

2011

A Systematic Meta-analytic Review on Factors Influencing the Strategic Alignment in Service-Oriented Architecture Projects

Patrick Mikalef
mikalef@ionio.gr

Adamantia Pateli
pateli@ionio.gr

Follow this and additional works at: <http://aisel.aisnet.org/mcis2011>

Recommended Citation

Mikalef, Patrick and Pateli, Adamantia, "A Systematic Meta-analytic Review on Factors Influencing the Strategic Alignment in Service-Oriented Architecture Projects" (2011). *MCIS 2011 Proceedings*. 58.
<http://aisel.aisnet.org/mcis2011/58>

This material is brought to you by the Mediterranean Conference on Information Systems (MCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in MCIS 2011 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

A Systematic Meta-analytic Review on Factors Influencing the Strategic Alignment in Service-Oriented Architecture Projects

Deleted: SOA

Formatted: English (U.K.)

Mikalef, Patrick, Ionian University, Tsirigoti Square 7, 49100, Corfu, Greece,
mikalef@ionio.gr

Pateli, Adamantia, Ionian University, Tsirigoti Square 7, 49100, Corfu, Greece,
pateli@ionio.gr

Abstract

With an increasing amount of companies engaging the Service-Oriented Architecture (SOA) paradigm, there has been a focus of attention on the business value which such projects may offer. Research in this direction however has been lagging, with studies focusing in their majority on technology-oriented aspects of SOA. This paper attempts to aggregate findings on factors that enable strategic alignment and observations that have been found to positively impact the business value of SOA projects. Our analysis is based on a meta-study of relevant academic literature. Findings suggest that unlike traditional Information Technology (IT) projects, SOA implementations require focus on three additional domains; an appropriate Infrastructure to support the development and deployment of SOA projects, an explicitly defined SOA Governance plan, as well as the Organizational Culture to support it. With the aid of a focus group consisting of nine expert domains, we then categorize the above factors into the following four levels of alignment; organizational, project, individual/cognitive and system.

Deleted: Service

Formatted: English (U.K.)

Keywords: Service-Oriented Architecture, Strategic Alignment, Meta-study, Business IT Alignment, Focus Group, Qualitative Study, SOA success and failure

Deleted: Service

Formatted: English (U.K.)

1 Introduction

For over two decades Business/Information Technology (IT) alignment has topped the list of concerns for scholars and practitioners (Luftman et al., 2005). Hundreds of research articles have been published on this issue, stressing the fact that companies which effectively manage to align their business with their IT strategies are more prone to realize an increase in organizational performance (Sabherwal & Chan, 2001; Cragg et al., 2002; Chen, 2010). The constantly changing business environment forces companies to continuously modify their strategies and operations in order to be competitive (Kennerley & Neely, 2003). The dynamic environment in which companies operate also requires IT to be agile, robust and easily adaptable to business needs (Kulatilaka & Venkatraman, 2001; Mathiassen & Pries-Heje, 2006). This constitutes a major issue for firm executives when selecting and deploying IT applications to support or form the corresponding business strategies, making the process of aligning business with IT a burden (Baets, 1992; Chan & Reich, 2007). In literature this difference of phase between the development of the business strategy and the deployment of the corresponding IT systems is a well-known fact. Scholars indicate that alignment should be seen as a process of change over time which requires continuous adaptation and monitoring (Hendreson & Venkatraman, 1993). Despite much attention placed on this issue, there still seems to be a time lag between the business and IT planning process which executives are unable to face. By the time an IT plan is deployed in order to support the business strategy, it is highly probable that it is already obsolete due to the constantly changing business environment (Van Der Zee & De Jong, 1999).

This apparent contrast between continuously changing business needs and inflexible and in most cases complex information systems, creates the need of fundamentally reshaping the way we consider IT architecture. The rapid growth of cloud computing, web services and Service-Oriented Architecture (SOA) provide the necessary tools for a transition to a more agile, cost efficient and interoperable environment (Chen, 2008; Papazoglou et al., 2007). However, the full potential of such digital technologies still remains largely undiscovered by companies, despite the solid evidence indicating that adopting SOA can provide a number of performance improvements (Hau et al., 2008; Bell, 2008). Furthermore, the extent to which web services and SOA in general can promote higher levels of business IT alignment, is a subject which has received inadequate attention so far; Studies to date have focused mostly on the financial impact of adopting a Service-Oriented Architecture, with limited focus on the impact that a SOA may have on a strategic level (Bieberstein et al., 2005; Arsanjani et al., 2007). More specifically there is a large gap in research literature regarding how organizations should apply the SOA concept in order to appropriately support and enhance business functions. This apparent lack of attention on factors influencing the alignment levels of SOA projects could very well be one of the reasons for which the full potential of SOA has yet to be realized (Viering et al., 2009).

The objective of this paper is to develop a framework pinpointing the critical factors on which an organization should focus during the implementation of a SOA project, so that its strategic objectives are met. By aggregating the most critical factors in attaining strategic alignment on SOA projects, it is then a simpler task to focus on each of them separately and achieve the expected level of fit between business and IT. It is expected that our proposed framework will promote the development of SOA implementations which are aligned to the business strategy.

In order to achieve this objective, a literature review is presented in the next section concerning empirical studies in the field of strategic alignment and SOA implementations. It should be noted that

the purpose of this research is not to propose a methodology for attaining alignment in SOA projects, but rather to present a framework on the different factors that must be taken into account during such a projects lifecycle. It is our firm belief that before proposing such a methodology for maximizing the degree of strategic alignment, all critical factors must first be recognized. We further follow the suggestions of Chan & Reich (2007) not only to list these antecedents of alignment, but also to investigate their inter-relationships through a systematic literature review.

In the following chapter, we present an overview of the most relevant empirical publications and their core findings. Chapter 3 introduces the conceptual framework based on the meta-study of the previous chapter, while in closing we present our conclusions and propose directions for further research.

2 Literature Review

The conquest of attaining strategic alignment is not new. For over two decades, scholars and practitioners have been faced with the challenge of revealing the secret formula which will provide companies with a competitive edge. However, it soon became obvious that creating a generic solution for any kind of enterprise and for any type of Information System was a mere delusion (Farrell, 2003). Although such studies provided some solid information about critical common factors influencing alignment, they could not explain those case specific attributes which are responsible for the greatest part. For this reason, efforts on creating Business-IT alignment models shifted in two directions, industry oriented approaches (Devaraj & Kohli, 2003; Avison, 2004; Cragget. al., 2002; Wills, 2006) and IS specific models (Paulzen & Perc, 2002; Holland & Light, 2001; Daamsgaard & Scheepers, 2000; Wetering van de & Batenburg, 2009). Such attempts provide better insight by taking into account the particularities of each case.

Before diving into case specific findings, it is first necessary to isolate those common factors that are of critical importance in the quest of attaining strategic alignment. With over 20 years of research on this field a vast amount of empirical publications exist which provide us with the necessary background to build upon. In order to identify common factors that influence the level of strategic alignment, we review non-sector and non-IS specific publications in Section 2.1.

Contrarily to research on Business-IT alignment, within the field of SOA, there is a recognized lack of empirical studies on the business aspects of such implementations (Viering et. al., 2009). Only a small proportion of SOA-related research has centered on enablers of successful SOA projects from a business point of view (Antikainen & Pekkola, 2009; Abdi & Dominic, 2010) with the majority of publications being focused on technical aspects. In Section 2.2., we review SOA-specific publications on success factors. Our goal is to identify those elements which lead to increased business performance, as result of strategic fit between SOA projects with business strategy. We argue that when an IT project is aligned with business needs, top management perceive the implementation of IS/IT as a success. Hence, it is our firm belief that success factors in SOA projects are in essence aspects that result in a strategic fit between business and IT.

To achieve the above objective, we have selected to review empirical studies with a significant number of respondents to assure a high degree of validity. In addition, our meta-study has included longitudinal studies, since they provide insight on antecedents that have a long-term effect on alignment. From these empirical studies, only highly cited or recent work published in distinguished journals and conference proceedings are selected. Finally we have chosen to use empirical studies

which were not performed on a specific domain, since the antecedents which are found can be applied in organizations in a range of business areas.

2.1 Business-IT Alignment

Business-IT alignment has been defined in literature in a number of different ways. Reich and Benbasat (1996) conceptualize alignment as the degree to which the mission, objectives, and plans by the firm are shared and supported by the IT strategy. Another definition by McKeen and Smith (2003) suggests that strategic alignment can be recognized when an organization's goals and activities and the information systems that support them remain in harmony (McKee & Smith, 2003). Chan (1992) argues that strategic alignment is the degree of fit between realized business strategies and realized IT strategy. It is evident from the above, that although scholars argue on different definitions of what strategic alignment actually is, they all agree that it is a desired state which yields significant competitive gainings for organizations.

In over two decades of studies on the topic of strategic alignment, a large number of empirical studies have focused on attributes which are regarded as being significant contributors in realizing this state. Table 1 presents some of the most cited empirical studies performed to date. A number of keyword combinations were used on scholarly article databases to select an initial pool of research articles in combination with related literature found in these papers. Through thorough screening and selection of highly cited empirical work, the initial set of articles was reduced to the articles presented in the table below. A number of common findings can easily be identified at a first glance from these selected publications. However, before isolating those which are proven to impact the attainment of alignment in more than one circumstance, a thorough review must be performed.

Author(s)	Year	Data Extraction Method	Sample Size	Significant Factors
Reich & Benbasat	2000	Interviews	57	<ul style="list-style-type: none"> • Shared Domain Knowledge • IT Implementation Success • Business/IT Communication • Business/IT Planning Process
Feeny et. al.	1992	Interviews	14	<ul style="list-style-type: none"> • Business/IT Communication (CEO/CIO) • Strong Leadership (CEO)
Sledgianowski & Luftman	2005	Case Studies (Longitudinal)	1	<ul style="list-style-type: none"> • Business/IT Communication • Skill Development
Teo & Ang	1999	Questionnaires	169	<ul style="list-style-type: none"> • Strong Leadership (Top Management) • Business/IT Communication • Shared Domain Knowledge • Business/IT Planning Process
Luftman et. al.	1999	Questionnaires	1051	<ul style="list-style-type: none"> • Senior Executives Support to IT • IT Involved in Strategy Development • IT Understands Business • Business/IT Communication
Weiss &	2004	Questionnaires &	21	<ul style="list-style-type: none"> • Business/IT Communication

Anderson		Interviews		<ul style="list-style-type: none"> • Top Management Comitment • Skill Development (Project level teams) • Monitoring & Control
Chan et. al.	2006	Questionnaires	226	<ul style="list-style-type: none"> • Shared Domain Knowledge • Prior IS Success
Avison et. al.	2004	Case Studies (Longitudinal)	1	<ul style="list-style-type: none"> • Senior Management capabilities • Collaboration in IS Planning • Shared Domain Knowledge • Business/IT Communication
Silvius	2007	Interviews (Focus Groups)	12	<ul style="list-style-type: none"> • Business/IT Communication • Partnership in Planning
Preston & Karahanna	2009	Questionnaires	243	<ul style="list-style-type: none"> • Shared Domain Knowledge • Business/IT Communication

Table 1. Literature Overview of Critical Factors in Attaining Strategic Alignment

According to a number of studies, strategic alignment requires a high degree of *shared domain knowledge* (Reich & Benbasat, 2000; Teo & Ang, 1999; Chan et. al., 2006; Avison et. al., 2004). The term refers to the degree to which business and IT managers are knowledgeable and actively participate in the others key processes (Reich & Benbasat, 2000; Preston & Karahanna, 2009). Furthermore, as Reich and Benbasat (2000) note, shared domain knowledge has an impact on long-term alignment i.e. sustaining the strategic fit between business and IT for longer time periods. The importance of *shared domain knowledge* is also identified to have an impact on IS performance, a corollary of strategically aligned IT (Nelson & Coopriider, 1996). In the same study, it is also noted by the authors that a prerequisite in enabling knowledge sharing between and within departments, is to foster a culture of mutual trust.

Rockart et al., (1996) indicate that increased *shared domain knowledge* is closely related with *Business/IT executive communication* with the one significantly affecting the other. Despite this close relationship, in literature they are regarded as two separate elements with a number of scholars stressing the importance that effective communication has on influencing the level of alignment (Feeny et al., 1992; Sledgianowski & Luftman, 2005; Weiss & Anderson, 2004; Reich & Benbasat, 2000; Teo & Ang, 1999; Chan et. al., 2006; Avison et. al., 2004; Silvius, 2007).

A third element which revolves around the collaboration of business with IT is that of the *planning process* between the business and the IT department. It is argued that through participation of the IT department in the planning of the business domain and vice versa, short term alignment can be achieved (Reich & Benbasat, 2000; Teo & Ang, 1999; Avison et. al., 2004; Silvius, 2007). A number of scholars also note that IT executives that participate in the business planning process are more aware of the objectives that top management has set than those who do not (Lederer & Burky, 1989). The utilization of planning frameworks for instance, such as enterprise architecture is considered to help improve the degree of business-IT alignment (Pereira & Sousa, 2005).

Contrarily to the three previous factors that were centered on the collaboration between the business and the IT domain, *strong leadership* is solely revolved around the ability of top management to take

action in a timely and appropriate manner and is considered to be one of the most important principles of total quality management (TQM) (Ugboro & Obeng, 2000; Feeny et. al., 1992).

Finally the importance of *skill development* is denoted in the study of Sledgianowski and Luftman (2005) in which they propose that organizations should promote on-the-job training, rotation, job enrichment and assignment in international positions. The maturity of the skill development process therefore is found to impact the degree of strategic alignment (Sledgianowski & Luftman, 2005; Weiss & Anderson, 2004). Research has also pinpointed that some actions of skill development such as job rotation between business and IT employees, can lead to increased levels of shared domain knowledge and facilitate better communication between the two domains (Reich & Kaarst-Brown, 1999; Watad & DiSanzo, 1998; Fuchs et. al., 2000).

An additional number of factors are discovered in various studies to have an impact on strategic alignment as seen on Table 1, such as *Prior IS Success* (Chan et. al., 2006) or *IT Success* (Reich & Benbasat, 2000). The aforementioned authors put forth the idea that companies which have in the past realized successful IT projects are prone to repeating this, hence, attaining a desired level of strategic alignment. Although prior IS success may serve as an indicator on how likely a company is to efficaciously undertake an IT project to support business, we argue that the strength of this factor lies in its ability as a predictor rather as a contributing aspect. We could make the assumption that several other factors actively contribute to a prior IS success, which if investigated could reproduce similar results. These for instance could include a number of our previous findings such as shared domain knowledge, strong leadership etc.

Finally, we consider findings that are reported in no more than one empirical study, to be unreliable to build upon in order to achieve and sustain business IT alignment. By this we do not totally disregard their significance, but rather place emphasis on those which are repeatedly identified in studies and thus are considered by researchers to be of the greatest importance.

Success Factors for SOA Projects

Over the last years, Service-Oriented Architecture (SOA) has emerged into the business world as a highly prominent architectural style (Viering et. al., 2009). The term was coined by Gartner analysts in 1996 and from the early 2000 managed to attract the interest of academics and practitioners globally (Natis, 2003). A definition provided by Beiberstein et. Al., (2005) refers to SOA as “a framework for integrating business processes and supporting IT infrastructure as secure, standardized components – services – that can be reused and combined to address changing business priorities” In order to stay competitive, organizations need to be agile and quickly adaptable to their external environment. The underlying IT infrastructure supporting the business functions must also be able to adjust according to the demands of the business. The basic premise of SOA is that it allows for the construction of loosely coupled composite services from a number of dispersed simple Web-Services. It is clear from the above, that this new architectural style promotes agility in IT, which is in alignment with business needs. However, SOA should not be seen as a solution to all IT problems, since it is argued that without a structured roadmap to implement a SOA, the strategic benefits which it offers cannot be realized (Huang & Hu, 2004; Biemborn, 2008; Adam & Doerr, 2008). It is evident that SOA projects, which in most cases span over a number of department and enterprises, require a high degree of Business/IT Alignment in order to be fruitful. From the scarce research in this direction, there is a strong indication that despite high expectations about SOA, initiatives so far have failed to enable this

alignment (Choi & Ramamurthy, 2011). Surprisingly, there is a lack of academic research for SOA projects on factors that impact the attainment of strategic alignment. Therefore, it is not possible to conclude with certainty that the factors found in the limited in quantity studies are the only ones significantly impacting the attainment of a strategic fit between business and IT.

Table 2 provides an overview on research performed to date on success factors, as seen from a business point of view, for SOA projects. It is surprising that although SOA has been in the spotlight of attention for almost a decade now, only six research studies have been performed on critical aspects that should be focused on during such implementations. Although the number of studies is disproportionately small compared to the attention which SOA has received, they do provide some very interesting findings. The research papers which we have included present: a) findings on factors that impact the attainment of strategic alignment in SOA projects, and b) critical aspects during a SOA implementation that are considered to lead to increased business value. Our position is that regardless of the naming given to these factors, they all revolve around the same concept, that of business IT alignment. Since the main concept of strategic alignment is applying IT in any given situation in a timely way, with all actions staying congruent with the business strategy, goals, and needs (Luftman & Brier, 1999), we argue that all studies center around the same notion.

Deleted: three

Results indicate that there are a number of similarities to success factors found in the previous section in attaining strategic alignment, such as *top management support* and *communication* between collaborating parties (Yoon & Carter, 2007; Abdi & Dominic, 2010). However, a number of elements are identified which are not noted in traditional IT projects of strategic alignment. This proves that SOA projects present some particularities in attaining Business-IT alignment and cannot be treated as traditional IT systems when aiming to attain a competitive edge.

Collaboration between domains was found to be a crucial aspect leading to strategic alignment in traditional IT implementations. In SOA projects, findings from empirical studies reveal that although the same applies in this case, it must be taken a step further, with trust, openness and inclination between business units to collaborate, being essential in order to realize business goals. Generalizing this concept, we can conclude that the *culture of the organization* is found to be a critical aspect in order to align business needs with the SOA project being implemented (Antikainen & Pekkola, 2009; Yoon & Carter, 2007). Quoting the words of Tony Bishop, vice-president of Wachovia: “*One of the greatest challenges is overcoming mistrust. Getting the business groups to trust another group to build something for them was not smooth.*” (Yoon & Carter, 2007). *Organizational culture*, as can be easily recognized, is a multifaceted element with trust lying at its foundation. Other aspects which comprise the *organizational culture* element are the forbearance of business silos, the openness of sharing data and knowledge from the IT side and strategic plans from the business side. Furthermore a culture of willingness for change is identified by Weill and Ross (2004) to be crucial in order to migrate to a SOA environment.

SOA governance is also presented in the study of Yoon & Carter (2007) and Antikainen & Pekkola (2009) (under the category of *Processes & Methodologies*) and regarded as one of the most important aspects that organizations must focus on, since it enables a better fit with business needs (Antikainen & Pekkola, 2009; Yoon & Carter, 2007; Abdi & Dominic, 2010). This concept is multifaceted and includes the processes of designing and assembling quality services and effectively defining rules to govern and use these services. Sambamurthy and Zmud (1999) identify three primary modes of IT governance: centralized, decentralized and federal depending on the distribution of authority which corporate, divisional and line management have over IT resources. The choice of an IT governance

mode according to the authors should be based on a number of organizational contingencies. SOA governance can be identified as a subset of IT governance. As an extension of IT governance, SOA governance must address how the decisions rights, infrastructure, policies and measures need to be managed in order to successfully deploy a SOA project.

Last but not least, *SOA technology infrastructure* and development tools are identified as a significant factor during a SOA implementation project, leading to greater results of alignment between business and IT. The utilization of such tools has been argued to be essential in order to enable faster delivery cycles thus allowing for greater business agility (Baskerville et. al., 2005; Choi and Ramamurthy, 2011). It is also confirmed by Antikainen & Pekola (2009) that the use of rapid development tools, enables companies to deliver SOA project within shorter timeframes, thus releasing the potential of SOA to provide agility. Such development methodologies may include agile software development for instance which allow for incremental development of service components. While the aforementioned are centered on the development methodologies that must be applied, SOA infrastructure refers to the configurable infrastructure resources such as computing, storage, and networking hardware and software to support the operation of all applications.

Author(s)	Year	Data Extraction Method	Sample Size	Significant Factors
Antikainen & Pekola	2009	Interviews	12	<ul style="list-style-type: none"> • Organizational Culture and Human Resources • Processes and Methodologies • Communication • Technology
Yoon & Carter	2007	Case Studies	5	<ul style="list-style-type: none"> • SOA Registry (Technical) • SOA Governance • Top Management Support • Trust Between Business Units
Boh & Yellin	2009	Questionnaires	108	<ul style="list-style-type: none"> • Top Management Support
Bieberstein et. al.	2005	Case Studies	1 (Longitudinal)	<ul style="list-style-type: none"> • SOA Governance • Organizational Culture
Adbi & Dominic	2010	Questionnaires	202	<ul style="list-style-type: none"> • SOA Governance • Business/IT Communication • Architectural Analysis Design Techniques
Choi & Ramamurthy	2011	Secondary Data	140	<ul style="list-style-type: none"> • IT Infrastructure

Table 2: Literature Overview of Critical Factors in SOA Projects

3 Conceptual Framework

The main idea behind our conceptual framework for Business-IT alignment in SOA projects is to combine overlapping concepts from studies on critical aspects in Business-IT Alignment projects and

on research in the field of success factors in SOA implementations. Through this aggregation, the most crucial factors in attaining strategic alignment in SOA projects will be revealed, leading to a better fit between business and IT. As a starting point, a literature review was conducted by employing structured queries in scholarly databases. The combinations of keywords were entered into academic database search engines such as DBLP, OMEGA, Inspec, IEEE Xplore and Web of Science. Publishers included are Elsevier, JStor, IGI Global, SpringerLink, Science Direct, Wiley, Inderscience and Sage. The following structured queries were performed to retrieve publications on strategic and SOA alignment success factors respectively:

- {Strategic, Business-IT, Information Technology, Information System} + {Alignment, Fit, Linkage, Congruency, Integration, Fusion, Linkage} + {Critical success factors, Antecedents, Enablers}
- {SOA} + {Strategic, Business-IT, Information Technology, Information System} + {Alignment, Fit, Linkage, Congruency, Integration, Fusion, Linkage} + {Critical success factors, Antecedents, Enablers}

For the former set of keywords, a total of 43 papers which concerned factors influencing the degree of Business-IT alignment were initially pooled, while for the later a sum of 19 articles on SOA Alignment were gathered. Therefore, a set of screening criteria relevant to the study were included in order to select publications based on their theoretical and practical value. The criteria for the screening of these papers included amongst others:

- Focus on manageable factors rather than antecedents such as size, industry etc.
- The study is empirically tested with a sufficient number of respondents (Quantitative and Qualitative).
- Study not bound to a specific type of industry.
- Exclusion of overly technical factors of Information Technology affecting strategic alignment.

All papers retrieved through the structured queries were subject to application to the above criteria. Subsequently, a total of 10 articles were selected for review on factors influencing business-IT alignment and 5 for SOA projects. From these articles an additional 8 were used through cross-reference in order to enhance the reliability of findings resulting in a total of 23 papers.

Since the aggregation was performed on the basis of a systematic literature review, in order to validate these findings and categorize them according to the organizational level which they address, a group of experts were selected to express their opinions regarding the outcomes via email interviewing. The expert group consisted of six practitioners holding positions such as IT/SOA Consultants, Project Managers and CIO's, and three academics whose research interests include among others Strategic Alignment and business value of SOA implementations. The consensus from this qualitative study was that in SOA projects, although these factors are not always explicitly addressed in formal plans, they are recognized a posteriori to impact the attainment of strategic alignment.

Figure 1 provides a visual representation of the contributing factors that were recognized in the previous chapter to have a significant impact on the strategic fit between business and IT. The relationships between these elements are based on our findings in the literature review and on discussion with the group of experts. We further categorize the factors which we found to have a significant influence in the previous chapter, to the distinct organizational levels of alignment identified by Chan & Reich (2007): Organizational, System, Project and Individual/Cognitive. These

four tiers identified by Chan & Reich, provide a different scope within the organizational context in which matters should be addressed. By means of a custom-built questionnaire the participants of the expert group were asked to select on what level they believed each factor should be ideally addressed. The results from this survey had very little variation and were mapped by respondents in the following manner with Figure 1 depicting the associations between them as found in the systematic literature review:

- **Project:** Business/IT Planning Process and SOA Governance
- **Individual/Cognitive:** Skill Development and Strong Leadership
- **Organizational:** Business/IT Communication, Shared Domain Knowledge and Organizational Culture
- **System:** SOA Infrastructure

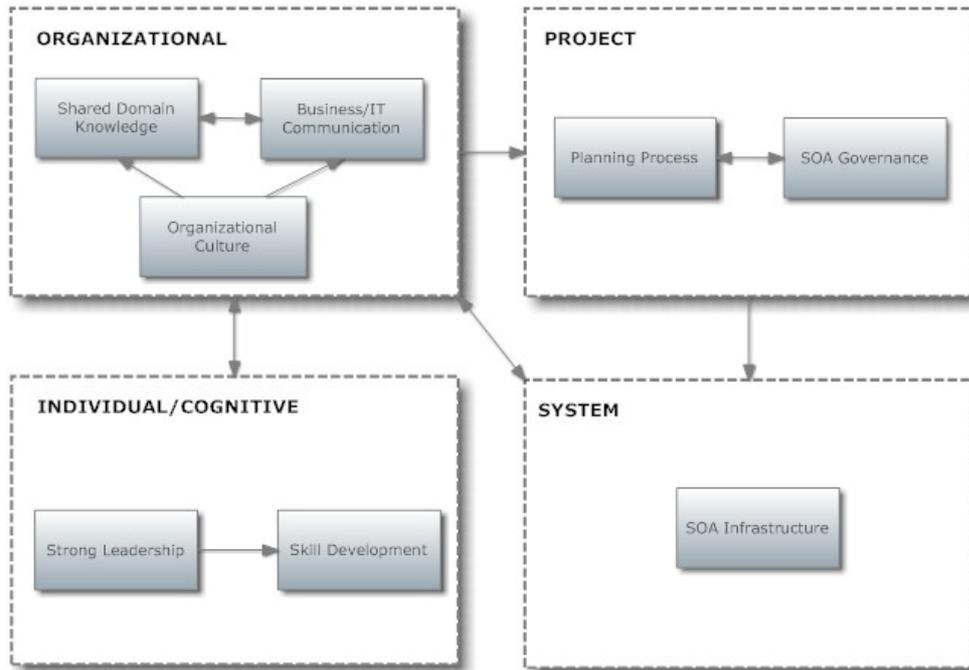


Figure 1: Relationships between factors contributing to strategic alignment in SOA projects

The visual representation of the relationships between the elements and the domains in which they are pertained provides a stepping stone on which a concrete roadmap for the attainment of business/IT alignment in SOA projects can be built. By identifying the main elements and their relationships it is possible to have a clear image on the cause and effect that actions may have on each of the identified factors. For instance, skill development must be initiated by a *strong leadership*, which in turn not only increases the capabilities of the people involved but also strengthens the relationship between employees of different domains. The effect of these set of actions also impacts the level of openness in knowledge sharing, breaking down business silos between departments which is one of the main inhibitors for alignment in SOA initiatives. In addition to having an effect on explicit knowledge

sharing, the increased communication between members of the business and IT domain enables the transfer of tacit knowledge. On this foundation, the design and implementation of the appropriate technology and governance to support it is qualitatively augmented. Through this example it is evident that these factors do not contribute towards alignment in isolation, but are rather directly or indirectly impacted by one another. Although literature explores the interrelationship between some of these factors, it does not provide a holistic view of the associations between them. Therefore, in accordance with Chan & Reich's call the following step should be to further examine and validate these relationships.

It should be noted that unlike past attempts, the conceptual framework which we propose, does not identify Business and IT as two separate entities that work in isolation. We believe that due to the heavy impact which IT has on successfully implementing a business strategy, a new form of structure must be promoted in which business and IT oriented employees closely collaborate on different levels. This view is in contraposition to the isolated business silos which many organizations chose at project level. We argue that in order attain strategic alignment all levels within an organization must be addressed appropriately. Our framework directly pinpoints which areas organizations should focus on in order to realize the expected outcomes of alignment. A visual representation of the four focus areas can be seen in Figure 2 below. As we can see, the four areas do not only affect the degree of alignment but are also inter-related. According to Floyd and Woolridge (1990) alignment should commence at an organizational level through a formal strategy be passed on at a project, system and individual level, thus translating business goals into personal goals (Campbell, 2005). However, Tan and Galoupe (2006) postulate that the attainment of alignment should be initiated at its most micro level, as shared cognition between business and IT executives resulting in organization-level alignment through a reverse procedure. We can therefore state that the initiation of alignment depends on the perspective of the practitioner at hand.

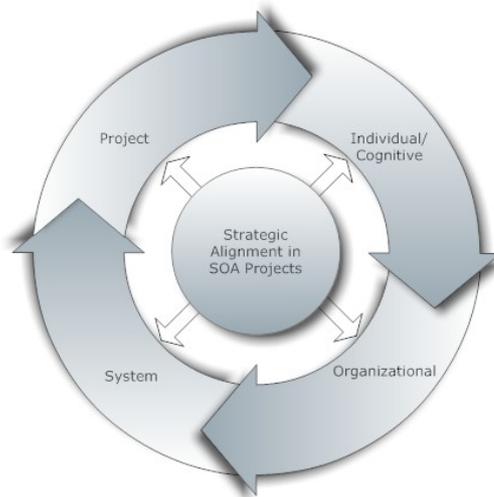


Figure 2: Focus areas for Strategic Alignment in SOA implementations

This framework is the first of a kind in identifying Business-IT alignment factors in SOA projects at all levels of alignment. In addition, in contrast to earlier studies we not only list these factors but also present an illustrative representation of their relationships based on academic literature.

4 Conclusions & Further Research

The aim of this research was to identify contributing factors that lead to successful outcomes in SOA projects. In order to accomplish this goal, a meta-study was performed on a number of relevant publications so the most important findings could be outlined. The outcome of this research suggests that when attempting to attain strategic alignment in SOA projects, some additional factors must be addressed. These include *SOA Governance*, *Organizational Culture* and *SOA Infrastructure* which unlike traditional IT implementation projects contribute to realizing the business objectives set. Since SOA projects aim at fulfilling the ever-changing business needs of an organization, they require a close relationship between business and IT in order to be successful. Establishing a culture which enables the efficient collaboration between the two entities is of critical importance. In addition, SOA projects pose a unique architectural type of Information Systems in which explicitly defined governance is essential to ensure their efficacy. Finally, for the rapid development of SOA solutions which are in support of the current business functions, appropriate development tools must be employed. The developed solutions are a reflection of the needs that the business has in order to be competitive. We further propose by means of focus group a categorization of these eight factors which are identified into four levels of abstraction: *Organizational*, *Project*, *Individual/Cognitive* and *System*.

However, this study still remains on a theoretical level without been put to test at large scale. It is our firm belief that the business aspect of SOA has yet to be researched adequately. We suggest that more exploratory research should be performed in the form of case and survey studies, in order to fully understand the impact that the identified factors have on alignment and outline their interrelationship as suggested by Chan & Reich (2007). A step further in this research direction is to research each of the found factors in isolation, in order to determine how the strategic choices which practitioners face in organizations enable or inhibit this desired state.

For instance, the different SOA governance modes can be put to test in order to determine which is most effective in attaining strategic alignment and for what type of enterprise (size, industry, governance mode etc.). In accordance with the previous, in the phase of business-IT planning in SOA projects a number of design techniques such as enterprise architecture frameworks (TOGAF, Zachman, and OBASHI) can be benchmarked in order to determine how effective each is in achieving strategic fit between business and IT. The same can be done for the different leadership approaches, knowledge management strategies for organizational (knowledge creation, knowledge transfer or knowledge protection) and individual knowledge, skill development methodologies (communities of practice, mentoring etc.) and so on.

A further extension of this study would be to investigate how other organizational aspects are affected by strategically aligned SOA projects such as time-to-market, cost management and business agility in particular. It is noted in academic literature that a number of companies focus disproportionately too much attaining alignment and neglect the importance of flexibility; therefore, by adding these constructs to a future empirical research, the outcomes of alignment can be determined.

References

- Abdi M. and Dominic, P.D.D. (2010). Strategic IT Alignment with Business Strategy: Service Oriented Architecture Approach. International Symposium in Information Technology (ITSim), 3 (1), 1473-1478.
- Adam, S. and Doerr, J. (2008). How to better align BPM and SOA– Ideas on improving the transition between process design and deployment. Proceedings of the BPMDS` 08, 49-55.
- Antikainen, J. and Pekkola, S. (2009). Factors Influencing the Alignment of SOA Development with Business Objectives, 17th European Conference on Information Systems.
- Arsanjani, A., Liang-Jie, Z., Ellis, M., Allam, A. and Channabasavaiah, K. (2007). S3: A Service-Oriented Reference Architecture. IT Professional, 9 (3), 10-17.

- Avison, D., Jones, J., Powell, P. and Wilson, D. (2004). Using and validating the strategic alignment model. *Journal of Strategic Information Systems*, 13, 223-246.
- Baets, W. (1992). Aligning Information Systems with Business Strategy. *Journal of Strategic Information Systems*, 1 (4), 205-213.
- Baskerville, R., Cavallari, M., Hjort-Madsen, K., Pries-Heje, J., Sorrentino, M. and Virili, F. (2005). Extensible Architectures: The Strategic Value of Service-Oriented Architecture in Banking, *European Conference on Information Systems*.
- Bell, M. (2008). *Service-Oriented Modeling (SOA): Service Analysis, Design, and Architecture*. New Jersey: John Wiley and Sons, Inc.
- Bieberstein, N., Bose, S., Walker, L. and Lynch, A. (2005). Impact of service-oriented architecture on enterprise systems, organizational structures, and individuals. *IBM Systems Journal*, 44 (4), 691-708.
- Campbell, B. (2005). Alignment: Resolving ambiguity within bounded choices. *PACIS 2005*, Bangkok, Thailand, 1-14.
- Cerami, E. (2003). *Web Services Essentials*. O'Reilly and Associates: Sebastopol CA.
- Chan, Y. E. and Reich, B. H. (2007). IT alignment: what have we learned? *Journal of Information Technology*, 22, 297-315.
- Choi, J. and Ramamurthy, K.R. (2011). Service-Oriented Architecture and IT-Business Alignment. *Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management*, Kuala Lumpur, Malaysia, January 22-24, 2011.
- Cragg, P., King, M. and Hussin, H. (2002). IT alignment and firm performance in small manufacturing firms. *The Journal of Strategic Information Systems*, 2 (11), 109-132.
- Daamsgaard, J. and Scheepers, R. (2000). Managing the crises in intranet implementation: a stage model. *Information Systems Journal*, 10 (2), 131-149.
- Devaraj, S. and Kohli, R. (2003). Performance impacts of information technology: Is actual usage the missing link? *Management Science*, 49 (3), 273-289.
- Farrell, I. J. (2003). *Aligning IT to Corporate Objectives: Organizational factors in use*, Unpublished Doctoral Dissertation, Macquarie University, Sydney.
- Floyd, S.W. and Woolridge, B. (1990). Path Analysis of the Relationship between Competitive Strategy, Information Technology, and Financial Performance. *Journal of Management Information Systems*, 7 (1), 47-64.
- Fuchs, P. H., Mifflin, K. E., Miller, D. and Whitney, J. O. (2000). Strategic Integration: Competing in the age of capabilities. *California Management Review*, 42 (3), 118-148.
- Hau, T., Ebert, N., Hochstein, A. and Brenner, W. (2008). Where to Start with SOA Criteria for Selecting SOA Projects. *Proceedings of the 41st Hawaii International Conference on System Sciences*.
- Henderson, J.C. and Venkatraman, N. (1993). Strategic Alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, 32 (1), 4-16.
- Holland, C. and Light, B. (2001). A stage maturity model for enterprise resource planning systems. *Data Base for advancements in Information Systems*, 32 (2), 34-45.
- Kennerley, M. and Neely, A. (2003). Measuring performance in a changing business environment. *International Journal of Operations and Production Management*, 23 (2), 213-229.
- Kulatilaka, N. and Venkatraman, N. (2001). Strategic Options in the Digital Era. *Business Strategy Review*, 12 (4), 7-15.
- Lederer, A. and Burky, L.B. (1989). Understanding Top Managements Objectives: A Management Information Systems Concern. *Journal of Information Systems*, Fall 1989, 49-66.
- Luftman, J. and Brier, T. (1999). Achieving and Sustaining Business-IT Alignment. *California Management Review*, 42 (1), 109-122.
- Luftman, J., Kempaiah R. and Nash, E. (2005). Key Issues for IT Executives 2005. *MIS Quarterly Executive*, 5 (2), 81-101.
- Natis, Y. (2003). *Service-Oriented Architecture Scenario*, Stamford.
- Nelson, K.M. and Coopridge, J.G. (1996). The Contribution of Shared Domain Knowledge to IS Group Performance. *MIS Quarterly*, 20 (4), 409-429.

- Mathiassen, L. and Pries-Heje, J. (2006). Business agility and diffusion of information technology. *European Journal of Information Systems*, 15 (2), 116–119.
- Papazoglou, M., Traverso, P., Dustdar, S. and Leymann, F. (2007). Service-Oriented Computing: State of the Art and Research Challenges, *Computer*, 40 (11), 38-45.
- Paulzen, O. and Perc, P. (2002). A Maturity Model for Quality Improvement in Knowledge Management. In: Wenn, A., McGrath, M., and Burstein, F., editors, *Enabling Organizations and Society through Information Systems*. Proceedings of the 13th Australasian Conference on Information Systems, 243–253.
- Pereira, C.M. and Sousa, P. (2005). Enterprise Architecture: Business and IT Alignment. Proceedings of the 2005 ACM Symposium on Applied Computing (SAC), 1344-1354.
- Preston, D.S. and Karahanna, E. (2009). Antecedents of IS Strategic Alignment: A Nomological Network. *Information Systems Research*, 20 (2), 159-179.
- Reich, B. H. and Kaarst-Brown, M. (1999). Seeding the line: Understanding the transition from IT to non-IT careers. *MIS Quarterly*, 23 (3), 337-364.
- Reich, B.H. and Benbasat, I. (2000). Factors that Influence the Social Dimension of Alignment between Business and Information Technology Objectives. *MIS Quarterly*, 24 (1), 81–113.
- Sabherwal, R. and Chan, Y.E. (2001). Alignment between Business and IS Strategies: A study of prospectors, analyzers, and defenders, *Information Systems Research*, 12 (1), 11–33.
- Sambamurthy, V. and Zmud, R.W. (1999). Arrangements for Information Technology Governance: A Theory of Multiple Contingencies. *MIS Quarterly*, 23 (2), 261-290.
- Silvius, G.A.J. (2007). Business & IT Alignment in Theory and Practice. Proceedings of the 40th Hawaii International Conference on System Sciences (HICSS'07), 211-221.
- Sledgianowski, D. and Luftman, J. (2005). IT-Business Strategic Alignment Maturity: A Case Study, *Journal of Cases on Information Technology*, 7 (2), 102-120.
- Tan, F.B. and Gallupe, B. (2006). Aligning Business and Information Systems Thinking: A cognitive approach. *Engineering Management, IEEE Transactions*, 53 (2), 223-237.
- Ugboro, I.O. and Obeng, K. (2000). Top management leadership, employee empowerment, job satisfaction, and customer satisfaction in TQM organizations: an empirical study. *Journal of Quality Management*, 5 (2), 247-272.
- van der Zee, J.T.M. and de Jong, B. (1999). Alignment Is Not Enough: Integrating Business and Information Technology Management with the Balanced Business Scorecard. *Journal of Management Information Systems*, 16 (2), 137-156.
- Viering, G., Legner, C. and Ahlemann, F. (2009). The (Lacking) Business Perspective on SOA Critical Themes in SOA Research. Proceedings of *Wirtschaftsinformatik 2009*, 45-54.
- Watad, M.M. and DiSanzo, F.J. (1998). Transforming IT/IS infrastructure and IS personnel issues, *Business Process Management Journal*, 4 (4), 322-332.
- Weill, P. (2004). *IT Governance: How Top Performers Manage IT Decision Rights for Superior Results*. Harvard Business Press, Cambridge, MA.
- Weill, P. and Ross, J. (2004). *IT Governance – how top performers manage IT*. Harvard Business School Press, Boston.
- Weiss, J. and Anderson, D. (2004). Aligning technology and business strategy: Issues & Framework, A field study of 15 companies. Proceedings of the 37th Hawaii International Conference on System Sciences.
- Wetering, R. Van de. and Batenburg, R. (2009). A PACS maturity model: A systematic meta-analytic review on maturation and evolvability of PACS in the hospital enterprise. *International Journal of Medical Informatics*, 78, 127-140.
- Wills, S. (2006). Strategic planning for blended e-Learning, Proceedings of *Information Technology Based Higher Education and Training*, 670-676.