

Exploratory Case Study Research on SOA Investment Decision Processes in Austria

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Abstract. Aligning information systems to financial key performance indicators and measure its returns has become one of the most important topics over the last years. However, despite the growing investments of many corporations into IT in general, an increasing number of questions and concerns have been arising to the effectiveness of these investments and their payoffs. Hence, an evaluation of an enterprise's IT architecture, as a part of IT investments, has been increasing its role throughout organizations worldwide. Numerous conceptual studies and tools to predict the business value of IT/SOA investment portfolios are being offered; nevertheless most of them substantially lack accuracy. For this purpose, we empirically investigate the application of SOA investment criteria in large Austrian corporations, which will be realized through a multiple case study collection reflecting current investment strategies and measurements.

Keywords: Business Value, IT, Empirical Study, Service-Oriented Architecture (SOA).

1 Introduction

The business value of information technologies in general and the adoption of different enterprise IT architecture paradigms in particular have been the cause of discussion for both academics and practitioners for ages [1, 2]. A particular challenge IT departments have been facing during the last several years is the question of how to measure the value of service-oriented architectures (SOA). The enterprise architectural model called SOA can be defined as a computing paradigm that utilizes services as the basic constructs to support the development of rapid, low-cost and easy composition of distributed applications even in heterogeneous environments [3]. However, IT infrastructure maintenance requires substantial financial resources; hence benefits should outweigh the costs and suffice expected returns. It is often argued that enterprises which made substantial investments in IT projects are often dissatisfied with their return on IT investments [4], as value assessments are frequently conducted inefficiently, using improper or not comprehensive methodologies, or are completely abandoned [5]. The challenge of whether or not to pursue SOA as a key element of a company's IT strategy was

primarily based upon the lack of clarity regarding potential benefits of this type of architecture. Various IT success models [6], SOA business value frameworks [2, 7] and SOA value drivers have been identified [8]. Yet a thorough literature review displayed that most empiric publications focus on either enhancing SOA and Web service concepts or exploring their adoption in practice [9]. It has been argued that an investment into SOA often cannot be properly evaluated because value potentials of this investment have not been made visible enough [10], in addition the consideration of risk is virtually absent in research on the returns on IT investment, even though the risks are widely recognized [11].

2 Research Design

This paper aims to empirically investigate SOA investment-decision making practices in large Austrian companies from a finance perspective, i.e. the underlying investment criteria rather than exploring organizational SOA effects [12], business process implications [13] or setting up a business case including detailed benefits and costs [14]. We also intend to examine the consideration of lag effects, i.e. the timing of IT investment decisions¹, which have been neglected in past literature reviews [15]. A total of six public and private companies (semi-structured interviews with 2 interviewees per case) have been analyzed and coded by 2 different interviewers from January to March 2010. After independent within-case and cross-case data analysis using an inductive approach [16], common patterns and experiences among the selected companies have been identified. Derived from the considerations explained so far, the research questions for this case study can be formulated as follows:

1. What is the strategy and expected business impact behind SOA initiatives?
2. What investment methodologies and investment criteria (qualitative and quantitative) are being applied by leading Austrian companies to evaluate initial and continuous SOA investments?

Based on a thorough literature review and the nature of the research questions, case study research for has been selected as the appropriate form of methodology [17], which needs to instantiate well-defined models before the data collection begins [18] and data collection methods used for this research had to follow a well-structured conceptual framework for this IT business value research [19], which is depicted in Figure 1. The categories covered include SOA strategy, investment evaluation, which

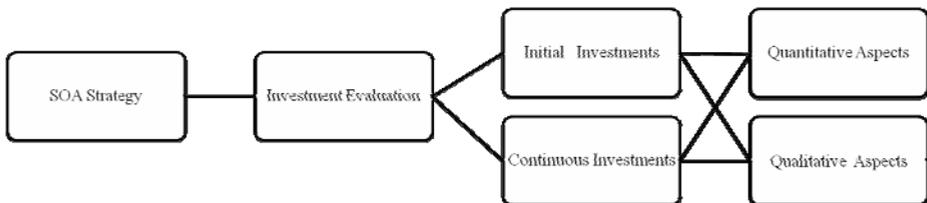


Fig. 1. Case Study Framework

¹ For an overview of the numerous models and valuation methods we refer to Frisk (2007) [20].

is split into initial investments and continuous investments to investigate on potential consideration of timing or lag effects. Examination on investment evaluation also reflects the distinction between quantitative and qualitative aspects influencing an IT manager's investment decision.

3 Case Analysis

Case 1 - Banking Group

The company is an Austrian banking group with a total of more than 2000 branches in Austria and the bank's strategy is focused on retail customers.

The touch point for SOA was the idea to integrate separate services from different technologies into a singular platform. Over the course of development the focus has shifted to business process management. Back then, cost savings were not an issue for the group because of its good financial performance, however, due to the financial crisis, cost pressure has become more severe and the need to reduce costs has suddenly emerged. Key business processes have been identified and categorized in their respective fields based on their automation potential, eventually it is planned to cover all the key processes in the bank with SOA, despite the fact that it was stated by the CIO that services reuse was very hard to achieve with SOA due to the high degree of services customization. Initial investments into the new SOA framework were primarily based on qualitative aspects and didn't require any quantitative measurements, whereas continuous investments needed a 5-year ROI calculation. Continuous investments were primarily based on automation potential, e.g. process execution time is measured "by standing behind the account manager with a stop-watch", Qualitative aspects are not measured for continuous investments; moreover no calculations for potential future benefits of the investment are required. Based on the interview, the company is satisfied with its measurement techniques, and the measurements they deliver are "rather precise".

Case 2 - Telecommunications Group

The company's core business includes all aspects of mobile communication ranging from telephony to data transmission. It holds a strong market position in the Austrian market and is present in 8 countries in Europe. Altogether, the group serves approximately 20 million customers and employs approximately 20,000 employees. First SOA attempts were carried out in 2004 to eliminate excessive utilization of resources, increase transparency and reduce time-to-market, which is crucial to success in the dynamic and fast-paced telecom sector. A major benefit which has been realized with the first SOA implementations was the enablement of enterprise-wide communication in terms of a bridging between IT and other departments. There is no overall strategy behind the company's SOA initiatives to transform the whole architecture service-oriented; it is primarily used as a connecting layer between different silos with standard software, e.g. ERP or CRM systems. In terms of initial SOA investment evaluation mostly qualitative aspects on the benefits side of the equation have been used. Investment decisions were solely driven by the IT department; therefore no business case had to be calculated. All continuous IT projects are usually initiated by a change request coming from the business side, which requires a static business case containing a 5-year total cost of ownership calculation. In cases like automating

processes to lower the load of the call center, the amount of minutes saved by the investment, and therefore ROI, is relatively easy to calculate, however, it has been mentioned that it is far more difficult to calculate revenue increases due to the number of people who would for instance “switch their tariff plan based on the implementation of certain new services”.

Case 3 – Federal Ministry of the Interior

The department within the ministry is responsible for managing Austria’s central residence registry and the foundation of Austrian’s e-government services. The company only uses open-source software; also the process engine is based on an open source workflow system. The SOA implementation started in 2001 with XML and there were no pilot projects in the beginning on its way to SOA. The main reasoning behind the SOA implementation was to become faster, reduce errors, enable flexibility and improve change management. As a result, the company managed to hold its costs at a constant level, while traffic and number of users and transactions more than tripled. It has been stated by the company that one of the major advantages gained by SOA is the reuse of separate SOA blocks; accordingly all the processes of the company are currently supported by SOA. The decision to pursue a SOA strategy was primarily taken on qualitative aspects as no calculations have been made prior to the investment. Ongoing projects are evaluated with a static ROI calculation and investment costs are simply compared to the costs saved. The company is satisfied with its investments in SOA and during the past 4 years, the company managed to run at the same budget, although the amount of traffic, users and transactions has more than tripled.

Case 4 – Publishing Company

The company is the leading publisher of newspapers and magazines in Austria. It publishes 3 daily newspapers, 6 weekly magazines and employs more than 2000 employees in Austria. The company operates in a very heterogeneous IT environment, therefore key challenges include the ability to build processes quicker, cost-efficiency and the possibility to implement open-source technology more easily. In contrast to the Telco case, the publishing business does not require very short time-to-market, nevertheless SOA investment decisions have also been taken by the IT department in order to be better prepared for possible future developments.

Based on its strategic nature, initial SOA investments have not required any ROI calculation at all. Main aspects proposed by the IT department to evaluate potential investments have included cost and time savings in development, flexibility due to the implementation of open-source technologies as well as support of future business-to-business processes. In terms of continuous investments a 5-year ROI calculation is required. The IT department is responsible for calculating the costs, while business units are responsible for researching the benefits, either in cost savings or in revenue increase dimensions and subsequently both parts are compared over a 5-year period. No business project is approved if it doesn't break-even within the next 5 years, though cost savings had been identified very quickly during the first process automation projects, e.g. to reduce the workload of the call-center or implementation of an electronic billing system as the amount of minutes and postage expenses saved were easy to calculate and quick-wins. The company has recently started its company-wide SOA initiative and is satisfied with the results so far.

Case 5 - Data Service Provider

The company is the IT service provider for the Austrian public sector. Its two major customers include the Ministry of Finance and Ministry of Justice, whose IT infrastructure and architectural development are at very different stages.

The main drivers behind SOA initiatives were flexibility, quicker time to market, cost efficiency and synergy potential through services reuse. In the Ministry of Finance SOA is currently being implemented in the area of customs and taxes. The initial project started in 2007 and it was originally planned to transform the entire applications landscape service-oriented. In the Ministry of Justice SOA has been approached incrementally, focusing on optimization potential in the area of process development, currently services specification and development accounts for about 15% of the annual IT budget. For any initial SOA investments, similar to projects which are legally required to be implemented, no ROI calculations have to be completed. The main drivers that facilitated the decision to pursue SOA were qualitative aspects such as flexibility, transparency and faster time-to-market. Every continuous investment is evaluated based on several key criteria, e.g. IT strategy fit, investment costs, cost saved in operations and development. Current projects such as the electronic document exchange have been easy to justify as the calculation of time to be saved by eliminating manual process steps.

Case 6 - Insurance Group

The company is an international insurance group with its headquarters in Vienna. It is present in more than 20 countries in Europe and together with all its subsidiaries abroad, the company employs more than 20,000 employees and serves more than 7 million customers. The company is one of the SOA pioneers in Austria and has one of the most SOA-intensive architectures in the country. SOA currently accounts for approximately 1/3 of the total architecture of the group utilizing mostly web services, while large part of the group's architecture is comprised of old legacy systems. The main reasons behind the SOA implementation were expected efficiency increases, IT centralization as well as cost savings. After first steps in the late nineties, the scope of the first big SOA initiative included a business process management system, which was originally implemented as a pilot project by the company's own development team. However, the group decided to shift from in-house development to investing in ready-made solutions instead. The first large investment into SOA was not supported by any ROI calculation due to its strategic importance; still all continuous investments in the company are usually evaluated based on qualitative and quantitative aspects. Qualitative aspects include the alignment of IT and business processes overall efficiency improvements. Quantitative aspects consist of a 3-year Total Cost of Ownership calculation.

4 Research Results Analysis

After evaluating 6 cases of SOA implementations in large Austrian companies in various industries a distinct pattern of investment criteria has been examined which is depicted in Table 1. In almost all cases, initial investments into SOA were supported by primarily qualitative aspects. These included transparency, efficiency and

flexibility, services reuse, faster time-to-market, strategic reasons or focus on key business processes. Some of the companies had conducted pilot projects prior to their investment decision, while others went straight to implementation. In none of the cases stakeholders were fully aware of all the costs and benefits of SOA implementations with regards specifically to their company. However, it must be stated, that all of the interview partners were satisfied with their investments into SOA. In spite of the numerous existing IT valuation methods, advanced techniques have hardly been used and managers interviewed in this study predominantly used methods they intuitively understood [21]. Some of the reasons put forward for the failure to monitor benefits of their investments are [22]:

- Assessment of benefits was not required due to business strategy guidelines
- Difficulty to asses benefits after project implementation

In contrast to initial SOA investments, the evaluation focus of continuous projects in SOA environments observed shift to more quantitative aspects, with ROI in various forms serving as primary evaluation metric, while qualitative aspects have been playing a secondary role at this stage. Interestingly, some interview partners have given contradictory statements about certain benefits of SOA, such as reuse. It became also transparent that still IT employees are responsible for decisions related to SOA budgeting and spending, which is highly questionable [23]. The main reasons for the inconsistency of SOA investment evaluation included the choice of incomprehensive evaluation methodologies, inadequate assessment of inputs and outputs and the complexity behind establishing the total value of SOA [24], therefore the most common and accepted measure to justify IT investments based on this study has been a static Return on Investment (ROI) calculation. Nevertheless, it is uncertain if such a financial measure and other metrics can reflect intangible benefits, long-term strategic advantages and also the risk that enfold SOA-related investments.

Table 1. Cross-Case Analysis

Investment Criteria	Case	Banking	Teleco	Ministry	Media	Data Service Provider	Insurance
		<i>SOA Pilot</i>				✓	
Qualitative Aspects	Transparency		✓				
	Efficiency	✓		✓		✓	✓
	Flexibility	✓	✓			✓	
	Re-use			✓	✓	✓	
	Time		✓			✓	
	Strategy		✓		✓		
	Process Focus					✓	✓
Quantitative Aspects	Costs	✓	✓	✓	✓	✓	✓
	Revenue Increase		✓				
	ROI						✓

5 Conclusions and Further Research

It has been shown in this paper that it is still unclear how appropriate financial evaluation methods used in practice are to fully capture proposed SOA benefits and that a gap between science and practice is still undeniable. Based on the results presented we will concentrate our future research on (1) financial performance measures capable of evaluating all aspects that arise from SOA-related investments and (2) how to estimate payoffs from previous or future SOA investments. We are currently working on a real-options approach allowing to measure for risk and staged investments in a SOA context, which has been ignored in the past [11] and recommend to further investigate on this topic.

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