A method for valuing architecture-based business transformation and measuring the value of solutions architecture
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Summary

Enterprise and solution architecture have become key elements in today’s business and IT portfolio of activities. The purpose of these initiatives is to improve business and IT alignment, which is assumed to result in more effective and efficient use of the business and IT assets of a company. Enterprise architecture is the discipline that aligns business strategy with execution. Solution architecture is the discipline that aligns the enterprise architecture with business and IT implementation projects.

The theory and especially the practice of Enterprise Business and IT architecture has 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). Every major organization has created an enterprise and/or a solution architecture department which is responsible for defining and implementing the respective architectures.

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. There has been very little research published on the financial value of business and IT architecture. In other words, when organizations are investing in architecture by setting-up architecture departments, recruiting architects, educating and training these architects and setting-up architecture development and governance procedures, the cost of these activities can relatively easily be determined. However, the financial value for the business of these activities is largely undetermined. With “financial value” is meant the revenue or savings (in Euro’s) created by organization, which originates from the use of enterprise or solution architecture.

Research Questions

To determine business value of enterprise and solution architecture, the following 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?

**Question 1. Can we define a suitable method for measuring and quantifying, in financial terms, the value of enterprise architecture-based business transformation?**

Several methods are available for determining the financial value of architecture-based business transformation. One of the most simple and straightforward methods is the Net Present Value method. This method discounts expected future cash flows. However, there are several shortcomings using this method (Saha, 2004). **Real Options Analysis (ROA)** is another method for assessing the financial results of enterprise architecture. However, the standard ROA approach is not suitable for evaluating the financial results of enterprise architecture. Enterprise architecture-based business transformation initiatives have two main sources of uncertainty. Business transformation initiatives face uncertainty with regard to revenue and uncertainty with regard to cost. Also, the probability distributions of the revenue and cost uncertainty may be different. The standard ROA approach cannot accommodate these requirements. Therefore, we have adapted the standard ROA method to make it suitable for assessing the value of an enterprise architecture based business transformation initiative. Our approach can include multiple sources of uncertainty, while each source of uncertainty may have a different probability distribution.

**Question 2. Is the method usable in practice to determine the value of enterprise architecture-based business transformation?**

To test the ROA-based financial assessment method in practice a case study is conducted. In the case study, several architecture-based business transformation scenarios are compared. The business value (in terms of business revenue and savings) is calculated using the ROA approach.

Based upon the experiences of this case study we can conclude that Real Options Analysis is a valid approach for quantifying the value of enterprise architecture based business transformation. We also can conclude that ROA provides a better insight into the value of architecture based business transformation than other valuation methods. The reason for this is that the ROA is also able to assess the value of revenue elements which are difficult to assess with other methods.

First, ROA assesses the value of future changes in the transformation initiative. Architectural investments generally have an uncertainty about the value of future
services. Because of this nature of architectural investments, it is often not clear beforehand how the investments will be applied for maximal usefulness. Future users of the architecture implementation may find novel ways to use it and to generate additional value from it. This uncertainty provides its own value, which is not recognized by other valuation methods.

Second, ROA allows for valuing infrastructural investments. Architectural investments tend to have an infrastructural character. Infrastructural investments are generally hard to value, because their benefits are spread across company and are contingent upon follow on investments. ROA can handle this uncertainty better than other methods.

**Question 3. Can we define a suitable method to measure and to quantify, in financial terms, the value of solution architecture?**

To understand the value of solution (or project-level) architecture we selected as a measurement method statistical analysis of projects. This method allows us to mutually compare the results of software development projects and correlate the role of solution architecture to project success. The method analyses variance in project success variables and correlates these variances with solution architecture related project input variables. Examples of success variables are: *Project Budget Overrun, Project Time Overrun* and *Customer Satisfaction*. Examples of project input variables are: *Presence of a Solution Architecture Design, Presence of Architectural Governance Procedures*, etc.

**Question 4. Can we apply this method to determine the value of solution architecture?**

The statistical analysis approach was tested in a survey of 49 software development projects. In the survey, we define ten solution architecture-related project input variables and correlate them with eight project success variables, by statistically analyzing the results of 49 software development projects. The table below gives an overview of the main results. Applying solution architecture product to projects is correlated with the following project success effects:

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<tr>
<th>Project Success Effect</th>
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<td>(a) 19% decrease in project budget overrun</td>
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<tr>
<td>(b) Increased predictability of project budget planning, which decreases the percentage of projects with large budget overruns from 38% to 13%</td>
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<tr>
<td>(c) 40% decrease in project time overrun</td>
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These results demonstrate that the use of solution architecture is correlated with substantial, positive effects on project success variables. We can conclude that there are convincing indications that the use of solution architecture is correlated with a substantial improvement of several key success variables.

**Question 5. How is the business value of IT related to the value of enterprise and solutions architecture?**

During the last 15 years, several widely-published studies fail to identify a correlation between business performance and investments in IT. This is contrary to popular belief that IT support and businesses in improving their performance. A key question for the IT industry is therefore why this correlation cannot be measured.

We find that many IT value studies do not incorporate the role and value of architecture. Because architecture is concerned with the effectiveness and appropriate use of IT assets within an organization, this implies that these studies do not distinguish between those organizations that use IT assets appropriately and those who do not. The underlying assumption for this research is apparently that higher IT investments automatically lead to a higher impact of IT assets within the organization, which – at its turn – would automatically lead to better business performance. This assumption is clearly incorrect. When considering the business value of IT, one should not only consider the level of IT spending, but also the level of effective or appropriate use of IT assets by the organization.

Based on our research findings and relevant literature, we conclude that enterprise architecture plays a pivotal role in improving the effectiveness of the use of IT assets within a corporation, improves IT impact on business performance and, consequently, allows IT investments to have measurable effects on business performance.