A method for valuing architecture-based business transformation and measuring the value of solutions architecture
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1. Business Value of Enterprise and IT Architecture

This chapter introduces the subject of the thesis, definition of the concepts, statement of the key research questions and deliverables, followed by a description of the content of the chapters of the thesis.

1.1 Introduction

The theory and especially the practice of Enterprise Business and IT architecture have been developed quite vigorously the last years. Seen as a further development of the Information Planning approach (Martin, et al., 1989) the starting point for IT architecture is often considered John Zachman’s article in the IBM Systems Journal (1987). Enterprise architecture is considered the "missing link" between, on the one hand, strategy and implementation and, on the other hand, business operation and IT operation (Maes, et al., 1999). While the development of business and IT architecture methods more or less started from 1987, the approach and particularly the theory of architecture are still under development. International and national standardization organizations, such as The Open Group (TOGAF, 2004) and in the Netherlands Lankhorst (2005) is working on standardization of business and IT architecture and the effects of these efforts are now reaching the end users. Various IT organizations have developed their own architecture framework and use it in the market (Rijsenbrij, et al., 1999).

Considering the activities that take place in the business and IT architecture world, it is surprising that the foundation and business case for these activities are largely nonexistent. The whole field of architecture is still relatively young; main developments only started about 10 years ago. There is still little research done to quantify, in financial terms, the value of architecture.
The main subject of this thesis is to quantify financially the value of architecture-based business transformation and to measure the value of solutions architecture. Organizations invest a lot of money in architecture. These investments include, among others: training of architects, development of architectures and implementation of architecture processes within the organization. Is the spending of all this money justified? Approaches to information economics (Parker, et al., 1988; Oirsouw, et al., 1993) generally do not include the effects of business and IT architecture.

We argue that the consequence of this omission is a main reason that there is no measurable correlation between investment in IT and the business effects for the company (Strassman, 1997). Soh and Markus (1995) argue that plain investment figures, comparing the level of the investment to, for instance, revenue do not include any indication about the effectiveness of the investment. We claim the application of Enterprise Architecture improves Business-IT alignment. Furthermore, it improves the effectiveness of IT resources.

Summarizing, the subject of this thesis is linked to the effectiveness of investments in IT and the business benefits that an organization derives from investment in IT. In other words, we argue that architecture is a point of leverage, which can help management to improve the effectiveness of IT investments.

### 1.2 Definition of Enterprise Architecture

In order to understand the subject of architecture and the role of architecture within an organization, we will define what we mean by enterprise and solution architecture. Various definitions of business and IT architecture are in use. An overview:

1. “The fundamental organization of a system embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution.” (IEEE, 2000)

2. “The formal description of the 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.” (TOGAF, 2004)

3. “Normative restriction of designer freedom” (Dietz, 2005)
4. “Architecture links vision, strategy and feasibility, focusing on usability, durability and effectiveness” (IAF, 2007).

5. “Enterprise Architecture is the practice of applying a comprehensive and rigorous method for describing a current and/or future structure and behavior for an organization’s processes, information systems, personnel and organizational sub-units, so that they align with the organization’s core goals and strategic direction.” (Wikipedia, 2007)

Considering these definitions, it appears that the first two are defining architecture results and the third and the fourth define the concept of architecture. Apparently, the type of definition reflects the purpose of the author of the definition. The Wikipedia definition defines architecture as a practice, addressing both the business and technical architecture. In this thesis, we will use the following definition:

**Definition 1-1. Purpose of Architecture**

The purpose of Enterprise and Solution Architecture is to align the current and/or future structure and behavior for an organization’s processes, information systems, personnel and organizational sub-units, information systems and technical infrastructure with the organization’s core goals and strategic direction.

**Definition 1-2. Enterprise Architecture**

Enterprise Architecture is the practice of applying a standard approach for and describing in a standard way the current and/or future structure and behavior for an organization’s processes, personnel and organizational sub-units, information systems and technical infrastructure.

Note that this definition does not make a distinction between Business and IT architecture; it encompasses them both. This is how we consider the EA discipline; it should be seen as one discipline, addressing both business and IT.

### 1.3 Solutions Architecture

Enterprise architecture sets standards and guidelines, based on strategy, for the structuring of the organization. The Enterprise architecture is implemented by many projects, each implementing its own small part of the total design. The approach where project objectives are also determined by enterprise architecture objectives is called development under architecture. Wagter et al. (2001) formulate this as follows: “Development under architecture realizes concrete business goals
within the desired time frame, at the desired quality levels and at acceptable costs. [...] When a project is developed under architecture, the project starts with a so-called Project Start Architecture ([PSA]). A [PSA] is a translation of the overarching [enterprise] architecture principles and models to rules and guidelines tailored to the project. This provides the practical rules, standards and guidelines that are used by the project. Also, project design choices that influence other projects are described in the [PSA].” Based on this description, we define Solution Architecture as follows:

**Definition 1-3: Solution Architecture**
Solution architecture is a way of working with two main aspects:
(1) **Projects incorporate enterprise architecture-based standards, rules and guidelines.** The solution architecture describes the structure of the solution, the main interfaces and the interaction to the environment, to the existing application portfolio and to adjacent projects.
(2) **Architecture governance processes are in place to control the progress of the projects, with regard of the implementation of the standards, rules and guidelines by the project.**

The function of Solution Architecture is to link strategic business principles and objectives to actual implementation. As such, it can be considered an element of the Enterprise Architecture discipline, as the part of the EA discipline that takes care of implementations of the architecture.

### 1.4 **Key Research Questions**
The following key research questions are addressed:

1. Can we define a suitable method for measuring and quantifying, in financial terms, the value of enterprise architecture-based business transformation?
2. Is the method usable in practice to determine the value of enterprise architecture-based business transformation?
3. Can we define a suitable method to measure and to quantify, in financial terms, the value of solution architecture?
4. Can we apply this method to determine the value of solution architecture?
5. How is the business value of IT related to the value of enterprise and solutions architecture?
1.5 **Key deliverables**
The following key deliverables are defined in this thesis:

(a) *A definition framework for measuring the value of business and IT architecture*
(b) *Definition of a method to measure the value of enterprise architecture based on business transformation*
(c) *Definition of a method to measure the value of solution architecture*
(d) *The results of a case study describing the value of enterprise architecture based on business transformation initiatives*
(e) *The result of a case study describing the value of architecture-based business transformation*
(f) *Results and conclusions describing the relationship between the maturity of architecture and the business value of IT*

1.6 **Content of the Thesis**
Chapter 1 describes the key research questions and the content of the thesis. Chapter 2 defines enterprise and solution architecture, and describes the relation of architecture to other disciplines. Chapter 3 introduces the value of architecture and describes the architecture value assessment framework. Chapters 4 and 5 describe a method of measuring the value of architecture-based business transformation. Chapter 4 introduces the measurement approach. Chapter 5 describes the results of a case study, where this approach is applied. Chapters 6 and 7 describe a method of measuring the value of solutions architecture. Chapter 6 introduces the basic concepts and the measurement approach, while chapter 7 discusses the results of a study applying this approach. Chapter 8 describes the role of architecture and how this contributes to the value of IT for organizations. Chapter 9 contains a revisitation of the key research questions and overall conclusions.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to the subject, definition of the key concepts, description of the key research questions and key deliverables.</td>
</tr>
<tr>
<td>2</td>
<td>Definition of the role of architecture and positioning of architecture and relations to business transformation, strategy development and program execution.</td>
</tr>
</tbody>
</table>
### Chapter Description

3 Introduction to the measurement approach of the value of enterprise and solutions architecture. Introduction of the architecture value assessment framework.

4 Description of the approach for measuring the value of architecture-based business transformation.

5 Description of the case study for measuring the value of enterprise architecture based business transformation.

6 Description of the approach to measure the value of solutions architecture and the application of this approach for 49 IT software development projects.

7 Description of the results and conclusions from the solutions architecture case study.

8 Description of the role of enterprise architecture in creating IT value for organizations.

9 Revisitation of the key research questions and overall conclusions.

### Appendixes Description

1 Description of the approach of using ROA for valuing enterprise architecture development over multiple years

2 An overview of business services for the financial case study

3 Raw data analysis and transformation

4 Analysis of the null-hypothesis