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ABSTRACT

It is increasingly acknowledged that firms cannot be competitive if their business and information technology strategies are not aligned. A number of proposals have been made for achieving strategic alignment. Despite still being a major concern for business executives there is little published research that attempts to give methodological support for achieving strategic alignment in day-to-day business. Additionally it seems that alignment needs to be investigated in terms of formulating and implementing IT strategy on lower levels of abstraction in order to analyze, monitor and control the desired results. At first this paper covers the design of an IT governance architecture, considering existing approaches of enterprise architecture and strategic alignment. Subsequently an approach for clarifying the domain IT strategy by designing fine grained artifacts is presented. By choosing this approach, alignment is more likely to be achieved in practice and therefore, IT strategy implementation is supported.

Keywords (Required)

IT governance, IT strategy, IS strategy, IS strategy implementation, IS strategy formulation, Alignment, Enterprise Architecture

INTRODUCTION

The alignment of Business and IT (Business/IT-Alignment) is one of the fundamental challenges for practice and science nowadays (Forrester, 2007). It is a topic which is increasingly taken into consideration by different disciplines of Information Management in practice and science, e.g. Enterprise Architecture (Fischer and Winter, 2007) and IT governance (ITGI, 2007, Johannsen and Goeken, 2007). Following the prevalent perception, IT Governance comprises the formulation and implementation of IS/IT strategy as an essential function to ensure Business/IT-Alignment: „*IT Governance is the organizational capacity exercised by the Board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT.*" (De Haes and van Grembergen, 2004) Yet, it is a complex problem, in which cognitive, social, architectural, operative and strategic aspects collude. Hence, so far it is not possible to measure or control Business/IT-Alignment directly.

To master the control tasks in this sense, we propose an IT governance architecture by integrating SAM and existing approaches of enterprise architecture. This allows us to position an IT strategy domain within the extended IT governance architecture and state a proposal for an approach to specify its artifacts. By designing essential artifact of the IS/IT strategy domain within the architecture, we specify a framework for the formulation and implementation of IT strategy to support Business/IT-Alignment.

In the next section alignment approaches are represented and discussed. Based on the foregoing approach, section 3 describes the conceptualization of the alignment problem considering an extended IT governance architecture. Building on these findings, a proposal for positioning and detailing the artifacts of IT strategy is made in section 4. The proposal is accompanied by the consideration of the formulation and implementation of IT strategy. In the last section we discuss the results and depict the further proceeding in the ongoing research process.

APPROACHES FOR ACHIEVING BUSINESS/IT-ALIGNMENT

Chan defines alignment as "The "bringing in line" of the IS function's strategy, structure, technology and processes with those of the business unit so that IS personnel and their business partners are working towards the same goals while using their respective competencies." (Chan, 2002) Though, different aspects of alignment are being discussed in the literature. Besides strategy, structure, technology and processes also architecture, cultural, social and cognitive dimensions are

considered (Chan and Reich, 2007, Reich and Benbasat, 1996). Furthermore, different conceptions of alignment are distinguished: alignment as a state or result (Reich and Benbasat, 2000) or alignment as an ongoing process (Chan, 2002).

Hence, the different approaches of alignment are presented in the next subsection. This approach evolves an evaluation in exploring their suitability to achieve a "fit" between IT and business requirements. Besides well-known alignment models we also consider widespread approaches of enterprise architecture because these are regarded as central instruments for coordination in the question for Business/IT-Alignment (Fischer and Winter 2007).

Alignment in the field of enterprise architecture

By comparing different approaches of enterprise architecture, "Multiperspective Enterprise Modeling" (MEMO), "Business Engineering" and the "Semantic object model" (SOM), similar layers can be outlined (table 1). In a vertical way from layer to layer the increasing proximity to implementation is striking. With regards to content the architectural layers are comparable (Winter, 2003b). The presented layers and their artifacts are being described as follows.

Multiperspective Enterprise Modeling (Frank, 2002)	Business Engineering (Winter, 2003)
Strategy	Strategy
Organization	Process
Information systems	Information systems

Table 1: Layers of different approaches in enterprise architecture

On the strategic layer, the role of the company or the business unit is explicated in the value-generating network (Winter, 2003b). In the context of describing artifacts, e.g. products, services, partnerships etc. business models are modeled. (Winter, 2003b). By deriving the output, the precondition for the transition to the next layer is made (Winter, 2003b).

On the process layer, the business processes and their interdependencies in the company and its business units are characterized (Winter, 2003b). For this purpose, the process benefits, their procedures, responsibilities etc. are represented in a process model. By building a model of information in this way all conjunctions and dependencies of the used and produced information is illustrated (Winter, 2003b).

Finally the used hardware/software as well as their concurrences for the automation of process steps and interfaces are described on the layer "information systems" (Winter, 2003b, Österle and Blessing, 2000). Winter and Fischer present a fine grained architecture which contains relevant artifacts on five layers. (Fig. 1) (Winter, Fischer, 2007).
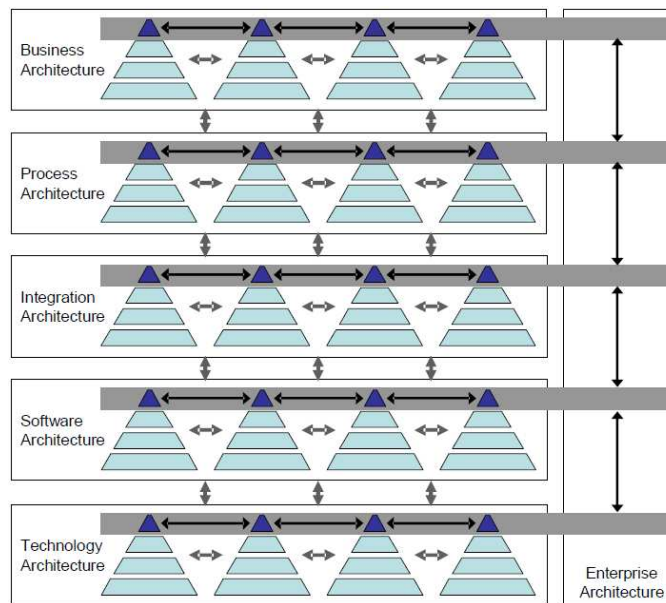

Figure 1: Essential layers of Enterprise Architecture (Winter, Fischer, 2007)

Despite of the position and conjunction of the different artifacts an explicit differentiation of IT and business artifacts is missing. However, a clear differentiation for concerns of IT governance and especially Business/IT-Alignment is of high interest. The described approaches do have an increasing proximity to technology when going downwards in the layers, but aspects of IT strategy and specific IT processes are not taken into account. Others models allow for this concern and are described in the next section.

SAM and further models of alignment

Probably the most popular model in the discussion about Business/IT-Alignment is the Strategic-Alignment-Model (SAM) developed by Henderson and Venkatraman (Henderson and Venkatraman, 1993). Various authors have adopted and extended it (Luftman, 1996, Maes, 1999, Maes, Rijsenbrij, Truijens and Goedvolk, 2000, Avison, Jones, Powell and Wilson, 2004).

Much of the strategic IT research has been based on the SAM. In our research, the model is used to introduce domains to consider in developing an extended IT governance architecture. The model conceptualizes the domains business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes. On two different levels, every domain has its constituent components: scope, competencies and governance at the external level and infrastructure, skills and processes at the internal level. In this context Business/IT-Alignment means „a balance among the choices made across all four domains" (Henderson and Venkatraman, 1993). However, the SAM allows for two fundamental characteristics of strategic management: strategic fit (interrelationships between external and internal domains) and functional integration (integration between business and technology domains).

Maes extends SAM by adding additional layers to cover architectural and communicational aspects of Business/IT-Alignment (Maes, 1999). Additionally he differentiates conceptional, logical and other viewpoints (Maes et al., 2000). However, Reich and Benbasat added the two perspectives "intellectual" and "social" to the discussion on Business/IT-Alignment and conceptualized it as a multilayer problem (Reich and Benbasat, 1996).

SAM and its presented extensions are descriptive and in this way provide help for the interpretation and description of Business/IT-Alignment. However, they do not offer methodological support for the management of Business/IT-Alignment and implementation. Additionally, SAM does not stand in line with the presented concepts of enterprise architecture. This is the reason we conclude that SAM alludes the Business/IT-Alignment problem on an overstated level of abstraction. The strategy domains and especially their artifacts have not been correlated in a practical way. We argue that an IT governance architecture supporting Business/IT-Alignment needs to differentiate between business and IT domains. Moreover it should also consider different aspects and domains of alignment.

CONCEPTUAL FRAMEWORK OF AN EXTENDED IT GOVERNANCE ARCHITECTURE

The components of the alignment definition of Chan mentioned above (strategy, structure, technology and processes) (Chan, 2002) also exist in approaches to enterprise architecture, e.g. within "Business Engineering" (Winter, 2003) (Fig. 2, left).

The aforementioned concepts have their limitations in addressing the aspects of management and governance, due to the fact that their main focus is the development of an overall enterprise architecture or of specific applications that fit into the architecture. Regarding this focus, they put less weight on governance of business and IT. Thus, the architecture has been extended by the domain "Governance" which links strategy and infrastructure/applications. Implementing a governance domain emphasizes the need to conceptualize (1) decision rights and accountabilities (Weill, Ross, 2004) as well as (2) controlling activities as ongoing tasks within the architecture (ITGI, 2003) (Fig. 2, right).
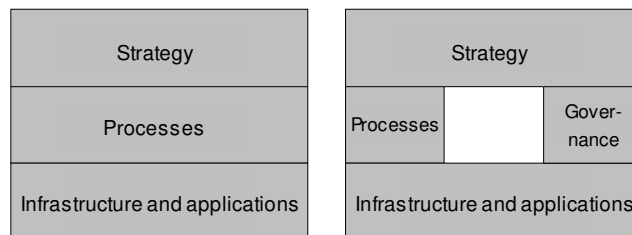
Figure 2. Business part of the IT governance architecture

Furthermore, in enterprise architecture approaches, the clear and explicit differentiation between business and IT is missing. Therefore, they are not appropriate to separate both for analytical purposes and to conceptualize interfaces between them, e.g. the information flows between business and IT processes. In addition, they do not reflect that today's IT organizations within an enterprise commonly have a strategy and, further, are organized in a process oriented manner which implies the existence of specific IT processes. Thus, we expand the architecture into a third dimension and distinguish between the business and the IT domain (Fig. 3).

An effective alignment of business and IT should not only take place on a strategy level, like Luftmann claims (Luftmann, 2008). From our point of view, the strategic alignment of business and IT must be accompanied by aligning processes as well, caused by the perception that an appropriate support of business activities can only be realized by linking both areas. That allows us to separate the relevant domains within the field of action.

The so resulting IT governance architecture can be used to structure problems of alignment on a high level of abstraction (macro level). The cross in the middle of our IT governance architecture symbolizes the way in which the domains of the architecture are being connected to a holistic system. Hence, we propose a framework which distinguishes alignment in different layers. In this way alignment means the transformation of strategy in governance, processes, applications and infrastructure in the context of planning, development and operations. We also separate IT and in this way concretize the need for coordination between business and IT.
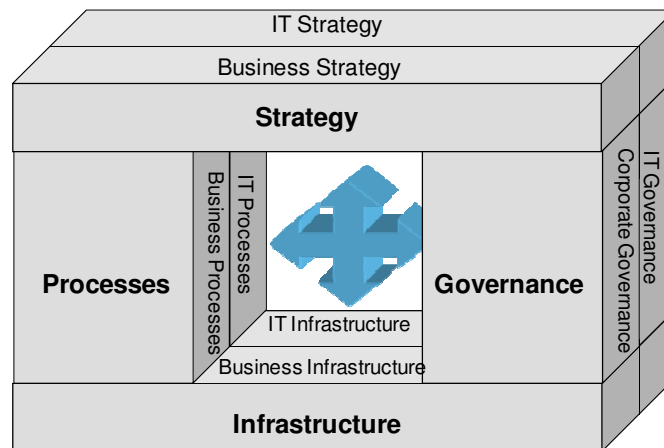

Figure 3. Extended IT governance architecture

APPROACH FOR DETAILING IT STRATEGY

Framework

Beforehand we introduced an IT governance architecture on a macro level to describe the coherences of Business/IT-Alignment in a holistic way. Though, it does not make a proposition about more detailed artifacts and their interaction on a lower level, which we call the micro level. As we believe that IT strategy plays an important role in the achievement of Business/IT-Alignment, we want to break down the domain, introduce several artifacts on the micro level and instantiate them in different case studies (Fig. 4). Unlike in the field of alignment (Luftman, Kempaiah, 2007) or IT governance (Weill, Ross, 2005), most literature on IT strategy does not report on any empirical results (Söderström, 2008). Hence, we construct and evaluate new and innovative artifacts following the design research paradigm (Hevner, March, Park, Ram, 2004). Modeling techniques allow us to abstract from real world phenomena and objects. By doing so we develop manageable artifacts to make the complexity of information systems and their interrelationships controllable (Thomas, 2006). We argue that a better comprehension of the essential aspects and coherences of IT strategy from different and sometimes complementary points of view can be accomplished.
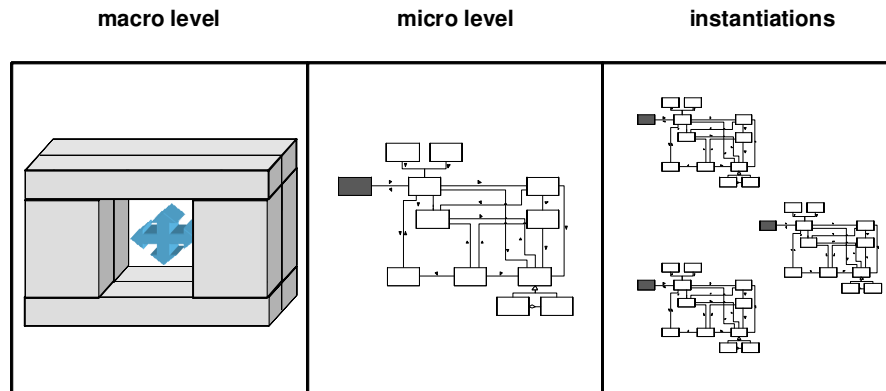
macro level   **micro level**   **instantiations**

Figure 4. Detailing the domain IT strategy

Approach

In constructing artifacts and their coherences, an adequate way to allow for a high degree of construct validity is to base on accepted scientific theories: "Such theories are readily available in the plethora of scientific articles and articles stored in online databases" (Vargas, Plazaola, and Ekstedt, 2008). An intersubjective comprehension of our design approach is achieved by a coherent and verifiably argumentation.

In accomplishing the literature review we followed the guidelines provided by Webster and Watson (Webster und Watson 2002). For a comprehensible knowledge elicitation from text-based sources we used a method called "Extended Influence Diagrams" (Lagerström, Johnson and Närman, 2007). In doing so knowledge is elicited and visualized in eight steps. Because of space limitations we do not describe the different steps in detail. A detailed description can be found in (Lagerström et al., 2007), an example for using the method can be found in (Vargas et al., 2008). As distinguished from the method we use a modeling language with a higher degree of explanatory power and a higher flexibility in modeling. Hence, the Unified Modeling Language (UML) which became a quasi-standard within object oriented modeling is used (Oestereich, 2005). It offers a wide spectrum of model types to design complex systems in its structure, composition (class and object diagrams) and dynamic behavior (sequence and activity diagrams etc.) (Kecher, 2005).

Background to IT Strategy

Besides the shared corporate vision, the initial starting point for achieving a high degree of Business/IT-Alignment is in formulating and implementing strategy for both, business and IT. It is a widespread perception that IT strategy is derived from business strategy. In the process of IT strategy formulation identified technological issues and innovations can also enable business strategy. IT strategy determines the planning and the transformation of strategic IT goals into IT governance structures, IT processes, applications and infrastructure by adjusting them to the business. The existing structure also plays an important role in identifying the target situation (internal impact).

We argue that IT strategy so far is more of an "abstract" construct and no framework for the formulation and implementation in a detailed manner is provided. The design of artifacts to understand the complex coherences in formulating and implementing IT strategy is needed. In doing this we will be able to instantiate real-world cases on the basis of the architecture and depict possible ways how to realize a continuous Business/IT-Alignment (Fig. 4).

IT strategy related issues are steadily among the highest ranking topics on management agendas and are discussed by practitioners on numerous conferences and magazines (Watson, Kelly, Galliers and Brancheau, 1997, Luftman, Kempaiah and Nash, 2006, Gartner, 2007).

Most scientific work in Strategic Information Systems Planning (SISP) seems to focus on the IS planning process itself rather than on the output or the implementation (Theo and Ang, 2000). There is also a lack of consensus and a variety of approaches to substantiate the content of information strategy in scientific literature (Mocker and Teubner 2005). Brown shows that between 1991 and 2004 only 25% of scientific work in SISP focuses on the content and only 10% on the implementation of IT strategy (Brown, 2004). Additionally it seems that IT strategy is still an arbitrary concept in practice and scientific research is only poorly perceived in practice (Mocker and Teubner, 2005).

The usage of different terms and definitions for IT strategy reinforces this assumption. Further, Lehner uses the term "Informatikstrategie" (informatics strategy) (Lehner, 1993), Chant et al. use "IT strategy" and "IS/IT strategy" (Chan, Huff and Copeland, 1997), Smits et al. use the term "Information strategy" (Smits, Poel, and Ribbers, 1997) and Lederer and Salmela use the terms "strategic information plan" and "IT strategy" without explaining the difference (Lederer and Salmela, 1996). In this respect scientific work concerning the components and artifacts of IT strategy illustrates a rather heterogeneous state.

In this paper we do not go into the discussion of the usefulness or inappropriateness of the described terms. But we do want to note that the subsumed concepts of the strategy terms do not necessarily correspond to each other. Henceforth, we use the term IT strategy and justify this because in scientific work as well as in practice it is the most common used term.

Construction of artifacts in the domain IT Strategy

In the sense of a target-oriented, strategically direction of IT a traceable value for achieving organizational success is required. IT must be effective and efficient, but be applied under consideration of its strategic potential (Ward and Peppard, 2002). In this context strategy can be understood as the "way" to reach goals (Witte, 2000). Business strategy is placed as a demand within IT strategy, in other words: IT strategy is determined from business strategy.

Within the construct of business strategy those components are identified, on which the IT has or could have valuable influence. For instance, the implementation of an external growth strategy by mergers and acquisitions could be supported by IT in providing a high degree of flexibility and technological integration potential, sometimes called merger readiness (Buchta and Schulte-Croonenberg, 2005). In this respect an IT strategy describes ways in which it can be applied to impact the business strategy (Atkins, 1994). Heinrich hypothesizes by formulating and implementing an IT strategy the connection between business and IT is shaped in a way which navigates and frames the actions of the IT-management to focus explicitly on the organizational success (Heinrich, 2002). Additionally it is unrealistic to assume that IT goals (objectives) can be formulated or realized without an existing IT strategy (Heinrich, 2002). Hence, IT strategy determines IT goals.

The formulation of an IT strategy means to define the concept, perspectives and/or the way in which strategic IT goals are transferred and executed in strategic initiatives (Heinrich, 1999). Yet, IT strategy does not comprise details about these initiatives or activities, but it defines and frames the scope for the decision makers (e.g. the IT steering committee). In doing this, propositions for IT governance (including IT management, IT organization and IT performance-management), IT processes, applications and technology are made.

Additionally, the actual state of evolution of the existing IT organization has a strong impact on IT strategy (e.g. starting with a partner managing data centers or developing applications to a business partner for optimizing business processes) (Buchta and Schulte-Croonenberg, 2005).

Valuable considerations for structuring IT strategy are existing value chains, valued driver models or business area strategies, so called internal impacts. In this respect the vertical integration (insourcing versus outsourcing) as well as organizational (centralized versus decentralized IT) and standardization (Standard applications versus in-house development) approaches are to be considered.

In summary IT strategy can be interpreted as a "bridge" between strategic IT goals and strategic IT activities (Heinrich, 2002). IT goals can be influenced by the external environment (e.g. laws, innovations or technological developments) and in this way be supported or endangered. For instance not knowing about newer technological improvements can lead to an adherence in old technologies and in this way lead to a strategic disadvantage. A late or erratic adjustment could also lead to high investments. This underlines the necessity to take these impacts into account in the IT strategy.

Activities already have an implementation character and in this way strictly speaking are not part of the IT strategy domain. But their accomplishment can be interpreted as part of the implementation of IT strategy. In this context long and short range activities are distinguished (Hansen and Neumann, 2004). On the one hand long range activities are only approximately determined in a time frame but on the other hand short range activities are detailed in specific milestones and resources. Again, IT strategy frames the IT activities and in this way also takes the implementation into account. „Implementation is what strategy is all about. You can't be satisfied with a theory, a system or even a strategy that is creative but isn't viable." (Rothschild, 1979) Furthermore according to Roush and Ball a strategy can't be successful, if there is no effective mechanism for the implementation: "(…) regardless of the intrinsic merit a particular strategy has, it cannot succeed if an effective implementation procedure is missing." (Roush and Ball, 1980) We postulate that metrics are needed for the measurement of an effective implementation. Following the Balanced Scorecard approach of Kaplan and Norton we also introduce perspectives to arrange IT goals, IT activities and metrics.In figure 5 we illustrate our actual draft of the domain IT strategy.
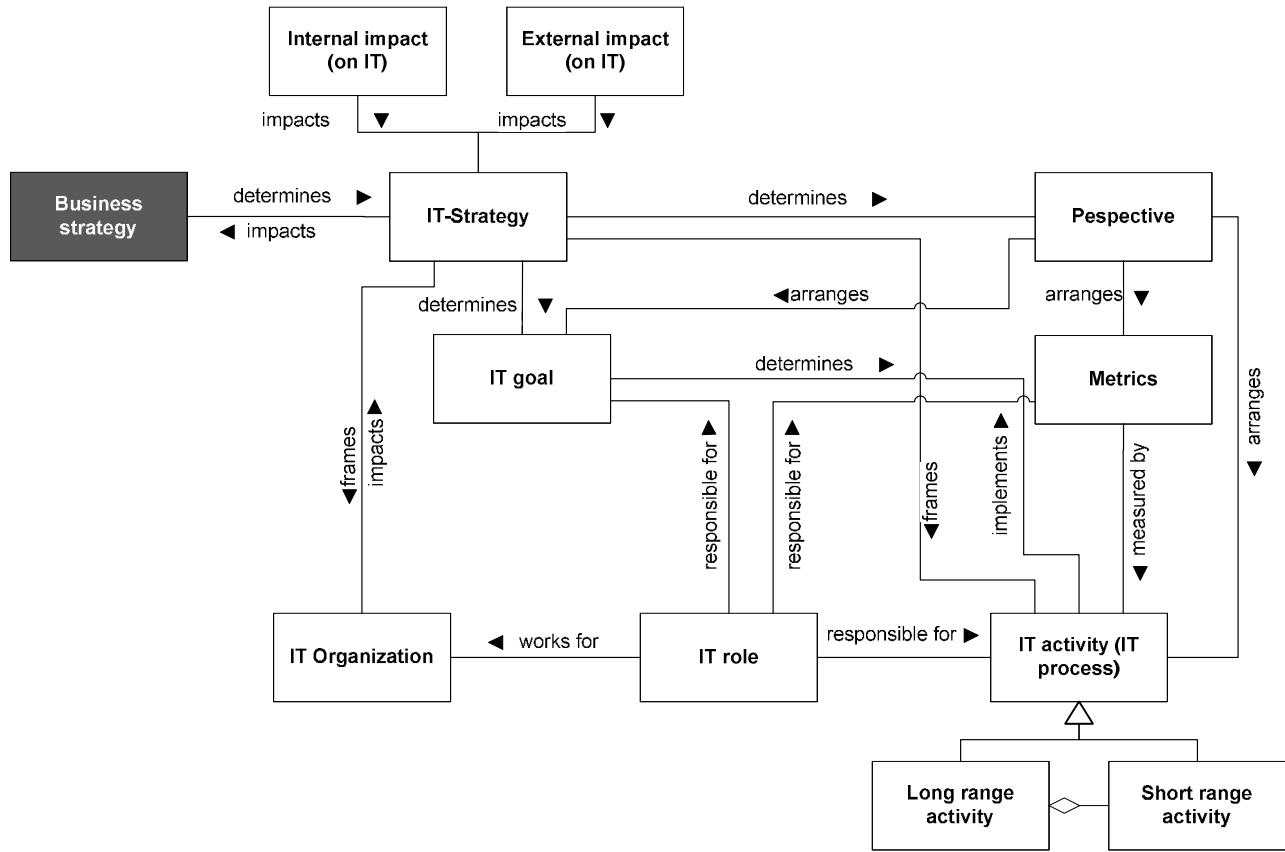
Figure 5. Artifacts of the domain IT Strategy

CONCLUSION AND FURTHER DEVELOPMENT

We proposed an extended IT governance architecture to emphasize the differences between business and IT as well as to show the necessity of Business/IT-Alignment. Within this framework we postulate that business and IT artifacts are to be analyzed and aligned by interfaces on different layers. With this approach we combine theory from enterprise architecture and adopt it to the Business/IT-Alignment problem. This could also help to overcome deficits of existing alignment models.

On this basis we proposed an architecture of fine grained artifacts which details the domain IT strategy. IT strategy was chosen because it is of very high interest in scientific works and in practice and still an arbitrary concept. The approach allows for a better understanding of the formulation and implementation of IT strategy in a corporate environment as well as its monitoring and control. In this way it can contribute to the achievement of alignment in practice. We are aware that it is not an exhaustive framework. But the validity of the artifacts as well as the connections between them was derived on the basis of accepted scientific theories presented in literature. The constructed model will be instantiated in case studies in different companies (Fig. 4). By conducting case studies and experts interviews in our ongoing research project we will add empirical data to support our framework. In doing so we fulfill the claim for a practical problem orientation as the basis for an application-oriented science within the field of information systems (Goeken, 2003) and an important guideline which should be followed in design science IS research (Hevner et al., 2004).

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