise architecture [Johnson and Ekstedt, 2007; Sessions, 2007; CIO Council, 2001].

The FEA can be viewed as either an implemented enterprise architecture or prospective methodology for creating enterprise architecture [Sessions, 2007; CIO Council, 2001]. Nonetheless, these frameworks agree on one important issue that is to help organization to reduce the complexity of the implementation of their IS/IT, improve organizational efficiency and effectiveness, which consequently impacts on the organization's agility and interoperability, and flexibility to change according to business needs.

To simplify the discussion, Table (5.1) presents a short summary of a comparison study of some of the important components of the some of the well-known architecture frameworks that are represented in business architecture, IS architecture and technology architecture presented in section 2.4 and illustrated in Figure (2.1). In addition, it shows how these frameworks address the concepts of strategic alignment and business value.

	Business Architecture	IS Architecture	Technology Architecture	Strategic alignment	Business value
Zachman	–	–	–	x	*
TOGAF	+	+	+	*	*
FEAF	+	+	+	*	*
NIST	+	+	+	*	*

Table (5.1) – Summary of the components of the architecture frameworks

Legend: [(+): Identified] – [(–): Partly identified] – [(*): Mentioned (or worded ambiguously) in general discussion but not identified clearly] – [(x): Has not been identified.

In short, different enterprise architecture frameworks developed to assist organizations to organize and implement their IS resources properly to meet their business needs, and achieve business goals. Based upon the IS literature, enterprise architecture helps organ-

ization to achieve alignment to deliver business value. It can be noticed from this short analytical study and what presented in Table (5.1) that the Zachman Framework [Zachman, 1978; Sowa and Zachman, 2002] is a general systematic taxonomy includes a set of models to describe the IS and its context. It has partly identified the components of enterprise architecture framework and the concept of business value in a general discussion without referring to any definition or meaning. The TOGAF, FEA, FEAF and NIST are almost the same in identifying the components of the enterprise architecture and the concepts of business value and strategic alignment.

The DoDAF and MODAF are seemingly different from the presented frameworks as they do not present the components of the architecture as identified in section 2.4. They define a set of models (products) and views as a means or common approach to visualize, develop, analyze a capability of a system, present and integrate different components of a system to meet their business needs. The purpose of these frameworks is basically for war fighting operations, integrating defense systems, and business operations and processes [MODAF (V.1.2 – 2008); DoDAF (2007-I)]. These two frameworks don't describe the components of enterprise architecture and the concepts of business value as presented in this study as they have a different nature and purpose.

In conclusion, it can be noticed that there is, however, a hard difficulty to find out how these frameworks identify the concepts of alignment and business value, although they address them as important concepts and assessment criteria in enterprise architecture. In addition, it has been argued in IS literature that the basic idea of the enterprise architecture is to help organization to achieve alignment and rapid respond to change based on business needs. Nevertheless, neither the theory of enterprise architecture nor the enterprise architecture frameworks have presented explicitly nor implicitly how these frameworks achieve alignment. Furthermore, they do not identify the concept of business value in a clear description. Therefore, it is still difficult to realize with the real benefits of the enterprise architecture in practical life in business and industry.

Thus far the focus of this study has been on the enterprise business architecture, and thereby highlighting the importance of achieving strategic alignment to deliver business value. Towards this approach, I suggest to develop and apply the strategic alignment paradigm based on the philosophy of the SAM framework of Henderson and Venkatraman's (1993) view and practical approach. This approach will offer an interpretive paradigm for achieving strategic alignment and its impact on organizational performance.

Summary

This chapter presents a short analytical study of the well-known enterprise architecture frameworks. It demonstrates that enterprise architecture is one of the most exciting areas and it is often used in business, where it combines business processes and IS capabilities, to achieve business goals. However, it seems, it is seldom examined (if not at all) to realize with the real benefit of any of these frameworks. I think there is some lack of information about how these frameworks achieve strategic alignment and how they identify the concept of business value. With this objective in mind, it can be recognized that resolving the ambiguities of the essential concepts (that include strategic alignment and business value), principles, rules, patterns, and interfaces of the enterprise architecture frameworks, will help organizations to realize the real benefits of enterprise architecture. Nonetheless, based upon the IS literature and building upon this study, it can be noticed that enterprise architecture is still evolving, and the ambiguity in its concepts and principles will be resolved by the progress in research and study, and bridging the gap between the theory in academia and practical work in industry.

6. EMPIRICAL FINDINGS

This chapter presents two case studies about two organizations use IS/IT extensively as inseparable parts of their business. This is a practical approach to show how can organizations achieve strategic alignment through an efficient use of IS architecture frameworks. The organizations that are used in this study are Volvo Group AB and Computer Science Corporation (CSC).

The collected materials in these two case studies in this master thesis comprise the business strategy and IS/IT strategy domains in general, and business architecture and application and information architecture components in particular. They are organized and presented in this chapter according to the framework of the proposed research framework in chapter 3. In addition I will briefly consider the components of the business strategy and IS/IT strategy of the external components of both the business and IS/IT domains as they represent an integral part to achieve strategic alignment.

6.1 Volvo Group AB

Volvo Group AB is among the big organizations in the world that use IS/IT almost in each business unit and section in the organization. The IS/IT service is primarily managed by the Volvo IT, which is one of Volvo Group AB subsidiary, and headquartered in Gothenburg, Sweden. Its business focus is on industrial companies with similar structure and demands as Volvo companies. The Board of Directors of Volvo IT consists of representatives from the larger Volvo companies. The President is always a corporation member in the board of directors of the organization. The company is global and is available in all countries where Volvo has a significant presence. There are about 6000 employees, including approximately 3500 in Sweden, and has an annual turnover of around 8 billion SEK. Volvo IT sells IT services primarily in systems, for management and server and network operation Infrastructure/Operations (I/O).

Volvo IT's primary market is Volvo Group, which covers all markets in which Volvo has the essential activities, namely Volvo IT in Sweden, Europe, North America, South America, Africa, and several countries in Asia and Australia. Since 2003, Volvo IT also sells its services in the ex-States market, mainly in the I/O. This activity has become widespread mainly by Volvo IT, where it is very competitive in this area. Approximately 10 % of turnover may relate to external customers.

Volvo IT is organized in a system development / management unit and I/O part, and marketing and a number of staff reporting to the CEO as presented in Figure (6.1). Systems development / management entity is organized under the principle of "Center of Excellence", i.e. all systems development personnel working with retailing or distribution system part of the same organization, wherever they are located on the globe. The same is also true of production, construction, etc.

Volvo IT has a hierarchical organizational structure in which all heads of responsibility are regulated in authorizations, and production records. Power escalation pathways are evident. Each year, developed as well as long-short-term goals formulated.
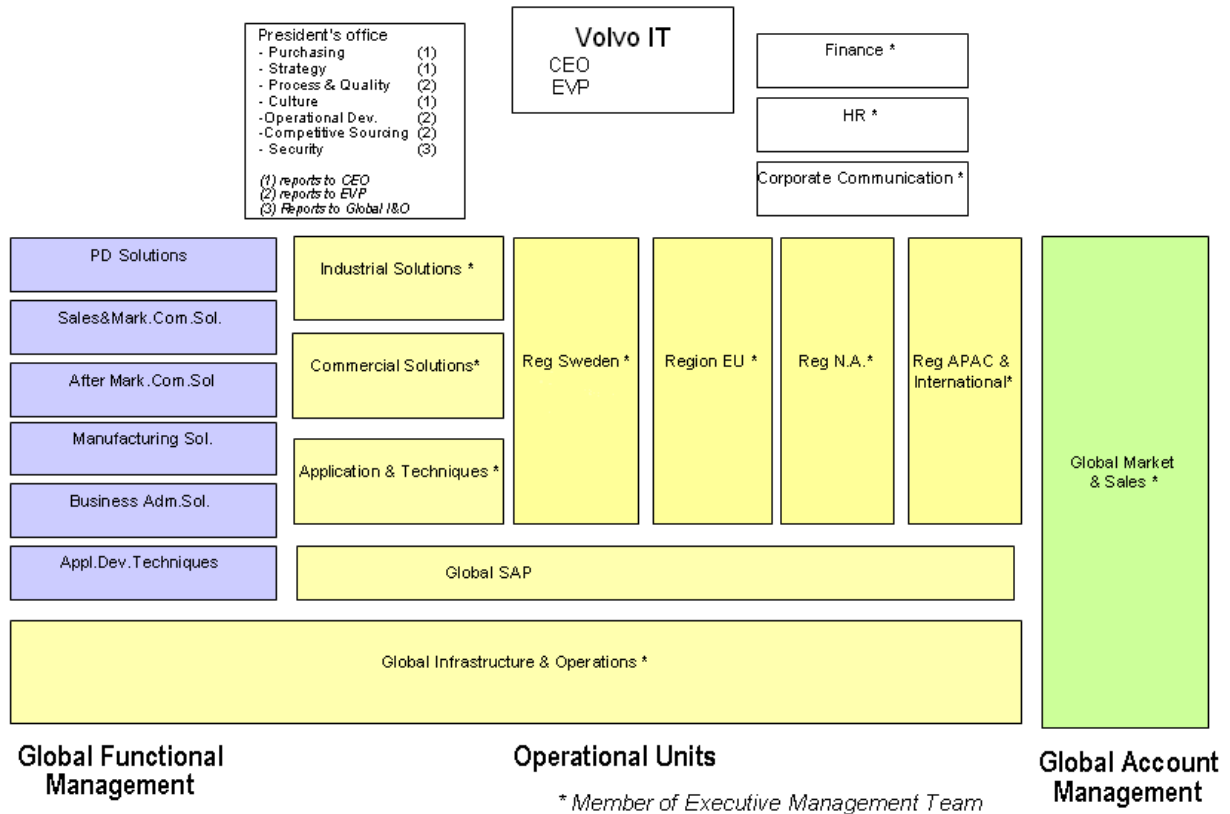
Figure (6.1) The Organization map of Volvo IT

Volvo IT is among the IT organizations in automotive industry that has successfully used IS/IT properly to improve its customers services in a dynamic business environment. Its business focus is to create and develop all IS/IT services to Volvo Groups and its business partners both locally and internationally. So it is business scope is to support IS/IT services to Volvo Group and it is business partners both locally in Sweden and internationally in different parts of the world, and its IS/IT scope is represented in the Global Infrastructure & Operations (Global I/O) that include most of IS/IT systems such as ERP SAP that is used in financial and business systems to achieve a uniform set of applications and thus a uniform way to work in economics and finance field, and other SAP modules that have been applied within the group, such as purchasing and human resource modules.

Volvo IT runs and supports and develops all types of IS/IT systems and services, regardless of platform. It can create a significant competitive advantage for industrial companies operating globally, or for companies with comprehensive IS/IT operations and high demands on operational security. The business competence in Volvo IT is almost the same as Volvo Group as it is a integral part of Volvo Group, so Volvo IT as an IT organization that invests to develop a world-leading expertise and thus leading product, the organization in addition to its competition in knowledge and experience, also its products and services are of high qualities, where it uses different quality management processes and frameworks such as Six Sigma or EFQM to offer high quality and rapid spare supply to its customers. Volvo IT is constantly measuring quality, operating costs and user satisfaction for benchmarking purposes and to keep ahead in the IT market place. Further Volvo IT can help with everything from analyses and research to run the

entire business process of the enterprise. Its services include networks, as well as server and client environments for processes, specific operations, or the entire company.

The IT competence is represented in highly educated recruited and trained employees in how to develop, implement and maintain different IS/IT system programs, such as data system engineers (analysts) and software programs. Volvo IT has many years of experience and the good knowledge and expertise that lead to the understanding the needs of complex business activities and proposing operational services. The organization provides high quality and cost-effective operation, support and infrastructure development services for all established platforms to both Volvo Group and their business partners.

In light of the administrative structure, Volvo Group is divided into a number of relatively independent product companies and support companies. It is organized in product related business areas and supporting business units as presented in Figure (6.2). This organization allows the different business units to work closely with their customers and utilizing Group-wide resources. The business units are organized globally and created to combine expertise in key areas. They have the overall responsibility for product planning and purchasing, and for developing and delivering components, subsystems, services, and service and support to the Group's business areas. The structure of the Group creates economies of scale in several areas, such as product development, production, parts supply and logistics, as well as in administration and support functions [Volvo Group Homepage & Volvo Group – Annual Report 2009].
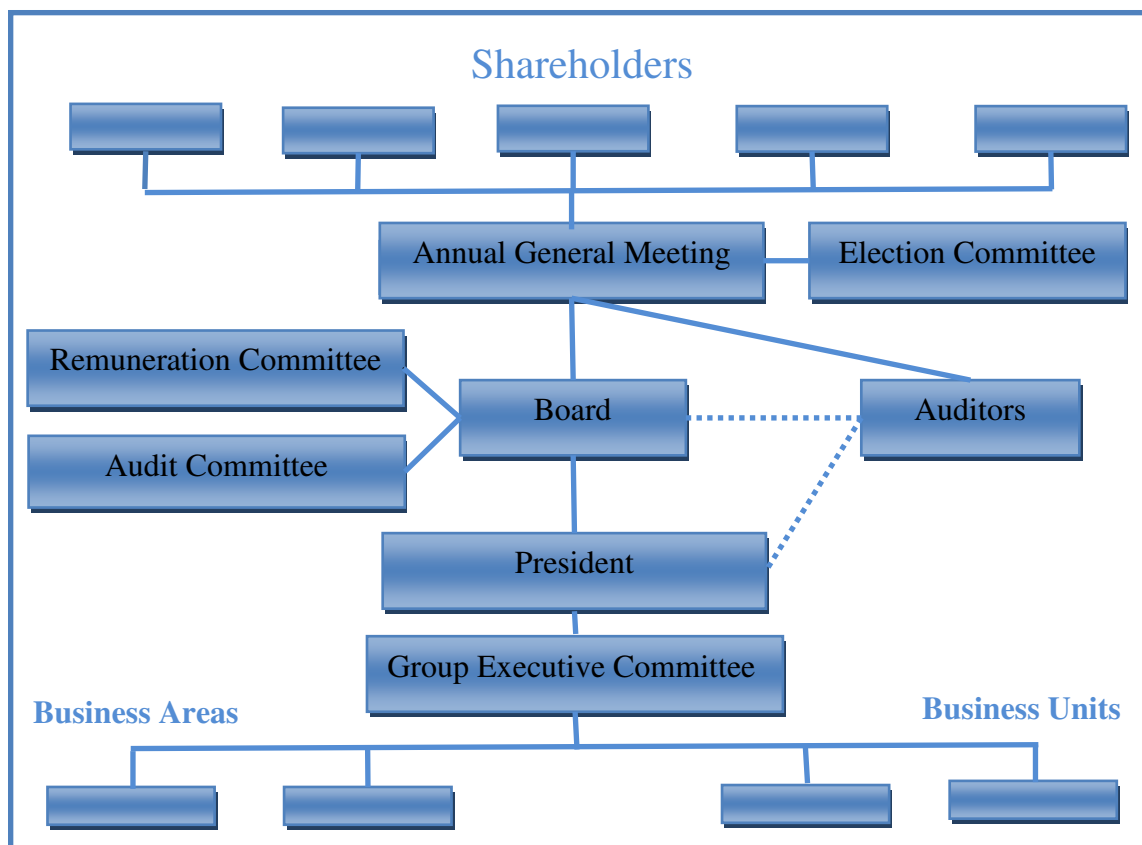
Figure (6.2) The Volvo Group Corporate Governance Model

Volvo Group applies a highly decentralized management, which means that when agreement is reached on the objectives and development given the management a free hand to achieve it. Product companies are organized as per category. Thus there is a

truck company, a bus company, a company for construction machinery, a company for the boat and industrial engines and an aero-engines and components for aircraft engines.

Support companies have to support all the product companies. Thus there is a company for component manufacturing, a company for spare parts supply, logistics, for the financing of customer purchases of Volvo products and a company for the Group's IT operations. Volvo IT offers effective solutions for business administration that target multi-national companies. It provides active support to streamline business administration and develop existing processes by organizing the entire administration chain, from analysis and configuration to integration, implementation and operation of Enterprise Resource Planning (ERP) solutions.

In referring to the IS/IT architecture, based on each Volvo company's strategic development plans drawn up in conjunction with the IS/IT skills and plans for change or development of the existing IS and IT operations (IS/IT architecture). These architectures developed in collaboration with Volvo IT"s architects represent a basis to determine the overall requirements for the development of IS/IT infrastructure. Corporate IS/IT architectures is the base for the generation of change / development of each company's application portfolio. On the architecture level, they are identified and agreed on possible synergies between the different business development plans.

Volvo IT is responsible for the development, maintenance and operation of the Volvo Group's major communications systems and technology, which is represented in Volvo Core Network (VCN). This network linking all Volvo Group units over the globe and consists of two logical parts, Wide Area Network (WAN) and Local Area Network (LAN). WAN is the big powerful network linking all Volvo various group companies and their different sections around the world. This is mostly fiber optics-based network with elements of satellite communications. LAN is the part of the network connecting all peripheral devices that PC and printer with local servers. This is mostly copper and radio-based communications. The local servers are connected to the WAN via routers (communication control unit).

Therefore, in light of this analysis I can shortly identify that the administrative structure of Volvo IT is organized in four main functional areas, two support oriented functions; Application & Techniques, and Infrastructure & Operations, and two development functions; Commercial and Industrial Solutions. The IS/IT architecture is represented in a large variety of IS/IT platforms ranging from main frames to UNIX systems. The overall infrastructure policy is described via a map of a dozen of functional areas with attached recommendations and guidelines. This map is governed by CIOs from the Volvo Group companies, i.e. the customers.

Concerning the processes perspective, Figure (6.3) depicts a good example on the business processes that is called Volvo processes, which includes both Volvo Group and Volvo IT as Volvo IT is an inseparable part of Volvo Group. Business processes in Volvo IT is usually managed in team-oriented work groups that develop both business and IS/IT projects for Volvo Group and its business partners. These processes range from supplier to retailer, which typically are not owned by Volvo Group. These processes cross many organizational boundaries.

The IT processes in applications and information architecture can be represented in using different IS/IT systems and application to simplify the business processes. It can be simply noticed that Volvo Group and Volvo IT have a wide geographic spread and many project participants in different parts of the world. Volvo IT and Volvo Group use

IT based collaboration software systems such as Microsoft Live Meeting, Video Conferencing, etc. Among these IS/IT based tools, for instance, Volvo Group and Volvo IT use Microsoft Live Meeting, which is a hosted Web conferencing service that connects and engages audiences in online meetings, training, and events through a reliable, enterprise-class hosted service. With meeting attendees participating from their PCs, people / managers / employees can deliver a presentation, kick off a project, brainstorm ideas, edit files, collaborate on whiteboards, and negotiate deals at a fraction of the cost and without the hassle of travel, which consequently improve employee productivity.
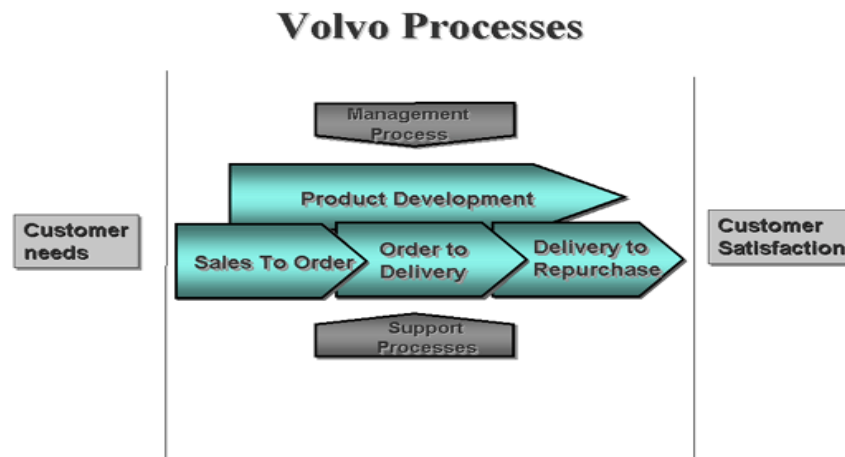
Figure (6.3) Volvo Processes

An outstanding example of the processes in business architecture can be represented in Customer Relationship Management (CRM) that consists of processes that Volvo Group uses to track and organize its contacts with its current and prospective customers. Volvo Group uses CRM to improve the services to its customers and to use customer contact information for targeted marketing. The processes in IS/IT applications are represented in the implementation of CRM Software – Microsoft Dynamics CRM, which helps increase sales efficiency, improve customer service, and streamline business processes.

A significant example that shows Business-IT Governance & Administrative structure and IS/IT architecture in Volvo Group is represented in a business-IT management framework. Within the Volvo Group there is a joint investigative and decision-making group called Group Issue Board Information Technology and Process Development (GIB IT & PU), which takes decisions in global affairs. The aim of GIB IT & PU is to create a unity of the group in respect of the basic presentation technology, and to forge a synergy between the different companies in the group. GIB IT & PU has at its disposal a permanent working group, IT Governance, whose mission is to conduct all the investigations ordered in GIB IT & PU and propose solution options. Volvo's IT experts participate in all these investigations, which involve a large influence on the settlement proposals and decisions. Basically, the role of GIB IT & PU is to investigate and decide matters relating to comprehensive development in the IS/IT area, and Volvo's main business and IT processes. It is found that the IS/IT development and process development are so strongly linked to each other that they must be handled by a single group decision. This group is headed by the Volvo IT chairman and every major company has a representative in this superior steering group board. The GIB IT & PU helps the Volvo Group to ensures the proper link between the one side that entails the business development and requirement changes in business (business architecture), and on the other side,

that entails the IS/IT development and changes within the main processes of the IS/IT (IS/IT architecture). All strategic issues of Volvo Group that entail business and IS/IT are to be investigated and decided at a high level within the GIB IT & PU. Since all the group companies involved in the process of investigations and decisions, they will be well anchored in the different companies in the group.

In respect to the skills both in business architecture and application and information architecture, it can be recognized that Volvo Group is a highly mature organization that passed through many different development processes and experiences both in business and IT. The Volvo Group as well as Volvo IT developed and gained high experience and professional in business and IS/IT skills. For instance in IS/IT skills, Volvo IT developed high skilled professionals in many software systems and application in different operating systems such as OS/400, UNIX, Linux, Window 2000, Window XP and VMS. In fact Volvo IT has a very large budget for education and training, so that all training is considered likely to contribute to Volvo's IS/IT development. Moreover, Volvo IT has built up complete and advanced systems for warranty, and quality management over the past forty years, which coupled with expert skills; provide its users with beneficial tools in business and IS/IT areas.

Furthermore, Volvo Group and Volvo IT have highly professional and expertise in IS/IT technical and business skills, such as communications, WAN/LAN expertise, customer support and application development, as well as in management skills in accounting, marketing and administration. They encourage the development of new skills in order to keep up-to-date with new technologies and business development. They seek a diverse workforce to encourage innovative solutions and new ways in business and IS/IT. For instance Volvo IT has acquired comprehensive skills in SAP software systems, where in 1995, the Volvo Group began to develop and implement a global financial solution. Today there are more than 15,000 SAP users at Volvo Group and many of the companies involved have extended usage to logistics processes. A global core solution, "the Volvo Finance Master", forms the basis for Volvo implementations. Moreover, Volvo IT as a capable partner in utilizing SAP solutions in an efficient manner, SAP has appointed Volvo IT as a certified Hosting Partner. Volvo IT and SAP will together supply software applications, implementation, operations and support to the industrial organizations.

In addition to the great potential of IS/IT in Volvo Group and Volvo IT that have identified in this study, where IS/IT provides added values to products and services, IS/IT opened a new business opportunities to many firms as a consequence of development and innovation in IS/IT Infrastructure and systems. An outstanding example of this development is featured in Volvo Group and Volvo IT where IS/IT became a business driver. In the late of 1970s, major IT companies launched the concept of "The paperless office". The background of this was that the advent of cheap photocopiers had dramatically increased the use of paper within the administration in enterprises. This included the use of word processor that has been made to the secretaries had access to a small computer with relatively simple means could be integrated with IS/IT operations.

Volvo Data then started an office automation project, called KA project in 1980; with the aim of internal Volvo Data reduce paper use, as far as it went. The base of the KA-project consisted of a rudimentary communication product which renamed to MEMO. This product was developed within the company and had developed a number of talented engineers to handle communication between them. With a relatively little effort developed this product that led to an e-mail system.

MEMO became very popular because it was a much simpler and straightforward way to communicate than by telephone or the internal mail. The use of MEMO systems was spreading very rapidly in the Volvo Data and drove an investment in terminals. Other companies within the Volvo Group realized pretty early the benefits of MEMO and acceded to the use and after a fairly short time MEMO became a predominant way of communication within the Volvo Group. Volvo companies earned a lot of money from MEMO because the alternative means of communication were both more expensive and less reliable.

In 1983 Volvo Group launched an idea to convert MEMO into a more marketable business, where Volvo Data and Ericsson Data formed what was called Verimation, where the idea was that in Verimation added proprietary products that existed within the two companies and had a market value of external Verimation.

The MEMO systems sold in such a large scale to Verimation that could fund all product development and product enriched with a large number of new features, including outside e-mail feature. Both ex-States customers such as Volvo companies contributed an amount of requests that this product was successful. Bridges to a host of other mail systems were created and, among other things, were MEMO for Windows up.

The company's revenues were generated through direct sales but also by very profitable support and maintenance. Unfortunately, it appeared that Ericsson Data did not have any products that were marketable on the external market, and this led to the Volvo Data took over Ericsson Data's share in the company. MEMO came during a shorter period in the mid 1990s that dominated the e-mail market. The total sales of the product delivered to more than 1,000 large enterprises in 27 countries. The number of users exceeded surely several millions.

The success of Verimation led to another company was formed, which was called Scandinavian Info Link (SIL) with the business strategy to enable e-mail between the companies using the MEMO. The SIL was founded by Volvo Data, Ericsson Data and SAS as the owner after a few years. The business idea was probably not very well thought out. It showed that communication between the big Swedish companies were not so extensive and that the charge was assessed SIL need to charge per e-mail far exceeded both the letter postage as fax fees, etc. The company managed to never come close to the volumes needed to reach "break even". SIL was sold after a few years to the Post, which had great ambitions in e-mail area.

With appearance of the Microsoft Outlook and as it became increasingly dominant in the e-mail, the market of the Verimation deteriorated. In 1999 Volvo IT decided to leave MEMO and move to MS Outlook, so the business market of Verimation was hit very hard, and Verimation's large customer base was reduced by a few hundred companies a year. Nonetheless it could still manage a decent product and generate an approved profit due to the outstanding maintenance contracts. Also via a series of sales of the company so it has both left the OTC list and is a part of another listed company, Nexus (a Norwegian Company) in Norway.

The strategic value of the MEMO to Volvo Group can be identified as:

- The use of MEMO internally in the Volvo Group has driven the use of IT, and a large number of Volvo employees have been introduced in the use of terminals and PC in an undramatic way.

- The Volvo Group was very early in usage of an "office", which annually added new features. These new features have originated from a large number of businesses,

> scattered in the world. This product, like the use of MEMO has been completely free, but exemptions from direct computer operating cost.

- Volvo Data had a great experience in how it was to work on the Volvo Outside the market, in a strong competition with other soft products business.

- It is not an easy experience; "a one product company" has been very difficult to survive in the long run. Verimation lived and generated surpluses in 16 years.

The output result of IS/IT implementation at Volvo Group impacts the organization performance both in direct and indirect ways. Volvo Group is a big organization and its business is spread in different parts of the world, and it uses IS/IT extensively, where the IS/IT is embedded in each department, unit and section and became inseparable part from the business. IS/IT has both internal and external impacts on the business performance that are basically represented in the business benefits the company gains from it. The company achieves productivity growth and profit gains through the efficient implementation of its IS/IT resources.

The efficient utilization of IS/IT resources in Volvo Group helps the organization to achieve business value that can be identified in both tangible and intangible benefits. However, it is still very difficult for Volvo Group to evaluate the intangible benefits, and identify the percentage of the business value of IS/IT investments from the total business revenue achieved by the organization.

6.2   Computer Science Corporation (CSC)

The advent of IS and IT in late 1950s due to the rapid development and high progress in computer science and engineering, digital communications systems and technology, and data communications, IS and IT keep reinventing itself at an amazing pace and create new developments in industry in many different ways. Moreover, IS/IT creates new business opportunities, where IS/IT became a business core in itself to many different organizations. CSC is among those firms that have IT is its core business. It provides IS/IT consulting and professional services to commercial and government markets. The company's outsourcing services include the operation of customer's technology infrastructure, including systems analysis, applications development, network operations, desktop computing and data center management. It also provides business process outsourcing, such as procurement and supply chain, call centers and customer relationship management, credit services, claims processing and logistics services. The company's IS/IT and professional services include systems integration, such as designing, developing, implementing, and integrating complete information systems. It's consulting and professional services include advising clients on the strategic acquisition and utilization of IS/IT; business strategy, security, modeling, simulation, engineering, operations, change management, and business process re-engineering. It also licenses software systems for the financial services markets, as well as providing various end-to-end e-business solutions to the commercial and government clients. The company offers its services to various customers in the aerospace / defense, automotive, chemical and resources, consumer goods, financial services, healthcare, manufacturing, retail / distribution, telecommunications, and technology industries to clients worldwide.

CSC as an IT superpower that manages IS/IT internally for itself where the firm treats itself as a client and it manages IS/IT externally to help its clients in business and industry to manage their IS/IT to support their business and to create business value for them. Moreover, as the firm treats itself as a client, it verifies/tests and learns new things about

IS/IT and develops new methodologies that lead to development of new products and services to be offered in the IS/IT business markets. The firm exports that knowledge to their clients which is a significant feature of the CSC. Therefore, the business nature of this firm involves internal business and external business that depend on and complete each other. In the late 1999, CSC formed a long-term mutual corporation and strategic alliance with Hitachi Ltd to offer the customers of Hitachi leading-edge information IT systems and services in Japan. Under the alliance, CSC and Hitachi established a collaboration to provide IS/IT systems and services incorporating world-class business practices, enabling customers to compete more effectively on a global basis.

In the corporation's business strategy, its business scope involves offering IS/IT professional business services to clients in the global commercial and government markets. Its service offerings include IS/IT and business process outsourcing, and IS/IT applications. In its IS/IT strategy, the IS/IT scope is represented in implementation of different information systems such as SAP ERP to increase work efficiency and enhance business performance. For instance, CSC implemented a Sales Force Automation system (SFA) based on mySAP Customer Relationship Management (mySAP CRM) solution to provide an integrated, multidimensional pipeline and company-wide view of potential business. Also in order to increase the effectiveness of the salespeople and make their results easier to consolidate, the CSC implemented Global Sales Force Automation (GSFA) management systems which are information systems used in marketing and management that help automate some sales and sales force management functions. The new GSFA management system was designed to replace all the existing Customer Relationship Management (CRM) approaches in the company, consolidate all their information into a single repository and accomplish more than any of them individually ever could. In relation to CSC-Hitachi collaboration, the business scope is represented in developing business-IT solutions and with its alliance with Hitachi, CSC and Hitachi offer IS/IT systems and services to Hitachi customers based on the business needs.

Viewing the firm from the business and IS/IT competencies, the CSC's business competencies are represented in high quality services, fast delivery of its products and services with acceptable prices (the higher the volume the lower the price) to their clients. Moreover the firm always aims for high reliability and quality and follows many quality standards such as IT Infrastructure Library (ITIL) and ISO quality standards. The firm's IS/IT competencies are represented in achieving a competitive advantage and enhanced business performance, the firm implemented different IS that gives it the capacity to operate compatible telecommunication networks and computer systems in support of enterprise-wide application. As CSC has an experience in all areas of IS and IT and uses the same systems as offered to external clients where applicable. In the CSC-Hitachi collaboration, the business-IT competence is represented in advanced total solutions expertise and know-how and in technologies and sufficient strategic knowledge and technical skills that CSC has to make the best possible IS/IT investment to its clients.

Regular education and retraining represent a very important issue in business and IS/IT competencies as IS/IT continuously subject to change due to the rapid development and progress in IS and IT. In this perspective, CSC has an extremely sophisticated education platform covering just about any business or IS/IT scenario that the company will need. Employees are expected to use bench time to take CBTs (Computer Based Training). There are education programs for all roles in the organization from beginner to expert, where education in CSC is a prioritized area. Therefore, all members of business as well as IS/IT members are able to keep up-to-date on the latest technologies and sufficient strategic knowledge and technical skills to make the best possible IS/IT investments for

the company. By this vigorous education program, CSC gains competitive advantages; first, all employees are always well knowledgeable and skilled with the new IS/IT knowledge and technology. Second, by the education programs, CSC creates a corporate business-IT culture environment among people in the firm, which make the firm highly competitive in IS/IT industry. CSC has built virtual Centers of Excellence where employees may learn and develop the latest technologies and solutions and services and provide leading edge competence to the organization.

The business governance of CSC is corporate governance, where the firm manages its relationships and strategic alliances with strategic partnerships at a corporate level then follows up at local level. Strategic alliances are essential to the CSC with the major product suppliers like SAP, Oracle, Microsoft, IBM, Sun, Salesforce.com etc. The company enters all markets as a single entity; however, in some cases when the deals are very large, the company enters the market with partnerships because no one supplier can deliver the whole. The IT governance is represented in the internal business strategy as a subunit of the business governance and is centrally steered by the CIO/CTO unit. Externally due to the business nature of the firm, the IT governance is represented in strategic partnerships with IS/IT vendors and strategic alliances with IT clients. For instance, the CSC-Hitachi collaboration, the IT Governance is represented in strategic alliance and IT outsourcing alliance.

The business structure of CSC can be presented in the organizational structure figure depicted in Figure (6.4). It has a hierarchical organizational structure in which heads of departments or units are regulated in an authorization. The hierarchical structure of the CSC is based on the business function of the various business units in the firm to deliver its service to clients in domestic and international commercial industries. Under the CSC Corporate, there are three business units that include Managed Services Sector (MSS), Business Solutions Services (BSS), and North America Public Sector (NPS).
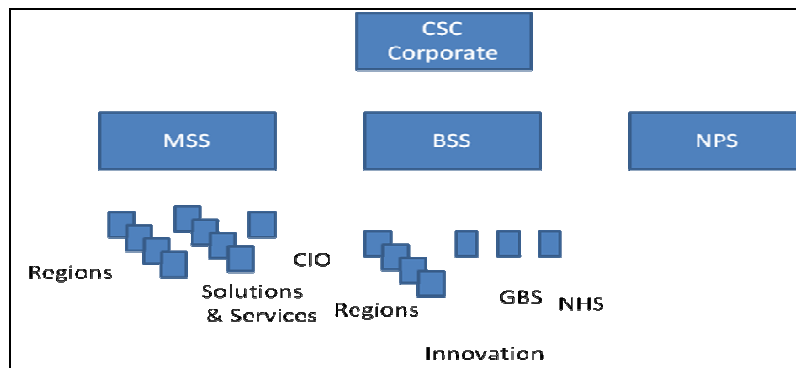
Figure (6.4) CSC Organization Structure

The MSS business unit provides IS/IT outsourcing services to clients in a broad array of industries including aerospace and defense, automotive, chemical and natural resources, consumer goods ,financial services, healthcare, manufacturing, retail and distribution, telecommunications, and technology. The BSS business unit serves a broad array of industries, providing industry specific consulting and systems integration services, business process outsourcing, and intellectual property-based software solutions. The NPS business unit services the U.S. federal government since 1961, and provides a broad of spectrum of services to most civil departments and branches of military, as well as the department of Homeland Security. Its service in this business unit ranges from traditional systems integration and outsourcing to complex project management and technical

services. Key offerings, such as enterprise modernization, telecommunications and networking, managed services, base and range operations, and training and simulation, can be offered to by the CSC to investors in business and industry [CSC – Annual Report 2010].

An outstanding feature with the CSC is that the company is business and IS/IT management and service corporation, and its core business deals with IS/IT products and services. The company creates the product and tests it, and introduces it to its customers and the market. It develops the methodologies and techniques to enhance the effectiveness and efficiency of business processes using IS/IT. The business processes and IS/IT processes are interconnected and strongly related to each other, and one completes the other. The CSC uses a business-IT management framework to implement IS/IT in an efficient way. The framework addresses the business-IT architecture called IT Strategic Roadmap (ITSR) as presented Figure (6.5), the CSC's fusion model. The ITSR process delivers the business value of IS/IT strategy through a true business goals-driven approach to IS/IT process. The company uses IS Strategic Roadmap framework to identify and simplify the business-IT direction to it and its customers to ensure that IS/IT Strategic planning will be driven by business-IT alignment within an enterprise. This framework helps the firm to execute IS/IT strategy properly that will "*(1) ensure that business imperatives are communicated and understood by the IS/IT functions; (2) align all stakeholders to focus on IS/IT investment based on the critical needs of the business; (3) direct the mix of capital versus operational expenditure based on strategic business goals; (4) map infrastructure and application portfolios as input to the enterprise architecture; and (5) provide clear responsibility for the implementation and delivery of the strategy*" [CSC Homepage].
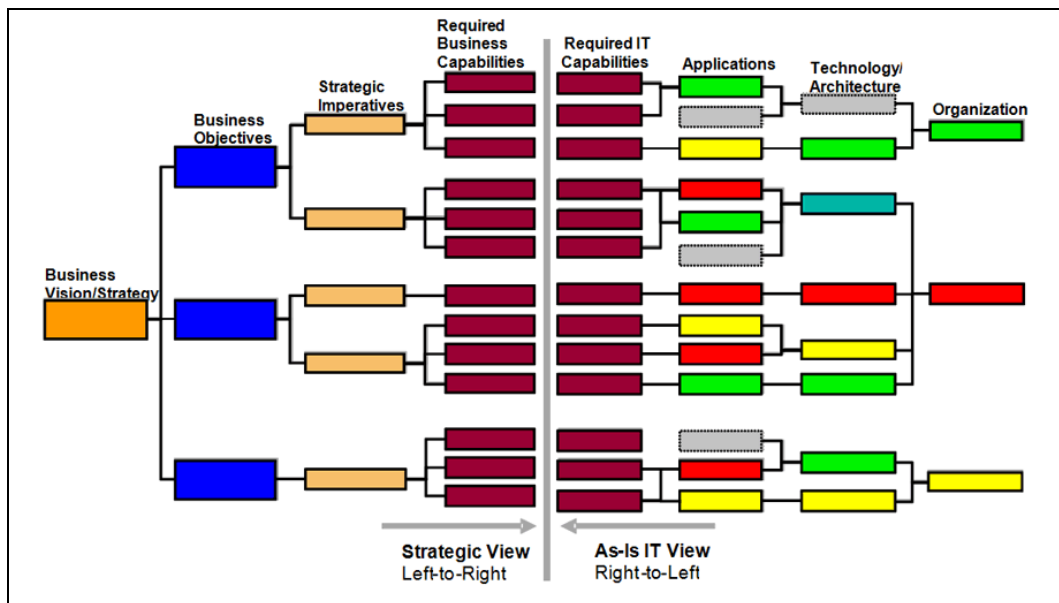
Figure (6.5) CSC IT Strategic Roadmap (ITSR) Methodology

The business and IS/IT skills and expertise are among the most important strengths of the CSC, which have proven both in public and private sectors. The firm developed and gained high professional business and IS/IT in different software systems and applications in different operating systems such as OS/400, UNIX, Linux, Window 2000, Window XP and VMS (Virtual Memory Systems). The IS/IT architecture plays a very important role in this issue. The organization employs different communications and com-

puter networks such as LAN and WAN. The CSC has highly professional and expertise in management consulting and IS/IT skills such as data and communications systems, LAN and WAN expertise, customer support and applications, accounting, marketing, and administration. Effective IS/IT implementation ensure high-quality products and services on schedule, and delivery of satisfactory services to customers.

Concerning the business processes perspective, the business processes in the CSC are mainly managed in team-oriented work groups to develop, test/verify or implement both business and IS/IT projects to the CSC and its business partners. The development or test/verification of business processes are sometimes required to be managed with business partners in different parts of the world. These projects can be facilitated with using software systems and application such as IT based collaboration software systems to run business processes very efficiently and achieve projects' goals within time and budget constraints. The IT processes in applications and information architecture in the CSC can be represented in using different software systems such as online collaboration and web conferencing service to conduct real-time, interactive presentations and online meetings over the Internet. The company uses IS/IT based real-time collaboration capabilities such as Microsoft Live Meetings, Video Conferencing, etc. to run its business efficiently and achieve projects' goals within time and budget constraints.

As CSC is a global IT services provider and management consulting, it has the knowledge and skills in business architecture and application and information architecture to help its people in the organization manage their job perfectly and develop a good work to their clients. Furthermore, as IS/IT becomes a fundamental business enabler of business growth and organizational change, CSC with its knowledge and skills in business and IS/IT, it helps its clients to manage their business efficiently and respond to business and organizational change in efficient and effective ways.

The output result of IS/IT implementation in CSC can be recognized in its internal and external business performance that are represented in the business benefits achieved from the IS/IT investments in the organization. The business benefits of IS/IT investment in the CSC are both tangible and intangible benefits as IS/IT investment is the core business of CSC. IS/IT enhances the effectiveness and efficiency of business process in the organization. It helps the organization to enhance the quality of its products and services both to the CSC and its clients, and increases it competence in IS/IT investments business market. The IS/IT investment helps the CSC to made significant gains in the productivity and profitability.

The business value of implementing IS/IT in CSC can be recognized by winning of a specific outsourcing business contracts that bring tangible benefits (represented in ROI) to the organization. Furthermore the organization is in a growth and development process, and its business IS/IT is in a growing process particularly in USA and Europe. The firm identifies it business value in its financial growth, customer satisfaction, and stakeholders and shareholders satisfactions. So IS/IT investments have a strong impact on the organizational performance, which are represented in both tangible and intangible benefits. The CSC by its success in business and growth tries to be a business leader in IS/IT services, management and consulting. Nonetheless, it is still very difficult for the CSC to identify the percentage of the intangible benefits of IS/IT investment from the total business revenue in the organization.

7. DISCUSSION

Chapter 2 introduced the basic concepts and theory of enterprise architecture, the SAM framework, and the concepts of business value and business and IS investment. Chapter 3 presented the research framework as a theoretical basis to address the concept of organizational performance as an output result of achieving strategic alignment through an efficient implementation of enterprise business architecture. Chapter 5 introduced a short analytical study of enterprise architecture frameworks. Chapter 6 presented the empirical study and research findings about Volvo Group AB and the CSC. This chapter, based on the empirical data and the conceptual framework, presents the discussion about how these two organizations can achieve strategic alignment that will impact the organizational performance. The organizational performance will be identified in terms of business benefits/business value.

7.1 Discussion

This research assignment has been initiated with a theoretical background that included the basic concepts of enterprise architecture, enterprise architecture frameworks, the strategic alignment model represented in the SAM framework, and the concepts of business investment and business value. The work proceeded with developing the conceptual model that has been used as a framework to address the organizational performance as an output result of achieving the strategic alignment between business architecture and application and information architecture.

The empirical study in the previous chapter includes two different organizations that are used for the empirical data and analysis, which are represented mainly in Volvo Group AB/Volvo IT AB and CSC. Volvo IT is an IT organization within Volvo Group, which is very highly mature organization deals with the IS/IT service to the Volvo Group and its business partners. CSC is a professional IT organization and a global IT service provider. To structure the debate about strategic alignment and organizational performance I distinguished four perspectives of organizational practices that are represented in: *structure perspective*, *processes perspective*, *skills perspective*, and *performance perspective*. This approach facilitates the debate to discuss the theory, research framework, and the empirical data. This way will help to determine how these organizations can manage to bridge the alignment gap between business domain and IS/IT domain to achieve strategic alignment, which will enhance organizational performance.

The theory of enterprise architecture has been presented in the mid of 1980s by Zachman (1987), which is represented in an IS architecture framework that has been introduced to business. That framework provides a systematic taxonomy for relating concepts and set of rules that describe the real world to the constructs that describe IS/IT concept and its implementation to achieve business value to organizations [Zachman, 1987; Sowa and Zachman, 1992]. The theory in the previous chapters argued that enterprise architecture is an approach to gather business processes with IS/IT resources to achieve business benefits. It is management tools and blueprint that helps organization to organize their business processes and IS/IT resources to achieve alignment that will deliver business value.

Based on literature, it has been identified that enterprise architecture is an approach that helps organization to achieve alignment and gain business benefits [Ward and Daniel, 2006; Wiell and Broadbent, 1998; Henderson and Venkatraman, 1991 & 1993, Luftman et al., 1993; Venkatraman et al., 1993]. However, the analytical study of enterprise ar-

chitecture frameworks presented in chapter 5 identified that neither the theory of enterprise architecture nor the enterprise architecture frameworks have showed explicitly nor implicitly how those frameworks achieve strategic alignment. Therefore, I suggest adapting the SAM framework of Henderson and Venkatraman's (1993) practical approach to achieve strategic alignment that will impact organizational performance.

Achieving strategic alignment between business architecture and application and information architecture is an important issue for business and IS/IT managers as it impacts on the enterprise's agility and flexibility to change according to business circumstances and needs [Hoogervoorst, 2004; Bernard, 2005; Schekkerman, 2004 & 2005]. Firms approach IS/IT Infrastructure investments differently depending on their strategic goals for cost savings through economies of scale, synergies across businesses, or longer-term requirements of flexibilities and agility [Ward and Peppard, 2002; Weill and Broadbent, 1998]. The SAM paradigm is a framework that offers firms the ability to effectively leverage there IS/IT resources [Henderson and Venkatraman, 1991 & 1993]. In this thesis assignment I adapted the SAM paradigm as a management framework to achieve strategic alignment, where my work in this model focuses on the internal components that included the business architecture and application and information architecture as presented in the research framework in chapter three.

The framework of the discussion will include the: *structure-perspective* (which deals with the administrative structure and IT architecture); *processes-perspective* (which deals with the business architecture processes and application and information architecture processes); *skills-perspective* (which includes the business architecture skills and applications and information architecture skills); and *performance-perspective* which will be identified in terms of business value/business benefits of IS/IT investments. However, the external components of the SAM framework (that are represented in the business strategy in business domain and IS/IT strategy in the IS/IT domain) haven't been omitted from this study, where I briefly analyzed and presented them in the empirical study in the previous chapter as vital parts of the SAM framework to achieve the strategic alignment [Henderson and Venkatraman, 1991 & 1993; Luftman et al. 1993]. I briefly referred to them as it is much more appropriate to consider them as they are an integral part to achieve strategic alignment, where strategic alignment basically requires a holistic approach to achieve it.

The research scope in this study is basically focused on the internal components of the SAM framework. Nevertheless according to the philosophy of the strategic alignment theory the power of the SAM framework is presented in terms of two fundamental characteristics of strategic management, which includes strategic fit (the interrelationships between external and internal components) and functional integration (integration between business and functional domains) as depicted in Figure (2.2) [Henderson and Venkatraman 1991 & 1993].Therefore, in a brief description based on the SAM framework presented in Figure (2.2) I discussed and analyzed the external components presented in the empirical data in the previous chapter, that both Volvo Group/Volvo IT and CSC managed to integrate their business strategy components with the IS/IT strategy components. Based on the theory of the SAM framework and the empirical study, the business scope of Volvo IT is represented in the support of IS/IT services to Volvo Group and it is business partners both locally in Sweden and internationally in different parts of the world. Its IT scope is represented in the Global Infrastructure & Operations (Global I/O) that include most of IS/IT systems such as ERP SAP in different business areas such as in finance for instance. This software application used in financial and business systems to achieve a uniform set of applications and thus a uniform way to ac-

curately manage financial liquidity and cash flow, and streamline processes to achieve superior financial performance. Other SAP modules that have been applied within the group, such as purchasing and human resource modules to support the business processes and applications adapted to the business needs of the organization. For CSC, the IS/IT strategy supports the business strategy by implementing different information systems such as SAP ERP that delivers enhanced capabilities for finance, human capital management, sales procurement, and other key enterprise functions to increase work efficiency and enhance business performance. Also as presented in the CSC case study, the IS/IT is a business core of the firm, where the firm is a client to itself as well as an IS/IT service and knowledge provider to its customers. Hence, it can be noticed that the IS/IT in this case is a business driver. Therefore, it is clear that the business scope and IT scope in the two case studies are highly harmonized, where IT scope supports business scope.

The business competence of Volvo Group and Volvo IT is represented in knowledge and experiences as well as in its products and services qualities through using different quality management processes and frameworks such as Six Sigma or EFQM to offer high quality services and products. The organization's IT competence is represented in the capability and efficiency of its IS/IT infrastructures and the IS/IT expertise both in knowledge and practice as well as technology awareness. In the CSC case example, as the core business of this firm is IS/IT services and specialized in IS/IT applications, the firm develops internal IS/IT projects and then sells them to their customers, whereby that the firm manages to make their IS/IT projects to become their business opportunities. Hence, the (internal) IT competence becomes an external business competence in CSC, which is an approach that creates an alignment between business strategy and IS/IT strategy. Therefore, in this perspective, it is clear that the business competencies and IS/IT competencies of the firms presented in the empirical case studies are consistent and mutually dependent in their accomplishment of business performance [Henderson and Venkatraman, 1991 & 1993; Croteau and Raymond, 2004].

For business governance and IT governance of Volvo Group and Volvo IT are established through the frameworks of GIB & PU presented in Figure (6.1) and also the Volvo Processes as presented in Figure (6.2) that include both the business governance and IT governance to work together to deal with both internal and external business and IT issues. In CSC case, due to the nature of the business core of this firm that it is an IS/IT service firm, the responsibility of IS/IT is basically shared between the business management people and the IS/IT management people. The IT governance unit in the firm controls the outsourcing process, where we can notice that the business governance and IT governance are merged together, and business governance and IT governance are represented in strategic partnerships with different venders and strategic alliances with different business partners. Therefore, based on the empirical evidence, the IT governance and business governance of the firms presented in the empirical case studies of the Volvo Group and CSC are very highly harmonized and compatible, where they succeeded in aligning the IT governance with their business governance, although they managed that in different approaches based on the nature and circumstances of their businesses and business practices.

Structure-Perspective: This perspective includes the administrative structure and IS/IT architecture presented in Figure (3.1). The administrative structure refers to the way the enterprise organizes its business. It includes roles, responsibilities and authority structure in the organization. The concept of IS/IT architecture refers to the technology priorities choices, policies that enable the synthesis of IS/IT applications, the configuration of

the software, hardware, network and data management system to be integrated into a cohesive platform to enable organizations implement IS/IT effectively and efficiently, and achieve business value [Ward and Peppard, 2002; Weill and Broadbent, 1998; Henderson and Venkatraman, 1991 & 1993; Luftman et al., 1993; Venkatraman et al., 1993]. In this perspective, it can be seen that CSC managed to achieve strategic alignment through adapting the ISTR framework presented in Figure (6.5). The company uses different IS/IT infrastructure and systems and different communications systems used in LAN and WAN networks. The company uses wireless technology to facilitate the business processes, and effectively and efficiently run its business in different parts of the organization that spread in different parts of the world. In almost the same approach, the Volvo Group through Volvo IT organization managed successfully to create a strategic alignment by the creation of the GIB IT & PU framework presented in Figure (6.1), which is a management board that takes both strategic business and IT decision in global affairs. The GIB IT & PU uses both WAN and LAN networks to let the different group members both in local and/or international manage their business issues in an efficient way. Moreover we can notice here with the ITSR framework of the CSC and GIB & PU of the Volvo IT, the strategic fit & functional integration processes addressed in the SAM framework are satisfied, which means that both CSC and Volvo Group & Volvo IT have successfully managed to achieve strategic alignment according to Henderson and Venkatraman's (1993) philosophy of strategic alignment.

Process–perspective: This perspective includes the business architecture processes and IS/IT application processes presented in Figure (3.1). A business process basically refers to a related group of steps or activities that use people, information, and their business resources to create a business value. It consists of steps related in time and place, has a beginning and an end, and has inputs and outputs [Alter, 1999; TOGAF (8)]. Business processes also refers to those practices and activities carried out to develop and maintain application, such as how firm's business activities operate or flaw. Major issues include value added activities and process improvement [Henderson and Venkatraman, 1991 & 1993; Luftman et al., 1993; Venkatraman et al., 1993]. IS/IT application process refers to the choices that define the work processes central to the operations of applications development of the IS/IT infrastructure such as systems development, design of major IS/IT work function and practices such as application development, system management controls or operations [Ward and Peppard, 2002; Weill and Broadbent, 1998; Henderson and Venkatraman, 1993; Venkatraman et al., 1993; Luftman et al., 1993]. In this perspective CSC creates a synergy between the business processes and IS/IT processes through the ITSR framework presented in Figure (6.5) to effectively utilize its IT resources and integrate its business processes with its IS/IT processes. In the same approach Volvo Group and Volvo IT managed successfully to achieve an approach to strategic alignment through the Volvo Processes framework presented in Figure (6.3) where both the business and IT processes are coherently organized and managed. Another example is through the implementation of CRM Software – Microsoft Dynamics to increase sales efficiency, improve customer services, and streamline business processes. Moreover, based upon the empirical data presented in the previous chapter, we can see that both the CSC and Volvo group/Volvo IT manage most of their work in team-oriented work groups supported with the use of different IS/IT facilities such as Microsoft Live Meeting and/or Video Conferencing to keep the different group members be in touch and updated with the latest information about their business progress, and run their businesses efficiently and achieve projects' goals within time and budget constraints.. Therefore, it can be noticed that IS/IT became as a business supporter or business enabler that delivers business benefits to the organizations and their clients.

Skills-Perspective: This perspective includes business architecture skills and IS/IT applications skills. The concept of skill in general refers to the ability or capacity of someone, a group or an organization to do something well. It is an attribute usually acquired or learned through training, education, or practice. It may include experience, competencies, commitments, values, and norms and attributes that allow an individual to perform a task, a business or an IS/IT service, deliver the IS/IT products and/or services [Weill and Broadbent, 1998; Henderson and Venkatraman, 1993; Luftman et al., 1993; Venkatraman et al., 1993]. In this perspective, the CSC and Volvo Group/Volvo IT developed high skills both in business architecture and IS/IT application and information architecture. The organizations through training and education to both business and IS/IT professionals created highly professional skilled employees. Moreover, CSC is a professional IS/IT service provider and business and IT management consulting organization that has highly professional business and IS/IT consultants and practitioners. Also Volvo Group is strongly engaged with highly qualified and professional business and IT consultants who are aware with the regulation and law, which created a highly harmonized business-IT culture. It can be noticed that these firms have successfully managed to achieve strategic alignment. There are some differences, however, in achieving strategic alignment due to differences in business natures and firms' business processes and practices.

Performance-Perspective: Organizational performance refers to the actual output result from achieving business practices in an organization that can be represented in productivity and profitability of the organization. It can be defined as the measures of growth in productivity and gains in profitability of an enterprise through its business endeavors and deployment of organizational and technological resources [Croteau and Raymond, 2004; Croteau et al., 2001; Croteau and Bergeron, 1999; Chan et al., 1997; Smith and McKeen, 1993; Venkatraman, 1989]. Productivity and profitability are key concepts used in business to measure or identify the performance of a company. The increase or improvement in productivity leads to better profitability [Willcocks and Laster, 1999; Willcock, 1999]. In this sense, the CSC and Volvo Group through their efficient implementation of IS/IT resources in the different business areas and units, they managed to create a synergy and enhance their competitiveness and facilitate business growth and success. They create business value for their customers, which consequently create business value to their shareholders and stakeholders. They use their expertise in business and IS/IT to create products and services of superior quality, safety and environmental care for demanding customers in selected segments. The IS/IT investment in both CSC and Volvo Group AB helps the organizations to make significant productivity and gain profits. However, the constructs of productivity and profitability in IS/IT investments are not the same as addressed with the tangible products and services as in normal industries such as in oil industry or transportation industries that identify the profitability in economical terms or financial measures. The constructs of productivity and profitability in IS/IT investments are still complex issue in IS industry and IS discipline, which lead the productivity and profitability paradox [Brynjölfsson, 1993; Brynjölfsson and Hitt, 1996 & 1998; Willcocks and Laster, 1999; Willcock, 1999] as addressed in IS literature.

Although the empirical study shows a positive impact of IS/IT investment on the organizational performance, it is still difficult to obtain the actual contribution of IS/IT investment in the total revenue of the organizations. Nonetheless evidence in the empirical data indicates that IS/IT facilitates significant growth in productivity and profit gains. Different scholars and researchers in literature view that IS/IT investment generates

long-term benefits that deliver business value to organization [Lin and Pervan, 2001; Apostolopoulos and Pramataris, 1997]. There is, nevertheless, a developing consensus concerning the difficulty of assessing IS/IT investments [Renkema and Berghout, 1997; Cronk and Fitzgerald, 1999; Bannister and Remenyi, 1999; Ward and Daniel, 2006].

It is important to recognize that although neither CSC nor Volvo Group have been consistently referred or linked to the SAM framework developed by Henderson and Venkatraman (1993), where in fact each organization created its IS/IT management framework to efficiently manage their IS/IT resources. Nevertheless, they succeeded to bridge the alignment gap between their business resources and IS/IT capabilities to achieve strategic alignment according the SAM framework philosophy. They succeeded to manage that through using or adopting their own enterprise architecture frameworks to efficiently utilize their IS/IT resources to achieve business value. These organizations instead of merely using their IS/IT capabilities as a management resource, they succeed to utilize them as a business driver to achieve a growth in productivity and gain business profits.

Furthermore, it can be noticed here that the efficient deployment of IS/IT helps the organizations to derive professional business services, and IS/IT services and products to both CSC and Volvo Group and their clients and business partners. The corporations continue and ensure efficient and profitable delivery of service and products, and deliver business value of IS/IT investments.

Based upon the previous analysis and what has been mentioned in the previous chapters that IS/IT is inseparable parts of the business process in both Volvo Group and CSC. As a matter of fact the IS/IT is embedded in each department and business unit in the organizations. These firms succeed to bridge the alignment gap between the business processes and IS/IT capabilities. The efficient implementation of IS/IT through achieving strategic alignment both in Volvo Group and CSC has a positive impact on the corporations' productivity and profitability. This can be noticed from the increased demand on their products and services that created a business value to the organizations and their clients. Volvo IT offers the required services to each department and business unit in the Volvo Group and its business partners both inside and outside Sweden. The CSC offers the IS/IT services to itself and satisfies itself as a firm to manage its business and IS/IT services, and offers business and IS/IT services to its clients in different parts of world.

Therefore, according to what have been presented, I can identify that IS/IT in both CSC and Volvo Group/Volvo IT is a business enabler as well as a business driver, and these two firms utilize IS/IT very efficiently to deliver business benefits and business value. Nevertheless, it can be recognized that the success and performance in both CSC and Volvo Group/Volvo IT could be different due to the different business nature of each organization. Hence, according to the theoretical study and empirical analysis, it can be identified that although the two organizations have followed slightly different approaches to leverage their IS/IT resources to achieve alignment, they have successfully managed to achieve strategic alignment. The firms under study have managed to achieve a strategic alignment according to the strategic alignment theory of the SAM framework [Henderson and Venkatraman, 1991 & 1993], although each one uses its IS/IT management framework. As a matter of fact, CSC and Volvo Group have succeeded in achieving the strategic fit and functional integration between the different components of the business domain and IS/IT domain as identified by Henderson and Venkatraman (1991 & 1993), and IS/IT becomes both a business enabler and a business driver as well. Therefore the IS/IT investment creates a business value to these organizations.

Moreover, developing, adapting or using enterprise architecture framework(s) is a good approach that facilitates proper coordination and organization of the business and IT processes across the enterprise to achieve alignment. For instance, the GIB & PU framework presented in Figure (6.1) developed by Volvo IT at Volvo Group and the ITSR framework presented in Figure (6.5) developed by CSC are very good approaches to facilitate the business and IT processes across the enterprises to create a synergy and achieve strategic alignment. Through these approaches business and IS/IT people work together, and the management people are well informed and knowledgeable with IS/IT issues, and IS/IT management people are well informed and knowledgeable with business concepts and issues. This way of coordinated and organized work creates some sort of harmony and coherency between the different groups in the different business units in the organization. Through ITSR in the CSC and GIB & PU Volvo Group and Volvo IT, the companies create some sort of business-IT culture that led their people in the organization to be highly harmonized in business.

It important to recognize that although this study reveals that Volvo Group and CSC have succeeded to leverage their IS/IT resources properly and develop business value through an efficient implementation of their IS/IT resources. Strategic alignment is a dynamic process as argued by Henderson and Venkatraman (1993), which implies that it is a continuous and cyclic and dynamic process that can be catalyzed by identifying key performance indicators, enterprise modeling, administrative governance processes, and other alignment execution mechanisms [Henderson and Venkatraman, 1993, Venkatraman et al., 1993; Gregor et al., 2007]. Therefore, enterprises have to deal with the important key factors to achieve strategic alignment presented previously in continuous and iterative ways. Furthermore, change is inevitable and essential for business development and innovation. The business environment is a dynamic environment, and as business strategies change, IS/IT strategies and processes must keep pace. Therefore, it is important for organization to identify the proper way to manage change [Henderson and Venkatraman, 1991 & 1993; Luftman et al. 1993]. IS/IT is always changing and the rate of technological change is very fast, due to the continuous and rapid progress in IS and IT, which demands that organizations have to keep up-to-date with technology development and business development [Ward and Peppard, 1996 & 2002; Earl, 1992].

Summary

This chapter presented the discussion of the analytical study presented in this thesis. It demonstrates, as it can be noticed from the above discussion that successful organizations in business and industry use IS/IT extensively in almost all business processes. They effectively utilize the IS/IT implementation to achieve strategic alignment to accomplish significant productivity and gain profit in efficient ways. Achieving strategic alignment helps organizations to achieve significant business benefits in the following:

- Significantly enhances business efficiency and improve customer services to create business value to customers and shareholders and stakeholders,
- Helps organizations to achieve significant gains in productivity and profitability,
- Creates operational efficiency, improves business processes, and stimulate growth,
- Helps organizations to achieve competitive advantage through high quality products and services with lower prices,
- Significantly enhances the IS/IT investments which increase the market penetration and organization's revenue, and
- Facilitates the agility and flexibility in product and service delivery, etc.

8. CONCLUSIONS

This chapter presents a summary of the results and highlights the conclusions to the study findings and contributions in this master thesis. It presents the research limitations/implications of the findings and some suggestions and recommendations.

8.1 Conclusions

This thesis project presented a qualitative research study to address the concept of enterprise architecture and investigates the link between the IS/IT investment and the organizational performance. It identifies the organizational performance in terms of the concept of business value (business benefits) of the IS/IT investment as an output result of achieving strategic alignment between business processes and the IS/IT capabilities through using an enterprise architecture framework. A positive impact of adapting an enterprise architecture framework(s) to achieve a strategic alignment that leads to organizational performance has been identified. Achieving strategic alignment between business resources and IS/IT capabilities through adapting the SAM framework to enterprise architecture has been introduced. This approach helps and supports organizations to bridge the alignment gap between business strategy and IS/IT strategy and create business value to the organization.

Therefore the main findings and conclusion points determined from the theoretical study, analytical study and empirical study in this master thesis can be represented in the following:

➢ The theoretical part in this thesis identifies the concept of enterprise business architecture as a management framework that emphasizes the business perspectives and architecture that identifies the practical issue in designing the business architecture based on the organization's IS architecture. This management framework can be used to describe and organize and control an organization's structure, processes, applications, systems and techniques in an integrated way within the context of enterprise architecture. Enterprise business architecture helps organization to achieve alignment between business processes and IS/IT capabilities that facilitates agility and flexibility in business processes in the organization. This approach helps to create a business value to the organization and its stakeholders.

➢ The concept of business value can be identified based upon the IS literature as an attribute that refers to a measure of tangible and/or intangible assets that evaluate the quality that renders something valuable or significance to someone, organization, or society. It refers to the importance, usefulness, or worth of something for someone or organization.

➢ The analytical study of enterprise architecture frameworks, concerning identifying the concepts of strategic alignment and business value, and the issue of achieving strategic alignment, demonstrated the following conclusions:

▪ Based upon the analytical study presented in this thesis, it can be noticed that there is a hard difficulty to find out how enterprise architecture frameworks identify the concepts of alignment/strategic alignment and business value.

▪ Although achieving alignment/strategic alignment is a very important issue in enterprise architecture; enterprise architecture frameworks have not explicitly or implicitly demonstrated how these frameworks achieve alignment/strategic

alignment. Furthermore, they do not identify the concept of business value in a clear description. Therefore, it is still difficult to realize with the real benefits of the enterprise architecture in practical life in business and industry.

➤ The empirical study in this thesis reveals the impact of achieving strategic alignment on the organizational performance in the following:

- The efficient implementation of IS/IT resources helps and supports organization to achieve significant growth in productivity and gain in profitability,

- Creates operational efficiency and improves business processes and stimulates growth,

- Helps to achieve and/or maximize business value/business benefits to satisfy the organization's shareholders and stakeholders,

- Achieve competitive advantage and increase its market penetration and organization's total revenue,

- Improve organizations competitiveness using creative approaches to achieve high quality products and services,

- Facilitates the agility and flexibility in product and service delivery, and

- Significantly enhances IS/IT investments, which consequently increase the market penetration and organization's revenue.

8.2 Research limitation/implication

I believe that while this thesis provides very interesting insights on leveraging organizational performance through enterprise business architecture with emphasis on achieving strategic alignment and its impact on organizational performance. The research project is limited to a strict time limitation and the practical part has only two cases, and the empirical study is constrained by the data collected in the case studies. A potential further empirical research study is needed to address the criticality of strategic alignment on leveraging organizational performance; and evaluating the tangible business benefits of IS/IT investments that was alluded to in this study. This will give invaluable results that will help people in academia and industry to understand and realize with the business value of IS/IT investment through achieving strategic alignment.

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