Strategic Business/IT Alignment using Goal Models

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Abstract. Since few years, enterprise information technologies (IT) are no more seen as a simple technological support for business strategies in the enterprise. Moreover, standalone IT departments are created in order to support evolution and growth of IT in the enterprise. Often, IT department defines a specific strategy describing vision, goals and objectives of IT development in the organization. However, to remain competitive, IT strategy and IT investment should be coherent with global enterprise strategies. The continuous process of preserving coherence between Business/IT strategies is widely known as strategic Business/IT alignment. Our work aims at discussing the relation between interview based Business IT alignement discovery and the Strategic Alignement Model proposed by Venkatraman. The paper proposes also modeling tools and engineering methodologies to support this alignment process.

Keywords. Business/IT Alignment, Strategic Alignment, Strategy representation, Goal modeling

1 Introduction

Survival of modern enterprises and their competitiveness in a continuous fluctuating context depend on their ability to exchange information with external actors (partners, customers, subcontractors) but also within their own organizations. Indeed, information is exchanged between enterprise intd ternal actors. Enterprise information exchange has been studied from different viewpoints [1, 2, 3]. Interoperability of enterprise systems can be seen as the operational aspect of a larger enterprise concern : Organization Alignment. This paper handles interoperability from the strategic point of view. More precisely, For the few last years, an important research activity has been achieved in the domain of enterprise systems interoperability in order to establish well structured information exchange between enterprise applications [4, 5]. During several years, information technologies have been seen as a technological means to implement business objectives. However, information and communication technologies growth implies creation of dedicated teams and departments working exclusively on the lead of IT projects inside the enterprise. According to [6], IT strategy intends to contribute positively to the creation of new business strategies or better support existing business strategy . This aim is often ensured by prospecting types and range of IT systems and capabilities potentially available to the organization.

In this paper, authors study alignment between Business and IT strategies by focusing on strategy modeling approach. The discourse of this paper is illustrated by real case studies achieved within partner enterprises (SMEs). The main aim of authors is to contribute to a model driven approach to establish and measure strategic Business/IT alignment within a given enterprise.

The paper is organized as follows: Section 2 presents the Strategic Alignment background related to this paper. Section 3 introduces the use of i* goal models in strategy formalising. Section 4 illustrates strategy goal models of real case studies. Section 5 proposes a model driven approach for identification of Strategic Alignment perspectives beeing used in a given organisation this identification is based on the SAM model defined in [6]. Finally, Section 6 presents primary conclusions of the work presented in this paper and gives short term perspectives for ongoing research work.

2 Strategic Alignment Background

The evolution of IT resources and competencies is one of main lever for efficiency and economic success of organizations [7, 8]. Venkatraman et al. define four interaction perspectives between IT and Business activities at strategic level (cf. Fig.1)
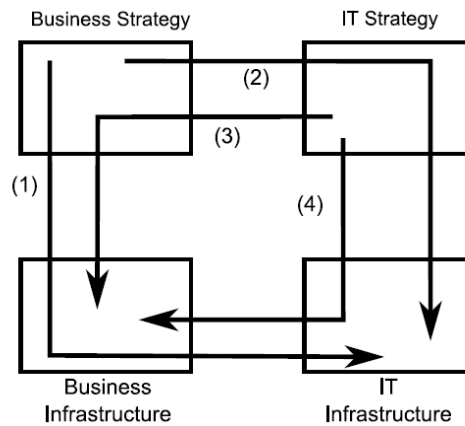

Fig. 1. Strategic Alignment Model[6].

1. Strategy Execution.
This perspective corresponds to the classical, hierarchical view of strategic management. It considers the business strategy as the driver of both organization design choices and the logic of the IT infrastructure . Top Management formulates the strategy; IT Management is only considered as strategy implementer.

2. Technology Potential.

This perspective also views the business strategy as the driver. However it involves the formulation of an IT strategy to support the chosen business strategy and the corresponding specification of the required IT infrastructure and processes. The top management should provide the technology vision to articulate the logic and choices pertaining to IT strategy that would best support the chosen business strategy. The role of the IT manager should be that of the technology architect. He designs and implements efficiently and effectively the required IT infrastructure that is consistent with the external component of IT strategy .

3. Competitive Potential.

This alignment perspective is concerned with the exploitation of emerging IT capabilities to: impact new products and services, influence the key attributes of strategy, as well as develop new forms of relationships. Unlike the two previous perspectives, which considered business strategy as given, this perspective allows the modification of business strategy via emerging IT capabilities.

4. Service Level.

This alignment perspective focuses on how to build world class IT organization within an organization. In this perspective, the role of business strategy is indirect. This perspective is often viewed as being necessary, but not being sufficient, to ensure the effective use of IT resources and to be responsive to the growing and fast-changing demands of the end-user population.

Even if the SAM [6] is widely admitted as a de facto standard tool for strategic alignment measure and improvement, strategic alignment analysis is often based on subjective interviews [9, 10, 11]. Many IT studies have simply posed the question, 'On a scale of 1–5, how do you rate IT alignment in your organization?' While this can be helpful as a single indicator of overall alignment, more detailed scales provide greater reliability and validity [12].

On one hand alignment research is mechanistic and fails to capture real life [12], on the other hand, the interview based measurement suffers from the lake of heuristics. To avoid subjective use of questionnaries, Model driven approaches have been used in order to provide well defined model based methods for alignment analysis [13, 14]. The approach proposed in the following section combines, interviews and goal modelling in order to capture strategies beeing applied in organisations. Afterwards, the obtained goal models are analysed in order to explicit alignment perspectives defined by SAM. The discourse is illustrated by examples inspired from real industrial case studies.

3 Goal Models for Strategy representation

In this paper, goal oriented models are used to formalize Business and IT strategies. those strategies are identified by means of interviews performed with Business managers and IT managers of partner enterprises. The formalism is inspired from the

strategic rationale model of the i* framework [15], figures have been designed using the TOAM4E[1] tool. Our approach is based on the comparison of two goal models, the first one describing Business strategy, the second one describing IT strategy.

   As in [16, 17, 18], the formalization of strategy models in this paper is based on goal models. Indeed, goal modeling concepts are suitable to support strategy modeling. The resulting models describe strategies in term of, vision, goals and objectives[19]. To represent those concepts, we base our approach on goal modeling concept (soft goals, hard goals and tasks). Figure 2 illustrates relationship between the main vision of an enterprise that represents the ideal stable state toward which the organization strives and the strategy that should enable the achievement of the vision. This figure is known as the BRG-model (Business Rules Motivation model).
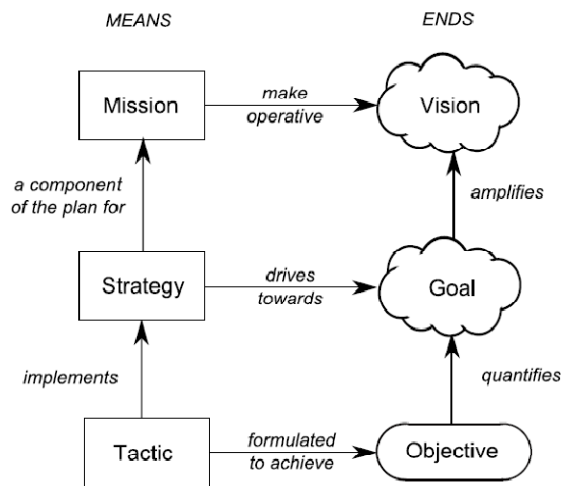

Fig. 2. Business Rules Motivation model [14].

The following explains concepts that appear in Figure 2:
- **Vision.** An end-state toward which the organization strives.
- **Mission.** The primary activity performed to achieve the vision.
- **Goal.** An abstract statement statement of intent whose achievement supports the vision.
- **Strategy.** A long-term activity designed to achieve a goal.
- **Objective.** A specific and measurable statement of intent whose achievement supports a goal.
- **Tactic.** A short-term action designed to achieve an objective.

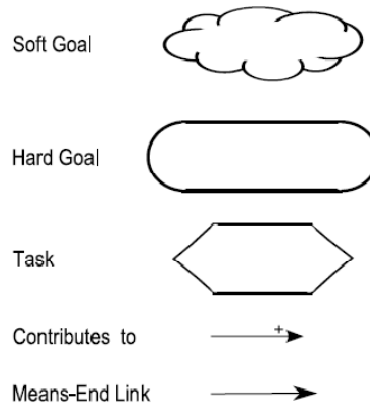Figure 3 shows the legend of i* models that will be presented in this paper.

Fig. 3. i* legend [15].

In the following section, real case studies are presented. These case studies have been used to practice our model driven strategic alignment analysis. The following focuses on the representation of Business and IT strategies used in SMEs presented previously.

4 Capturing Strategy: Case Studies

In this section, some case studies are presented. These case studies have been achieved in partnership with Belgian SMEs in order to collect information about in-use Business and IT strategies in these enterprises.

To collect enterprise information, semi-structured interviews of Business and IT managers have been performed. There interviews were conducted during 1.30 hour in order to analyse the connections, relationships, communication and understanding between both domains (Business and IT) to achieve Business/IT strategic alignment.

4.1 HappyMany

Summary of interviews
HappyMany is a young Belgian company whose ambition is to sell on-line products that are essential but not strategic. This service was designed for particular customers and SMEs. The company provides services based on telecoms and energy. The products offered are: fixed telephony, mobile telephony, Internet access, fuel, heating oil, etc. By regrouping their purchasing strength, HappyMany can provide best prices to its customers.

The strategic objectives pursued by the company concern the development of new products and markets. The second objective concerns the acquisition of new

competencies and the development of talents in order to better master the used tools and improve effectiveness in organizations.

The IT is a strategic resource within the organization but there is no formal and planned IT strategy. It is an iterative process regarding the emergent needs of the users. Globally all developments are internally managed despite some interventions of several services suppliers.

In that enterprise, the most important is to have a global strategy (corporate strategy) that involves the objectives of all functional areas and then develop IT solutions in response to this strategy. The IT solutions developed or acquired have to meet some requirements that are: components homogeneity, compatible resources and cost requirements. To improve internal IT competencies, several on-line trainings are performed.

Strategy formalizing
In order to apply our model driven approach for strategic alignment to the HappyMany company, the first step consists in the translation of Business and IT strategies into goal model formalism. Figures 4(a) and 4(b) illustrate result of formalizing HappyMany strategies in i* formalism.

4.2 Concept & Forme

Summary of interviews
Concept & Forme is a small company in domain of stoves assembly and installation. The company has been created in 1983. Concept & Forme has an ultramodern production system. Its turnover grew by 30 to 50% since 2001. This results from its intelligent use of the Internet to develop sales and to simplify the administrative structure of the firm processes. In this company, increasing profitability and economic growth are main business objectives to achieve. This is mainly translated into the need for a better manufacturing and sales processes efficiency.

In this context, the IT department is responsible of prospecting for new information systems, working environments, and IT competencies that should help the company to achieve its main business objectives. Actually, in collaboration with external subcontractors, the IT department started in 2000 the deployment of a web oriented platform that would be an open window on the manufacturing process. This platform aims at increasing transparency and proximity with partners and customers. IT managers have used the platform as a support for new services: products availability checking, product customization, order status monitoring, and traceability. The platform has been also improved in order to allow for an efficient management of customer relationship. In addition, to management of the IT platform, IT department has implemented a new ERP system in order to answer process efficiency needs.

Strategy formalizing
Figures 5(a) and 5(b) illustrate the result of formalizing Concept & Forme strategies in i* formalism.
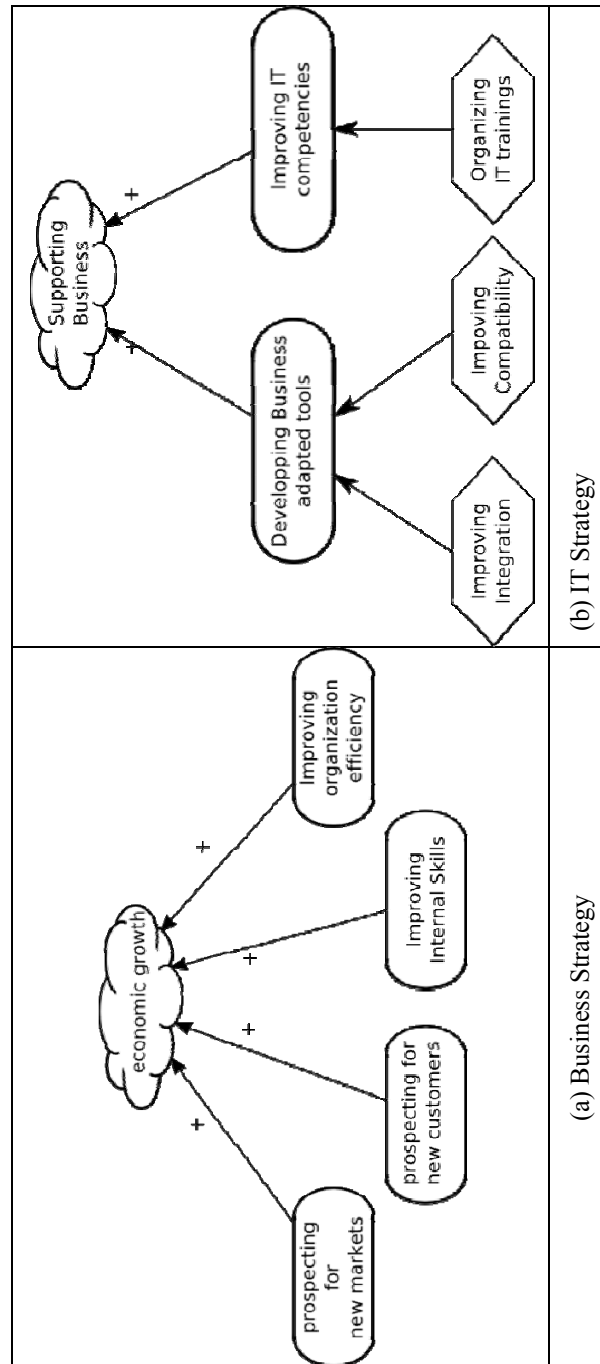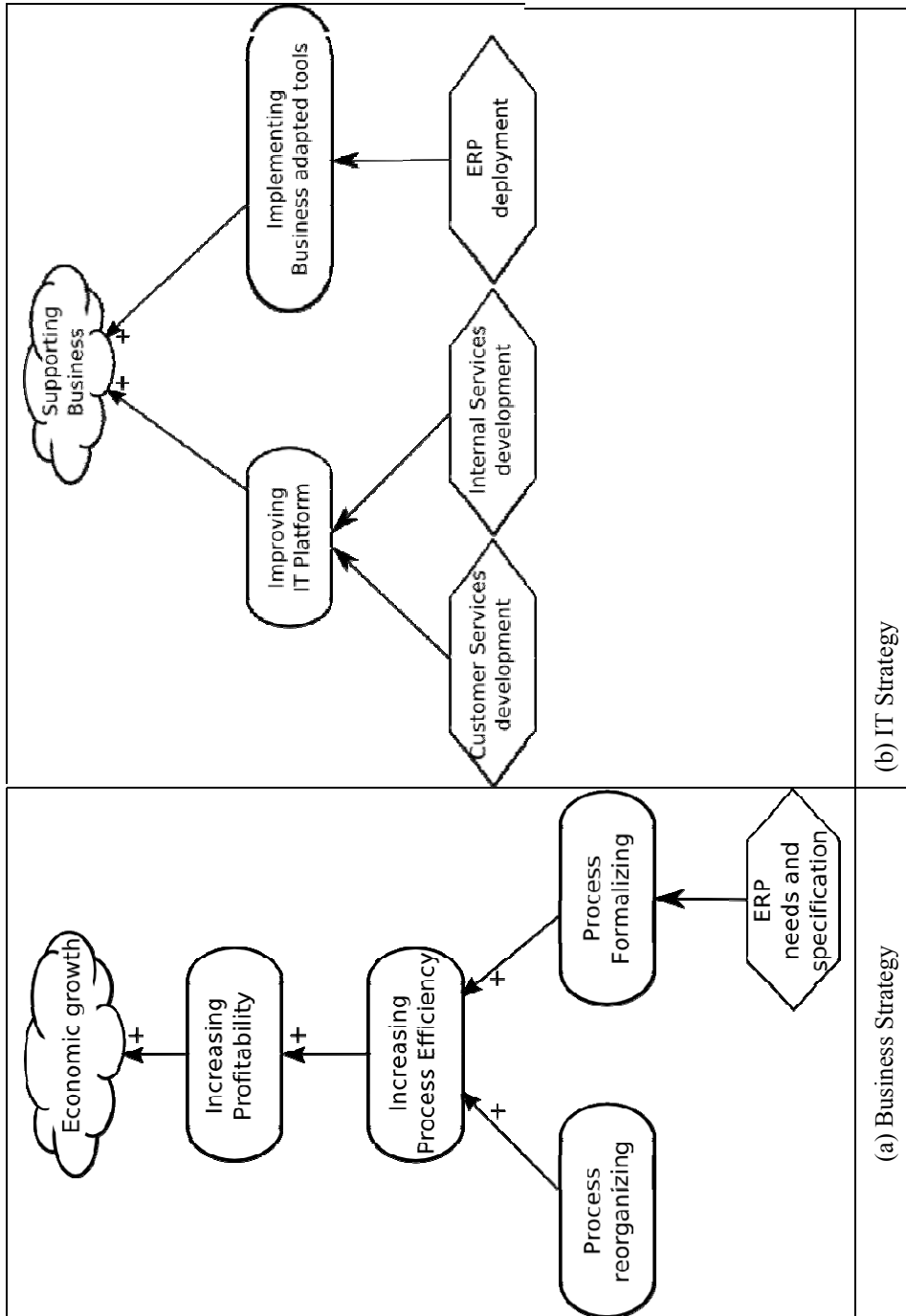
Fig. 4. *HappyMany* Strategies

Fig. 5. *Concept & Forme* Strategies

5 From Strategy Goal Models to SAM

The analysis of both Business Strategy goal models and IT Strattegy goal models enables comparing both models and identifying elements that are belonging to business domain or to IT domain but that are semantically related. It is also important to identify types of relationships that can exist between those elements. The orientation of the relationship is determined by asking 'What element existed first?' . The other element is then assumed to be a consequence of the first one. The relationships that are beeing discovered are Cause/Effect links. By Identifiying semantic links and orientation of the relationships we can mapp those relationships into Venkatraman's SAM perspectives

Example: In Happy Many case study, in Figure 4(a) and (b), the elements 'Improving Integration and Compatibility' and 'Improving org. efficiency' are semantically inter-related, because achieving one goal implies (or necessits) the achievement of the other. We can assume that there is a link between both goals, the orientation is obtained by asking managers if 'Improving Integration and Compatibility' has beeing decided before strating to think about 'Improving org. efficiency' or the contrary. The Answer of all managers was clear: 'Improving Integration and Compatibility' was at first an IT initiative, afterwards business managers decided to take advantage from this integration in order to generalise 'Improving org. efficiency'. Moreover, this semantic Cause/effect relationship corresponds to a service level perspective in which IT department intends to improve quality of application used in the enterprise by respecting homogeneity and compatibility requirements the requirements induce indirectly in business strategy aiming at improving efficiency.

5.1 Illustration

Happy Many
Starting from goal models presented in 4(a) and (b), a first analysis of the strategic alignment that could be established between Business and IT departments of HappyMany can be performed.

Table 1 shows the identified relationships that link elements from the Business strategy illustrated in Figure 4(a) to elements from IT strategy illustrated in Figure 4(b). In this table, additional information specifies the orientation of the relationship and the kind of relationship.

Table 1. *HappyMany* Business /IT Strategies comparison.

	IT element	Orientation	Business Element
(a)	Supporting Business	←	Economic Growth
(b)	Improving Integration and Compatibility	→	Improving org. efficiency
(c)	Improving IT competencies	→	Improving Internal skills

Regarding the SAM model and regarding inter-strategies links that have been discovered through goal model analysis, we distinguished three kinds of strategic alignment used in HappyMany:

(a) expresses the fact that the main Business goal "Economic growth" implies a continuous technical support. It corresponds to technical opportunities perspective of SAM,

(b) corresponds to a service level perspective in which IT department intends to improve quality of application used in the enterprise by respecting homogeneity and compatibility requirements the requirements induce indirectly in business strategy aiming at improving efficiency,

(c) expresses competitive potential perspective due to the fact that the IT department proposes IT trainings that could be performed to improve internal competencies of the enterprise.

Figure 6 resumes strategic alignment perspectives that have been identified using the model driven approach presented in this paper.
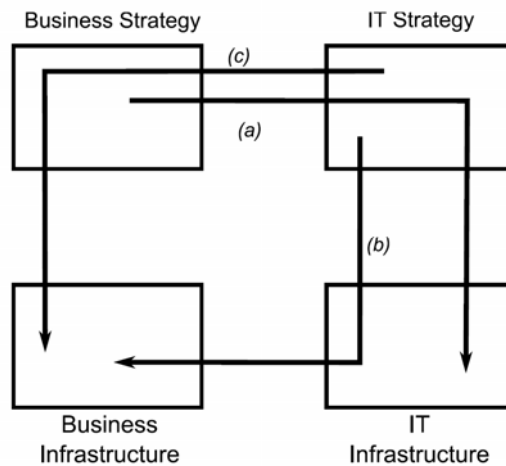

Fig. 6. Adaptation of the SAM model to HappyMany

Concept & Forme

Table 2 shows the identified relationships that link elements from the Business strategy illustrated in Figure 5(a) to elements from IT strategy illustrated in Figure 5(b):

Table 2. *Concept & Forme* Business /IT Strategies comparison.

	IT element	Orientation	Business Element
(a)	Supporting Business	←	Economic Growth
(b)	ERP deployment	→	ERP needs and specification
(c)	Internal Services development	→	Process reorganizing

(a) corresponds to technical opportunities perspective of SAM (IT support enables to achieve business objectives),

(b) formalizes the fact that the deployment of ERP implies at IT level necessits ERP specification at business level. This action is typically a case of service level perspective.

(c) the development of Internal Services hosted in the IT platform improves daily activities and process performed by employees. This will help indirectly in Process reorganizing. This relationship corresponds to a service level perspective.

Figure 7 resumes strategic alignment perspectives that have been identified within Concept & Forme.
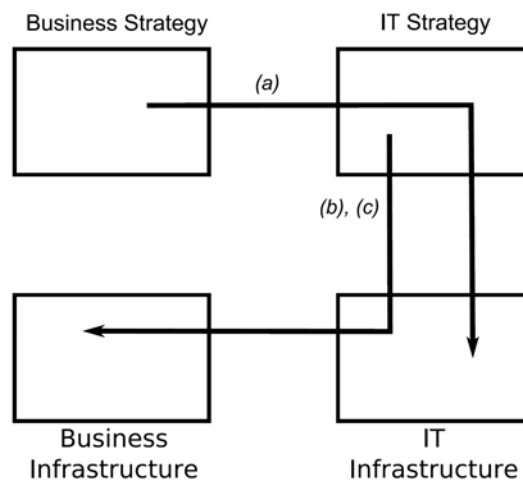

Fig. 7. Adaptation of the SAM model to Concept & Forme

6 Discussion and Conclusion

The work presented in this paper aimed at introducing some formalisation in the interview based alignment measurement process. Measuring the gap/fit between Business Strategy and IT Strategy assumes a good knowledge of both strategies. However, as argued in [12], a recurring issue seen in previous alignment research is that often corporate strategy is unknown or, if known, is unclear and/or difficult to adapt. This poses a significant challenge because most models of alignment presuppose an existing business strategy to which an IT organization can align itself. In addition, Formal business strategies are often too ambiguous for business managers to understand. Problems encountred are often related to (a) capture of strategic knowledge and (b) analysis and determination of degrees or level of Alignmnent. In this paper, authors aimed at combining SAM semantics to strategy goal models in order to encompass problems related to representation and capture of strategy on one hand, and problems related to the method by wich alignment is identified. Using i*

goal models provides a formalism for strategy capture, the consideration of SAM in goal models analysis provides a method for a model driven Business/IT alignement discovery.

The proposed approach is very interesting to encompass the lack of formalisation to interview based measurement of strategic Business/IT alignment. The approach starts by formalising results of semi-structured interviews into formalized i* goal models expressing both Business and IT Strategies of a given company. Afterwards, the achieved modeling allows us to perform a structured study of strategic alignment based on the SAM model [6]. Indeed this approach enables us to better classify the kinds of business-IT alignment perspectives that are already existing in the company. Usually, such a classification is based on interviews performed with Business and IT managers. Thus, the classification can be biased by the managers' interpretation of the SAM model. The approach presented in this paper proposes an objective method to identify strategic alignment perspectives being used in a given company. The model driven approach for strategic alignment analysis is based on the comparison of two models: on one hand, a goal model representing Business strategy and on the other hand another goal model representing IT strategy. The comparison highlights semantic correspondences between both strategies.

Ongoing work aims at identifying and formalizing types of links that can be built between Business strategy goal model and IT strategy goal model. The main objective is to provide rules, methods and adapted tools in order to establish an alignment engineering methodology.

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