Advancing Organizational Alignment Decisions: Insights from the Structural Alignment Theory to the Business - IT Alignment Problem

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ABSTRACT

In this article, a theory-driven approach for managing the alignment process between business and IT by making high-quality IT investment decisions is developed. The aim is to increase the understanding of the dimensions of the alignment problem and to offer some support in solving it. The conceptualization of the alignment issue is searched from the structural alignment theory, arising from and applied in psychology. After the theoretical considerations, the article adopts a multidimensional and constructive approach to the alignment problem and looks for answers to the question: How should organizations align business and IT, or at least, how to support the business and IT alignment decisions? As a result, a theoretically sound framework originating from the alignment problem is proposed for the evaluation of IT investments, a methodology based on that framework, and a concrete investment support system to help decision makers. The applicability of the approach is evaluated in the context of an actual case in the finance sector.

KEYWORDS

AHP, Alignable Differences, Business - IT alignment, Decision Making, IT Investments, Nonalignable Differences, Organizational Alignment, Structural Alignment, Support System

1. INTRODUCTION

During the last century, efficiency in organizational contexts has been sought by specialization, functional differentiation and professionalism - generally, by division and structuring of work. Impressive success stories at the level of organizations and in whole societies have been heard. Consequently, additional managerial requirements to integrate and coordinate the diverging activities within organizations have been recognized at the same time. Organizational units and other groups have become committed to their own goals and started to compete with each other, instead of cooperating and striving towards common goals. The need to align interorganizational or cross-functional activities has arisen. At the same time organizations operate at more and more competing product and resource markets, and thus the need to align organizational activities in the exogenous context have become obvious as well.

Generally, alignment is the proper positioning or state of adjustment of parts in relation to each other (Merriam-Webster, a). If not a synonym, alignment is at least closely related to the concept of ‘fit’. The best known ‘fit’-theories are tied to the perspectives of natural selection where the fit is the...
result of an evolutionary process. The theories of managerial selection have adapted the principle of fit to the organizational context-structure relationship.

Today, information technology (IT) has penetrated every organization of any size in every industry. It is difficult to find organizational activities or processes where information systems would not be employed in one way or another. In addition to academic interest, the alignment problem between business and information technology has been assigned to a set of the most challenging IT topics in practice. The problem spans multiple dimensions, like all organizational decision levels, different time frames, intellectual and social capabilities, tangible and intangible assets, organizational structures and processes, etc. It is a most wicked problem with complicated, controversial, diversified and pluralistic features. In the literature the problem has been typically oversimplified by focusing only on a few dimensions and ignoring the others.

Organizational alignment in general but also the alignment between business and IT does not just happen; it is realized by a series of decisions at different organizational levels. The abilities and skills to make such complicated and multidimensional alignment decisions are rare (Powell, 1992), and all support is valuable to advance the quality of those decisions. One of the most significant classes of such decisions are the IT investment decisions. The business – IT alignment (BITA) is finally created or solved by these investment decisions. In principle, the whole IT function within an organization and thus, the whole alignment problem is a result of investment decisions and by implementing those decisions. Fortunately, the problem can also be solved by proper investment decisions and their implementation. Behind the high-quality investment decisions there are, of course, a number of organizational, managerial, financial, technological, and other factors. IT governance, economic situation, technological competences, project management capabilities, to name only a few, might have critical effects on the quality of IT investment decisions.

First and foremost, the purpose of this paper is to combine and integrate IT investment decisions and the alignment issue at the theoretical and conceptual level. To reach the purpose, conceptualization of the most significant dimensions of BITA problem as suggested by prior alignment studies is needed. Unfortunately, the plethora of diverse, nonintegrated concepts and dimensions makes it difficult to develop an integrated, parsimonious approach for managing the alignment process. In order to address this difficulty, a more definite conceptualization and explanation of the alignment issue is searched from the structural alignment theory (SAT), arising from and applied in psychology. In SAT, entities are viewed “as systems of objects, object-attributes and relations between objects” (Gentner, 1983, p. 156). The theory states that two entities can be compared by putting the hierarchical structure of one entity into alignment (or correspondence) with the structure of the other entity to which it is compared. The principles of structural alignment (SA) have extended beyond analogical reasoning to other cognitive phenomena, such as comparison (Markman & Gentner, 1993b) and choice (Markman & Moreu, 2001; Markman & Medin, 1995; Medin, Goldstone, & Markman, 1995). Moreover, the theory has been applied to other phenomena, like information extraction (Mauch, 2000) and opportunity acknowledgement in markets (Grégoire, 2005).

After the theoretical considerations, this paper adopts a constructive approach to the alignment problem and tries to find some answers to the How-question: How should organizations align business and IT, or at least, how to support BITA decisions? The purpose is to develop a theory-driven approach for managing the alignment process by making high-quality IT investment decisions.

Next, the argumentation of the discussion is based on prior studies on BITA, studies on IT investments, and especially on SAT. In section three, the theoretical discussion is materialized as a new alignment approach. In section four, the applicability of the approach is evaluated in the context of an actual case from the financial sector.
2. THEORETICAL CONSIDERATIONS ON ORGANIZATIONAL ALIGNMENT

In organizational circumstances, the structure and processes of an organization must fit its context if it is going to survive and perform effectively. Lawrence and Lorsch (1967) have suggested that the performance of the organization improves when the operations are aligned well with the external conditions and Chan et al. (2006, p. 1) found empirical support “that IS alignment improves organizational performance”. Powell (1992, p. 119) was even able to show by an empirical study in two manufacturing industries that “some organizational alignments do produce supernormal profits”. In addition, the need to align interorganizational or gross-functional activities has arisen, too.

Information technology (IT) is, of course, a means to facilitate such a fitting, but at the same time, IT can be a source of a considerable fitting, or alignment, problem. IT can at worst case live its own life, neglecting its role and position within the organization and between organizations. Unfortunately, the empirical evidence conforms the frequency and annoyance of the problem.

The terms ‘alignment’ and ‘fit’ have been considered to be close enough to be regarded as synonyms in a number of prior studies on BITA (Héroux & Fortin, 2018; Hirschheim & Sabherwal, 2001; Hussin, King, & Cragg, 2002; Tallon, 2007). If interpreted broadly, most of the studies within the information systems domain have adopted a kind of ‘fit’ or ‘alignment’ perspective. According to Weill and Olson (1989), over seventy percent of IS studies use the research model assuming that the better the fit between the contingency variables (strategy, structure, size, environment, technology, task, and individual characteristics), the better the organizational performance.

The BITA problem has been explicitly at issue over thirty years (McLean & Soden, 1977). Research on BITA or the fit problem is massive, spreading to a number of dimensions. The purpose of the next discussion is to comprehend the alignment problem broadly and to ensure that we are going to solve right problem in the subsequent argumentation.

2.1. Some Dimensions of the Business - IT Alignment Problem

The BITA problem spans multiple dimensions. Based on the literature analysis, a ten-dimensional model of BITA is presented in Figure 1.

According to Figure 1, typical alignment

1. Crosses all organizational decision levels
2. Can be a realized or only planned
3. Includes risk and uncertainty
4. Is an outcome or a process

Figure 1. Key dimensions of the Business - IT - Alignment
5. Can be aimed at and evaluated by single or multiple measures that
6. Can be tangible or intangible by nature
7. Can be accomplished by evolutionary or revolutionary changes
8. Engages single individuals, groups as well as whole organizations
9. Requires intellectual and social capabilities to accomplish
10. (The guidelines for successful alignment) cannot be grounded alone on the existing practices

Next the key dimensions of BITA are shortly discussed.

1. **Decision Level (Strategic – Tactical – Operational):** Most of the studies on BITA concern alignment at the strategic level (Gutierrez, Orozco, & Serrano, 2009). Although criticized (Ciborra, 1997; Keen, 1996; Maes, 1999; Silva, Figueroa, & González-Reinhart, 2007; Smaczny, 2001), the strategic alignment model suggested by Henderson and Venkatraman (1993) has achieved a permanent status and a kind of reference point in subsequent studies (e.g. Avison, Jones, Powell, & Wilson, 2004; Gerow, Thatcher, & Grover, 2015; Papp, 1999). Despite the strategic nature, it defines four alignment perspectives with two types of integration between the business and IT domains: strategic and operational integration. The concept of strategic alignment has also been completely questioned. Maes summarizes his critique by concluding that “strategic alignment is not only illusory, but even inexpedient!” (Maes, 1999, p. 5). However, the strategic, high-level alignment is not the only alignment level (El-Mekawy, Rusu, Perjons, Sedvall, & Ekici, 2015).

At the operational and tactical levels, alignment problems mainly concern technological and social issues like IT infrastructure and contents, processes and projects, communication, resource allocation, and technology and people (Hussin, King, & Cragg, 2002; Tarafdar & Qrunfleh, 2009; Tarafdar & Qrunfleh, 2010; Wagner & Weitzel, 2012).

2. **Actualization (Intended – Realized):** When proposing the construct ‘business strategic orientation’, Venkatraman (1989b) applies the distinction between intended and realized strategies. Strategic intent is associated with a priori strategic choices, whereas the realized strategy is defined as a consistent pattern of behavior in the organization (Mintzberg, 1978; Mintzberg & Waters, 1985). Most of the realized strategies emerge without preconception (Grant, 2006). This might hold also with IT strategies and, as a consequence, with BITA at the strategic level, indicating that there is a lot of uncertainty in alignment plans. The intended alignment can be beneficial for adding IT resources (L. Chen, 2010).

3. **Degree of Certainty (Certain – Risk – Uncertain):** Organizational alignment or fit always inhere risk and uncertainty. Fit is by definition a reaction towards environmental uncertainty and instability. Bergeron et al. (2001) include environmental uncertainty in exploring the impacts of information technology on business performance, using six different perspectives to alignment, as proposed by Venkatraman (1989a). It has been found that riskiness as a part of strategic IT alignment is positively related to the IS contribution to organizational performance (Johnson & Lederer, 2010). Also, Choe et al. (1998) found that external factors, such as environmental dynamism and hostility, influence the facilitators of strategic IS alignment.

4. **Transitivity (Process – Outcome):** Byrd et al. (2006) classify strategic alignment into two categories; process and outcome alignment. Some researchers have focused on the process of attaining alignment (Chan, Huff, Barclay, & Copeland, 1997; Sabherwal & Chan, 2001; Tallon, 2007), whereas some others are interested in the outcomes, or content, of the alignment (Chan, Sabherwal, & Thatcher, 2006; Wu, Straub, & Liang, 2015). In his studies (Tallon, 2007; Tallon, 2011) moves from firm level alignment and conceptualizes alignment at the lower process level. It should be noted that each planning and decision level has its own shapes of dynamics and thus different ways to align, and that outcome-oriented research focuses on realized rather than intended strategies.
5. **Goal / Evaluation Criteria (Single – Multiple – Hierarchic):** The implications of alignment can be evaluated from different perspectives. Generally, the final purpose of IT is to provide business value to the organization. Avison et al. (2004, p. 225) see that alignment assists “a firm in three ways: by maximising return on IT investment, by helping to achieve competitive advantage through IS, and by providing direction and flexibility to react to new opportunities.” In their empirical investigation Tallon and Kraemer (2002) were able to uncover an interesting phenomenon; an alignment paradox showing that while strategic alignment can lead to increased IT business value, this relationship is only valid up to a certain point, beyond which further increase in the strategic alignment appears to lead to a lower IT business value. This result indicates that there is an optimal level of business IT alignment – too much is too much even with alignment. Generally, the impacts BITA can be evaluated by single or multiple criteria.

6. **Measurability (Tangible – Intangible):** Usually the alignment factors are difficult, if not impossible, to measure. Still, a number of significant research efforts have been made to quantify the alignment levels of an organization empirically. Venkatraman (1989a) discusses the concept of fit in the field of strategy research and is able to identify six static, cross-sectional perspectives for measuring fit: fit as moderation, mediation, matching, gestalts, profile deviation, and covariation. Bergeron et al. (2004), for example, build on the gestalt model and coalignment concept to measure the effects of alignment on organizational performance. Luftman (2000; 2003) has developed a Strategic Alignment Maturity assessment tool for evaluating the present position and change directions “to attain and sustain business-IT alignment” (Luftman, 2003, p. 15). This measurement instrument is used and developed further in a number of maturity studies (e.g. L. Chen, 2010; Cumps, Vlaene, Dedene, & Vandenbulcke, 2006; De Haes & Van Grembergen, 2009; Khaiata & Zualkeren, 2009).

7. **Progress (Evolutionary – Revolutionary):** Alignment between business and IT can be a smooth and continuous or a rapid and broad progress. Cumps et al. (2006) combine the resource and evolutionary-based views of the firm to analyse the alignment performance and to deduce alignment guidelines. Evolutionary economics focuses on continuous learning, knowledge accumulation and gradual build-up of knowledge. Consequently, also alignment builds on organization-specific routines and knowledge accumulation rather than short term actions. Sabherwal et al. (2001) were able to separate relatively stable or evolutionary changes, and rapid, revolutionary changes in the strategic IS management profiles.

8. **Actor (Individual – Group – Organization):** Business and IT can be aligned at personal, group or organizational levels. Depending e.g. on the education and experience, a single person can search for an appropriate balance between his/her tasks and available technology. A person in the marketing department may actively design and implement data marts for his/her own use. Similarly, a group of people may want to adopt some technological solution to their jobs, or their jobs to technological possibilities. It is clear that alignment at the level of the whole organization is the most challenging. Of course, the alignment success at different levels can be interrelated (Chong, Chan, Ooi, & Darmawan, 2011).

9. **Capabilities (Intellectual – Social):** One aspect of BITA is motivation (Middleton & Harper, 2004). Intrinsic motivation based on internal factors is a strong motivator for individuals, but for groups and organizations extrinsic factors like money may provide more powerful means of motivation. Setting personally meaningful goals, making the results visible and recognizing them, as well as increasing interpersonal skills like, for example cooperation, are factors that advance individuals’ motivation to align.

Reich and Benbasat (1996; 2000) and Gregor et al. (2007) apply the distinction between the intellectual and social dimensions of the process of strategic business planning. When studying the social dimension of the alignment, Reich and Benbasat (2000) found that shared domain knowledge between business and IT executives is the most influential construct in alignment. Walentonowitz and
Beimborn (2011) found that the complex social structures between business and IT are vital to the success of alignment. Similarly, Preston and Karahanna (2009) found that the shared understanding between CIO and top management about the role of IS in the organization is a significant antecedent of the intellectual alignment. Although conceptually separated, in practice the social and intellectual dimensions of alignment can be interrelated (Campbell, Kay, & Avison, 2005).

10. Is-Ought (Descriptive – Prescriptive): Designing or planning the alignment process is normative action which is conceptually a completely different task compared to the descriptive analysis of the prevailing state of the alignment. The purpose is to find an answer to the question ‘How should be’ or ‘How ought to be’, not the question ‘How is’. The ‘is-ought’ problem was raised by David Hume (1711–1776), who criticized the way to make claims about what ought to be (prescriptive statements) on the basis of statements about what is (descriptive statements). Most alignment studies concern the ‘is’-side of the problem, generating empirical descriptions of the actual alignments. Some studies (e.g. Cumps, Viaene, Dedene, & Vandenbulcke, 2006; Luftman, 2003) offer direct alignment guidelines or recommendations for successful alignment. Unfortunately, prescriptive statements on how the alignment should be done are generally too loosely given.

After considering these 10 key dimensions of BITA, it is clear that BITA is a most complicated problem with diversified characteristics, requiring multiple explanations to account for its nature. All dimensions of the BITA problem have been dealt with in the relevant research. Partial explanations are common but there is not, however, any attempt to manage all dimensions holistically. The problem is oversimplified by focusing on a few dimensions and omitting the others.

As emphasized by Chan et al. (1997, p. 125), “business strategic orientation, IS strategic orientation, and IS strategic alignment are modelled best by utilizing holistic, ‘systems’ approaches instead of dimension-specific, ‘bi-variate’ approaches”. Although it is clear that “there is no silver bullet for achieving alignment” (Luftman & Kempaiah, 2007, p. 166), we should try, as academicians, to integrate and transform the huge knowledge of the issue to practical support.

Smaczny (2001, p. 797) criticizes the present state of the alignment studies: “… no studies have focused on how organizations actually achieve alignment”. More practical advice on how to achieve alignment is needed (Booth & Philip, 2005). BITA does not just take place; it is implemented after a sequence of decisions at different organizational units. The most significant classes of such decisions are the decisions on IT investments. The BITA problem, or at least a significant part of it, is finally created or solved by these investment decisions. Next, some perspectives to comprehend the role of IT investments in BITA are presented.

2.2. IT Investments

Information technology forms the largest capital expense in many companies and other organizations today (Nolan & McFarlan, 2005) and it is forecasted that worldwide IT spending growth rate is still rising (Gartner, 2018). Beyond that, it is the key to achieve business objectives and open new strategies. Unfortunately, the capabilities to make IT investment decisions that are aligned with the goals and strategies of the organization have not grown along with the need.

Usually, studies on BITA and IT investment issues are fully isolated. Byrd et al. (2006), however, integrate the issues and shows that strategic alignment has an influence on the relationship between IT investment and firm performance. Velcu (2010) found by a path model that strategic alignment was significantly related to the financial benefits of the ERP investment. As summarized by Gerow, Thatcher and Grover (2015, p. 479), “IT investments may be necessary to support and enable alignment of IT with the business”. The core of IT investments is discussed next from the viewpoint of the alignment dimensions described above. The discussion hopefully clarifies the close relationship between the issues.
Essential characteristics of any investment decision, even though to a varying extent, are the commitment of resources, the involvement of risk, and the fact that the benefits are not wholly exhausted in the short term. IT investments can be categorized by a number of dimensions to a number of classes. Ross and Beath (2002), for example, found that IT investments differ along with two dimensions – technology scope and strategic objectives – and companies need to make four types of IT investments: transformation, renewal, process improvements and experiments.

Also, IT investments can be strategic, tactical or operative by nature. Strategic IT investments are vital for the wellbeing of the whole organization and on its long-term performance, whereas operational investments seek increasing performance on a relatively narrow scope at a short horizon. Moreover, we can differentiate between intended and actually realized investment plans. According to Chen et al. (2008) even the intended alignment influences IT investment effectiveness.

According to the general portfolio theory by Markowitz (1952), all investors maximize their expected utility. The expected utility of an investor is assumed to depend only on the expected value and the variance of the expected return. Thus, in general, the expected value is a valid outcome measure of return, the variance provides a valid measure of risk, and all investment decisions are completely described by these two measures. Thus, return and risk are widely accepted as the basic criteria for the evaluation of any portfolio of investment alternatives. Without exception, this holds with IT investments as well. Compared with other investments in the business context, IT investments have some special characteristics which make it difficult to evaluate their return. This is due to the benefits being mainly intangible by nature. Moreover, at least part of the risks in IT investments are exogenous and uncontrollable. When Dewan et al. (2007, p. 1827) investigated the risk - return relationship of IT investments they found that “IT capital investments make a substantially larger contribution to overall firm risk than non-IT capital investments”.

There are a lot of process models for managing the investment process, and a lot of criteria to evaluate them. In general, the investment or the capital budgeting process can be divided into separate phases.

Within the intangible investments, the potential goal state the firm aims at is perhaps not best described by the firm’s maximal present value, but several other goals can be driven for. In addition to the general goals, also strategy or problem-oriented lower level goals may be used. Among the goals there exist hierarchical or other relationships that are determined by personal preferences. Thus, there may be several acceptable solutions to the intangible investment problems, and the alternative that is finally chosen depends on the personal preferences of the decision-maker or decision-makers.

By replacement or expansion investments organizations seek smooth and continuous development, i.e. evolutionary changes. Strategic investments, on the other hand, especially offensive ones, might aim at quite new lines of products, production or service, new business in new markets, or other revolutionary changes.

Generally, the investment evaluation techniques involve the use of discounted cash flow, which is often given as a net present value formula. Sylla and Wen (2003) reviewed the existing IT investment evaluation methods and categorized them into three groups: IT evaluation methods for tangible benefits, intangible benefits, and risks.

Depending on the type of IT investment, the actor in the investment process can be a single person, a group, or the whole organization may be involved the process. Similarly, the investment decisions may concern individuals, groups, or the organization, and the implementation of these decisions requires intellectual as well as social capabilities. Responsibility of IT investments certainly depends, for example, on the type and scope of the investment, organization of IT, or established organizational relations between IT and business. In charge there can be IT management, IT governance, joint team between IT and business, etc.

All in all, the key characteristics of IT investments closely resemble the dimensions of BITA problem discussed earlier. In Appendix A, the features of IT investments are related to the dimensions of the alignment problem. Generally, the whole IT function within an organization and thus, the whole
alignment problem is created by investment decisions and by implementing those decisions. Thus, the problem can also be solved by proper investment decisions and their implementation. That is, organizations search for the best fit to the context at hand by investment decisions.

Next, in order to find some support to IT investment decisions, let us return to the alignment concept. The dimensions of the alignment problem and the respective characteristics of the IT investments discussed above give sufficient background to develop a theory-driven approach for managing the alignment process by making high-quality IT investment decisions. However, the plethora of diverse concepts and dimensions makes it difficult to develop an integrated, parsimonious approach for managing the alignment process. The approach has to be sharpened in order to establish a theoretically sound methodology with practical value as well. Therefore, the perspective is changed by quoting the structural alignment theory (SAT) that defines some useful concepts more exactly.

2.3. Structural Alignment Theory (SAT)

SAT is a generalization of the structural mapping theory (Gentner, 1983). In the theory, entities are viewed “as systems of objects, object-attributes and relations between objects” (Gentner, 1983, p. 156). Simply, the theory states that two entities (element, object, concept) can be compared by putting the hierarchical structure of one entity into alignment (or correspondence) with the structure of the other entity to which it is compared. It is assumed that there are groups of connected properties organized in a hierarchy, and structural alignment (SA) is a process for searching the deepest potential correspondence between two entities (actually the mental models or representations of the entities are compared). In other words, structurally consistent alignment requires that each element of a representation matches one element of the other representation (one-to-one correspondence).

In essence, the original SAT is based on reasoning by analogy rather than on literal similarity. An advantage of SAT is that it “permits non-identical representational elements to be placed in correspondence when they play the same role in a mapping relational structure” (Markman & Moreu, 2001, p. 356). This means that quite dissimilar entities can be compared if they play the same role or aim at the same goal. In comparisons between mental representations, structural similarity (relationships) is emphasized over featural similarity (attributes of elements). The relationships between the elements can be based for example on cause-effect, means-end, or problem-solution relations.

According to SAT, the alignment process yields the commonalities of pairs (common dimensions) and two types of differences. Alignable differences take place when two entities have different values on a common dimension and nonalignable differences when one entity has attributes without correspondence in the other entity. The distinction between alignable and nonalignable differences is fundamental because the predictions of the theory about the evaluations of similarity are based on the relative weighting of the differences: “…alignable differences are more salient than nonalignable differences” (Gentner & Markman, 1997, p. 50). This relative weighting of two types of differences has been recently questioned by Estes and Hasson (2004). Gentner and Markman (1994) discovered in their experiments that people found it easier to list differences (particularly alignable differences) for similar pairs than for clearly dissimilar pairs.

The principles of SA have extended beyond analogical reasoning (Gentner & Markman, 1997) to other cognitive phenomena, like comparison (Markman & Gentner, 1993b), categorization (Poitrenaud, Richard, & Tijus, 2005), conceptual combination (Wisniewski, 1997), and choice (Lee & Lee, 2016; Markman & Moreu, 2001; Markman & Medin, 1995). Similarly, the theory has been applied to other domains, like information extraction (Mauch, 2000), consumer behaviour (Nam, Wang, & Lee, 2012; Sun, Keh, & Lee, 2012), opportunity acknowledgement in markets (Gégoire, 2005), and opportunity recognition in the context of SME internationalization choices (Peschken, Shukla, Lennon, & Rate, 2016).

The structural alignment theory has been implemented in different algorithms, including the Structure Mapping Engine (Falkenhainer, Forbus, & Gentner, 1989), the Incremental Analogy Machine (Keane & Brayshaw, 1988; Keane, Ledgeday, & Duff, 1994), ACME (Holyoak & Thagard, 1989)
and LISA (Hummel & Holyoak, 1997). Although these models describe the process of analogizing in slightly different ways, they are still variations of structural alignment (see Keane & Costello, 2001).

So far, the dimensions of BITA, characteristics of IT investments and some basic properties of SAT have been discussed. Based on this discussion, a new approach for managing the alignment process is proposed in the next section.

3. AN APPROACH FOR MANAGING THE ALIGNMENT PROCESS

3.1. Alignment in Goal Space

The object of the experiments with SAT has usually been some existing entity (being or concept), not an intended one. However, when IT-investment decisions are concerned, future or intended systems are of interest. In such a case we cannot compare existing entities, but the investment alternatives are first projected into a goal space and then the expected goal values are compared. Thus, applying the principles of SAT, two investment alternatives can be compared by putting the goal structure with the goal values of one alternative into alignment (or correspondence) with the goal structure with the goal values of the alternative it is compared with. The importance of the goals in the alignment process has been emphasized for example by Semler (1997, p. 23): “Organizational alignment is the degree to which an organization’s design, strategy, and culture are cooperating to achieve the same desired goals.” There is no alignment between business and IT unless the common goals are agreed upon.

The rationale of employing goal space instead of the original space of the decision variables is based on the assumption that only the goal space unifies otherwise diverse entities. Here, not structural similarities but rather structural preferences are of interest. The goal structure represents the commonalities of the alternatives, and the goal values have alignable or nonalignable differences. When the alignment is made in goal space, we do not align by comparing existing similarities or differences, but by deducting value-based priorities and analyzing their similarities or differences. When the goals are agreed on, it leads to the alignment of work-flows and other processes, performance evaluation, attitudes toward risks, principles of resource allocations, etc. Goal alignment is a kind of a driver for all organizational alignment activities.

3.2. Goal structure

Individual behaviour, as well as organizational processes, are basically grounded on values. Values are the basic preferences that guide selections in different decision situations. According to Dose (1997, pp. 227-228), “values are evaluative standards relating to work or the work environment by which individuals discern what is ‘right’ or assess the importance of preferences”. In Rokeach’s (1973, p. 5) definition, values are seen as forms of beliefs: “A value is an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence”. Instead of a single value, a person’s behaviour is guided by a cluster of values, or by a value system where hierarchical relations typically exist, as Fritzsche (1995, p. 910) states: “A series of clusters of values together form a person’s value system consisting of a value hierarchy or priority structure based upon the relative importance of the individual values.”

In the organizational context, “organizational value systems provide guides for organizational goals, policies, and strategies” (Wiener, 1988, p. 536). Organizational values (value system) guide organizations to make strategic choices, set goals and objectives, or run the everyday business. Personal and organizational values have multiple implications for different stages in the management process. Values, for example, influence the search for investment alternatives. They are manifested in the goals and goal structure, and they are present when the alternatives are evaluated. Although the values are relatively fixed, they may change even in the short run, or at least they can be explicated differently.

Prior research has shown that people perform better when they work on a task having a specific, challenging goal (Locke & Latham, 1990). According to Robinson and Stem (1998), alignment in
the organizational context is a highly goal-oriented process. They define alignment as: “The degree to which the interests and actions of each employee support the organization’s key goals” (Robinson & Stern, 1998, p. 89).

In the organizational context, work is divided to differed divisions, departments, groups or teams, who usually strive towards their own goals and compete with each other for common resources, recognition, rewards, etc. However, intergroup relations and cooperation between units are prerequisites for organizational effectiveness. Because we cannot eliminate departments, groups or other units, we must align the groups toward a higher order, common goal. In psychological literature such goals are called ‘superordinate goals’ (Sherif, 1958). “Superordinate goals are goals that get people from opposing sides to come together and work toward a common end result” (Alleydog.com’s online glossary, n.d.). Superordinate goals aim at a higher purpose than any one group, and this way align all groups to that purpose by giving each a common goal. Each time there is a conflict between groups, each group has to go back to the superordinate goal to make choices. In addition to conflict resolution in psychology (Hunger & Stern, 2002), the concept of superordinate goal is applied to a wide variety of scientific inquiry, e.g. in economics (March, 1962), marketing (Webb & Lambe, 2007), project management (Pinto, Pinto, & Prescott, 1993), and product development (Atuahene-Gima, 2003).

Because organizational designs usually have some hierarchical characteristics, also the goals have a hierarchical nature (Bateman, O’Neill, & Kenworthy-U’Ren, 2002). The superordinate goal can be divided to lower level goals, each of which still serves as an upper goal for some lower level organizational units or processes. Therefore, it is consistent and fair to suggest that the goal space in the organizational context is structured hierarchically, with the superordinate goal at the top and the goals of groups, processes, or even individuals at the lowest level.

To sum up, BITA employs individual, organizational and social values and preferences. In addition to values, the goal structure may reflect organizational structures (designs), business strategies and environmental characteristics, like uncertainty and risk. The goal structure forms a means-end relationship between IT investment alternatives and business performance, be it business value or other success measure.

Although the goal structure may reflect a number of things and it may be presented by a number of means, it is basically a mental construct that guides human actions in the organizational context. When the final goal structure is agreed upon within the organizational unit or between organizational units, it serves as a means to increase the comparability of entities, i.e. it establishes a one-to-one correspondence between the alternatives. Generally, the alternatives can be aligned with respect to the goals at the same level or to the highest-level goal.

The goal space should be rich enough to catch the most significant properties of all alternatives. In practice, however, each alternative has unique properties that cannot be directly related to the common goals. Therefore, when aligning business and IT by making IT investment decisions, there are two main groups of differences: alignable and nonalignable differences. Some investment alternatives may have properties that cannot be related to any commonly accepted goal (nonalignable difference), but the alternatives differ also by the properties that are related to a commonly accepted goal (alignable difference). In the next section, the alignable differences are further conceptualized into two subsets.

Gentner and Gun (2001, p. 575) conclude: “In sum, the alignment process illuminates both common structure and differences related to that common structure”. By projecting this statement to the goal space, it can be concluded that the alignment process illuminates both the common goal structure and the differences related to the common goal structure. Table 1 describes the main principles and contents of SAT and the special connotations in the goal space.

As the organizational contingency theories generally state, there is no best way to manage an organization, but there are alternative ways to fit the organizational structures to the context. In IT investment decisions this principle leads to the conclusion that there is no superior investment alternative, but there are always goal dependent tradeoffs between investment alternatives. In other words, when a number of items are aligned to another set of items by using a number of evaluation
criteria, we cannot unambiguously state the order of the alternative alignments but there are tradeoffs between them. Next, some of the alignment concepts discussed above are related to tradeoff analysis.

3.3. Analysing the Differences

3.3.1. Tradeoff Analysis

In conditional contingency theories the underlying premise is that the organizational context and structure must fit together if the organization is to perform effectively. In actual decision analysis this rule inevitably leads to the analysis of tradeoffs between alternatives and sensitivities in inputs and outputs. Tradeoff analyses are related to situations where two or more entities are in conflict. A tradeoff is “balancing of factors all of which are not attainable at the same time” (Merriam-Webster, b). When two desired qualities or aspects of an entity cannot be achieved at the same time, we need to give up one desired quality or aspect in order to attain the other. Typically, tradeoff analyses are related to decision situations concerning limited resources where two or more entities require the consumption of the same resource.

Lawrence and Lorsch (1967) have reported that in uncertain environments, successful firms adopt more differentiated structures than unsuccessful firms. Therefore, it is clear that uncertainty and risk are key attributes in organizational decision making and tradeoff analysis. Actually, one of the best known tradeoff situations is the one between risk and return. It is a generally known principle that the expected return rises with the increase of risk. Simply, the risk-return tradeoff states that invested money can provide higher profits only under the possibility of being lost. The techniques of tradeoff analysis vary from intuitive experiences and graphical descriptions to complicated mathematical models (Gorschek & Henningsson, 2005). When evaluating and choosing an IT investment, tradeoff analysis can be used for different types of tasks: evaluating the priorities of investment alternatives a priori, evaluating selected alternative a posteriori, or validating the hierarchical goal structure.

In the following discussion it is assumed that most of the properties of the decision alternatives are represented by the goal structure, that is, the nonalignable properties are minor and less significant. This assumption is in congruence with Markman and Medin (1995, p. 118) who propose “that comparison (and decisions) are biased to favor alignable differences over nonalignable differences.” Generally, SAT claims that “alignable differences are more salient than nonalignable differences” (Gentner & Markman, 1997, p. 50) and as a result, “the alignable difference should be more heavily weighted than

<table>
<thead>
<tr>
<th>Constraints of SAT</th>
<th>Content</th>
<th>In goal space</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-to-one correspondence</td>
<td>Each element of a representation matches at the most one element of the other representation (isomorphism). The comparison process maintains an isomorphism between the elements of both domains.</td>
<td>Each goal of a representation (alternative) matches at the most one goal of the other representation.</td>
</tr>
<tr>
<td>Parallel connectivity</td>
<td>Arguments of matching predicates must themselves be able to be placed in correspondence. If two statements are matched, then their arguments should be placed in correspondence as well.</td>
<td>Lower level goals must be able to be placed in correspondence.</td>
</tr>
<tr>
<td>Systematicity</td>
<td>People prefer deep matching systems over those with only isolated, scattered matches, and draw inferences based on completing systematic patterns. Larger systems of shared matches are preferred over smaller systems of matches or fragmented, isolated matches.</td>
<td>Deeper goal hierarchies are preferred over those with only isolated, scattered goals.</td>
</tr>
</tbody>
</table>

### Table 1. Contents of the structural alignment theory (SAT)

<table>
<thead>
<tr>
<th>Differences</th>
<th>Alignable differences: Conceptually related to a commonality. Nonalignable differences: Conceptually not related to a commonality.</th>
<th>Alignable differences: Conceptually related to a common goal.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Win-win differences</strong></td>
<td><strong>Tradeoff differences</strong></td>
</tr>
<tr>
<td></td>
<td>Nonalignable differences: Conceptually not related to a common goal.</td>
<td></td>
</tr>
</tbody>
</table>
the nonalignable difference” (Estes & Hasson, 2004, p. 1083). Therefore, in the following discussion attention is paid to the alignable differences and their properties.

In Figure 2 six (investment) alternatives are positioned in a goal space with only two goals. All differences between the alternatives are related to the common goals and are therefore alignable. However, alternatives A1 and A2 are inefficient inner points and alternatives A3 – A6 efficient Pareto solutions (goal maximization is assumed). If we move from A1 to A2, both goals are improved, but the movement between A4 and A5 increases one goal and decreases the other one. The difference between A1 and A2, for example, is a win-win difference because the goals are not in conflict with each other, but both can be improved if alternative A2 is accepted instead of A1. On the other hand, the difference between A4 and A5 is a tradeoff difference because both goals are not attainable at the same time.

From the organizational point of view, alignment can be seen as an agreement of common goals between organizational units or functions. Alignment is not a dichotomous ‘yes-no’ decision, but a measure of degree, ranging from complete opposition to perfect agreement.

3.3.2. Splitting the Differences

As discussed above, the differences between objects in SAT are split into two categories – alignable and nonalignable differences (Markman & Gentner, 1993a). It is proposed here that the detailed constitution of both types of differences can be further split in the goal space by the structure of the goal hierarchy. This deepens the analysis and creates new knowledge for the final decision. Because the alternatives are compared through the goal hierarchy, and the difference data is collected piece by piece, it is possible to explore this data and explain the constitution of the differences in detail. By splitting down the differences between the alternatives, it is possible to create relative profiles regarding each alternative (Figure 3). Comparing the goal profiles and their deviations is also a kind of alignment process (see the profile deviation perspective on alignment proposed by Drazin and Van de Ven (1985).

Figure 2. Decision alternatives in goal space
Here, the difference does not refer to the dissimilarity between the attributes of the alternatives, but the difference in goal values the decision alternatives are likely to generate.

3.4. Two-Way Alignment Process

The discussion above can be summed up as a process model of BITA. One direction of the alignment is the creation of a commonly accepted goal structure between business and IT. In Figure 4 this is described as a vertical flow. Vertical alignment certainly requires the managers in business and IT to demonstrate a lot of cooperative and integrative capability. Constructing a goal hierarchy demands individual as well as social capabilities; agreeing on common goals is equally important as difficult. Individual differences in the perception of similarity and difference are well recognized (Simmons & Estes, 2008). Avison et al. (2004, p. 225) emphasize the importance of common goals: “Co-operation between the business and the IT department to maximise investment in technology is vital, and with this in mind, IT investments and business objectives have to be considered together”. Wang and Campbell (2005, p. 22) found that the most important decision criterion for IT investments is “Align well with organizational goal”.

Another alignment direction is to use a commonly accepted goal hierarchy and to align the IT investment alternatives. As an output of the horizontal alignment, we do not get similarity data but preference data. In the horizontal alignment process the alternatives are compared in pairs with respect to the lower level items of the goal hierarchy. If one alternative has special properties that cannot be compared to another alternative with respect to any item of the goal hierarchy, the difference is nonalignable – or the goal hierarchy must be iteratively exchanged. Otherwise the horizontal alignment gives the priorities of investment alternatives, distinguishes win-win and tradeoff differences and splits the differences.

As indicated by Figure 4, the accepting and grouping of goals for a common hierarchy is in itself an alignment process. However, the common goal space serves as a means to align business and IT activities, especially IT investments.

The main advantage of the proposed approach is to systemize the coordination process between the goal structures of IT and business. By omitting the win-win differences and concentrating only on the tradeoff differences it is possible to accelerate the process remarkably. Another advantage of the proposed approach is that it can be applied under different contexts. It is only required that the
goal structures, hierarchical or not, can be explicated. They reflect the context an organization needs to be fitted. In addition, the proposed process is applicable to the alignment problems between two or more organizational units in general, not just between IT and business. The vertical alignment process can start from any number of organizational entities with respective goal structures.

Appendix A aims to integrate the discussions in sections two and three. Although the proposed approach builds on the existing dimensions of BITA problem and the respective properties of IT investment decisions, it imports some concepts from SAT.

4. EVALUATION OF THE PROPOSED APPROACH BY AN ILLUSTRATIVE CASE

4.1. Methodology: Case Project

According to Yin (2009) the case study is the correct choice when complex, social phenomena are of interest and is especially applicable when How and Why questions are important. The case study approach for the empirical part of this research can therefore be justified by the complexity of the phenomenon at hand and by the type of the research question.

The case application employed here is a Web Content Management (WCM) project. The case organization is a large multinational company operating in the field of finance services. Due to acquisitions and mergers, the company’s WWW-based network environment was diversified and a need for integration and standardization was expressed by outside customers as well as inside organizational units.

A relatively large project was set up to integrate the wide range of related software and respective solutions in creating the company’s intranet and extranet content. For this purpose, the company decided to invest in one central WCM system available for all organizational units. WCMs manage first and foremost documents, images, and audio and video material in digital form. The content in question may be directed internally within an organization (business-to-employees), or it can be made available to other businesses (business-to-business) or customers (business-to-customers). In addition to operative merits, the project aimed at strategic benefits in terms of integrating business processes and streamlining the web-publication process.

As a technical mean, the Analytic Hierarchy Process (AHP) (Saaty, 1994) was used in the case project. Based on mathematics and psychology, AHP has been developed to tackle complex, multicriteria, political and economic decision problems. As input, AHP uses the judgements of the decision makers about the alternatives, the evaluation criteria, the relationships between the criteria (importance), and the relationships between the alternatives (preference). In the valuation process, subjective values, personal knowledge, and objective information can be linked together. By this
procedure, it is possible to structure the decision problem into a hierarchy that reflects the values, goals, objectives, and desires of the decision makers.

The data collection process in this case followed strictly the well documented principles of AHP. Even though company documentation was used, the project group was the main source of the input data. As always in a group setting there were differences in views and judgments between members, so that is why a suitable method had to be found and applied to accommodate those differences (Lai, Wong, & Cheung, 2002). In this project no geometric means or votings were applied but the group was able to meet the consensus during face-to-face discussions. Those discussions concerning alternative strategies and evaluations criteria (goals) were as such appreciated highly. Technically, the needed data can be gathered either by questionnaires or by direct input to the applied software. In this case the data collection questionnaires were used for practical reasons. Then the data was entered to the AHP-model, and the results were processed and delivered to the next meeting of the project team. The project team made some reassessments and the process was iterated a couple of times.

4.2. Analysis

4.2.1. Constructing Representatives of Alternatives

According to SAT, the first phase of the alignment process is the construction of the representatives of the objects. No one is aware of every detail of all potential WCM alternatives, and the decisions are made under imperfect representations (information). At the outset of this project, a set of ten potential WCM systems was identified. The searching process was supported by published reports and analyses of international consultancy companies. Ten initial alternatives were submitted to preliminary analysis, concentrating on functional requirements and compatibility with the existing IT architecture. Through the preliminary analysis and elimination, four adequate alternatives were identified.

4.2.2. Aligning the Goal Hierarchy

In the second phase of the alignment process, the business and IT goals were generated and aligned (vertical flow in Figure 3). It was assumed that the general theory of investment management (Markowitz, 1952) is valid and the company in principle evaluates all its investments in terms of utility over risk and return. Return is composed of costs and benefits, and risks come either from outside (systematic risks) or inside (unsystematic risks) the company. Environmental uncertainty is represented by the systematic risk. This goal structure is considered to be general and valid for all investments, including IT investments.

The special characteristics of IT investments are placed on the lower levels of the goal hierarchy. Costs are assumed to be comprised of business costs and IT costs. Most of the benefits of WCM are intangible, stemming from the business impact, strategic value and success of use. Success of use refers to the usability of the system, and business impact to the actual effects on conducting the business processes. Strategic value refers to such dimensions as competitive advantage or organizational learning. Systematic risk (adaptation requirements and vendor experience) stems from outside the company, and unsystematic risk (application complexity, application size, organizational environment, team expertise, and technological novelty) from inside the company.

Galbraith (1977) concludes, based on his empirical studies, that 50 - 70% of variance in organizations can be accounted for by general theoretical propositions, leaving the rest to organization specific factors. Thus, in the goal hierarchy, the four upper levels are assumed to be general goal measures and the fifth level a case specific (contextual) one. The fifth level of goals includes 35 context dependent measures. In sum, the aligned hierarchy contains totally 54 goal variables at five levels, as described in Table 2.
4.2.3. Aligning by the Goal Hierarchy

In the third phase of the alignment process, the preference data is collected by making pairwise comparisons. The relative preference of each alternative (not similarity) is evaluated against each lower level goal, and the relative importance of each goal against the upper level goal according to the principles of AHP. Next, using the preference data, the alternatives can be ranked by any of the 54 goals in the goal hierarchy. The final ranking with respect to the highest goal (Business value) is described in Figure 5.

In this case, using the collected pairwise evaluations, WCMS2 appears to be the best alternative, and WCMS1 receives the lowest utility in the light of the goal hierarchy discussed above. If the alternatives are evaluated by the Risks goal, WCMS4 seems to be a less risky investment, and WCMS3 seems to have the highest risk properties.

How can this result be explained? The rationale behind the results and the reasons for the rating of the alternatives can be analysed in detail by following the structure of the developed goal hierarchy. In Figure 6 the contribution of six measures to the alternatives is described. For example, at the lowest level, ‘Business efficiency’ contributes significantly to all strategic alternatives. On the other hand, ‘Business integration’ seems to be the second biggest advantage to the other alternatives, except WCMS1, which has relatively high ‘Continuous costs’.

4.2.4. Tradeoff Analysis

When the alternatives are analysed, the final results can be grouped into a portfolio matrix (Figure 7). The position of each alternative in the matrix is determined directly by the coefficients of risk and expected return, as suggested by the original investment theory. When interpreting Figure 7, it must be realized that the alternatives are positioned in the matrix by their business value, i.e. lower risk means higher business value. According to Figure 7, only WCMS2 and WCMS4 are efficient.
Figure 6. Ranking of the investment alternatives with lowest stacked bars

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCMS2</td>
<td>0.477</td>
</tr>
<tr>
<td>WCMS3</td>
<td>0.204</td>
</tr>
<tr>
<td>WCMS4</td>
<td>0.178</td>
</tr>
<tr>
<td>WCMS1</td>
<td>0.141</td>
</tr>
</tbody>
</table>

Figure 7. Tradeoff analysis between four IT investment alternatives

Pareto solutions to the initial investment problem, and the decision maker needs to make tradeoffs between risk and return when making the final choice. The difference between WCMS2 and WCMS4 is a tradeoff difference. The differences between WCMS3 and WCMS2 and between WCMS1 and WCMS4 (dotted lines) are win-win differences, because a more efficient alternative can be found, no matter how the return and risk are weighted (ceteris paribus).

If the tradeoff analysis is made only with respect to costs-goal, then WCMS1 is the best choice (Figure 8a), but if it is made by the whole goal hierarchy (Business value), the situation is the opposite (Figure 8b). This result suggests that the alignment process is a highly goal-sensitive one. Aligning the business and IT strategies (alternatives) by the costs-goal leads to one shape of alternatives and aligning by the highest goal (business value), leads to another shape in the Business costs / IT costs space.

4.2.5. Splitting the Differences

Let us consider an alignable, tradeoff difference between WCMS2 and WCMS4. In Figure 9 the total difference in terms of the total utility is split into its components. In the graph, the bars represent the lowest level goals that favor one alternative over the other. The first bar indicates the difference (= .299) in overall ranking between the two alternatives. Its length can give an idea of the degree of influence of the various goals compared to the total difference between the alternatives in overall business value. In the rest of the graph, the total difference is split down to the ten most important components, and the magnitude of each component is graphed by bars.

If the best alternative (WCMS2) is considered as an ideal one, then the other alternatives can be compared against it and the splitting process resembles the deviation-score approach to fitting, as proposed by Drazin and Van de Ven (1985).
4.3. Case Findings and Implications

The primary research question in the paper was: How should organizations align business and IT, or at least, how to support BITA decisions? During the theoretical considerations it was proposed that one of the most significant classes of such decisions is IT investment decisions. The value of the theoretical considerations, respective methodology and concrete decision support system are assessed by an actual case in a real context. We next interpret the case from the alignment and investment perspectives discussed earlier, putting particular emphasis on the managerial points of view that allowed the company to bypass the organizational and technical difficulties originated from the numerous acquisitions and mergers.
Based on the result of the analyses, the case company’s final choice in the strategic WCM project was the WCMS2 system and it has been successfully implemented corporate wide later. Generally, based on the feedback from the case company, the quality of alignment between business and IT rose to a higher level. Specially discussing, bargaining, and agreeing the goal structure was evaluated to be of high value. Although those discussions were deep and wide, the proposed approach systematized and speeded up the converge process. The theoretically grounded, ready-made portion of the goal structure helped and directed the search of the case-specific goals and evaluation criteria. As such, no additional resources were needed. Certainly, the methodology cannot remove the need for the extensive investigation of the features and functionality of the investment alternatives, but, once performed, it does provide a consistent and a rigorous way to conduct the final assessment. Omitting the analyses of the win-win differences between alternatives and concentrating only on the trade-off differences increased the process effectiveness (short project duration, low project costs). Reduction of complexity was seen as the main advantage of the approach.

The graphic oriented methodology helped to communicate the results of evaluation to people who are not technically oriented. The strengths of each investment alternative with respect to each criterion can easily be seen as well as the contribution of the alternatives to the whole goal structure. Because most of the data collected was based on subjective evaluations, it was important that the evaluation criteria and their weights can be easily changed during the evaluation process. AHP methodology is sometimes a laborious tool with the pairwise comparisons but it offers automatic measures to evaluate the consistence of the inputs provided.

The capability of the methodology to employ tangible as well as intangible measures was highly valued by the participants. Equally, the clear priorities of the investment alternatives were considered important. It was easy to start the implementation activities based on the prescriptive analysis. Generally, encouraging feedback about the applicability of the methodology was received from the case organization and they said it would be possible to take the methodology into wider use in the future.

5. DISCUSSION AND CONCLUSION

In organizational circumstances, work is divided to differed divisions, departments, groups or teams, who typically strive towards their own goals and compete with each other for common resources, recognition, rewards, etc. However, cooperation between units are prerequisites for organizational effectiveness. Because we cannot eliminate departments, groups or other units, we must align the groups toward common goals.

Generally, the best possible internal or external fit within an organization does not just happen but is determined by decisions. Similarly, BITA is an integrated, rather than orthogonal concept and is implemented after a series of decisions at different organizational levels. One of the most significant classes of such decisions is the decisions on IT investments. BITA, or at least a significant part of it, is finally determined by these investment decisions. It is clear that all alignment problems are not resolved or created by investment decisions. A lot can be done by re-organizing and re-allocating resources, reformulating working routines, outsourcing or insourcing activities, managing knowledge, communicating more effectively, etc. Still, the scene is furnished by investment decisions.

The challenge in this research was to find sound conceptual integration between the alignment issue and IT investment issue. As a point of departure, a majority of the alignment literature was reviewed and crystallized into ten distinctive dimensions. These dimensions categorize the understanding on the alignment issue and form a requisite basis for the proposed approach of the alignment process. Still, new theoretical insight was needed to integrate and combine the alignment and investment issues deeply enough.

In this paper, a more definite conceptualization and explanation of the alignment issue is searched from the structural alignment theory (SAT), arising from and applied in psychology. The paper extends SAT and shows how the principles can be applied in an actual alignment situation between business
and IT. Because business and IT are structurally so different, they cannot be compared or aligned directly, but the principles of SAT must first be projected to the common goal space.

The proposed approach implemented as a support system can be applied to the alignment issue at strategic, tactical, or operational levels. The system has been planned to support different phases of the process, although it is based on the expected outcomes of IT-investments. The system can be used a priori to estimate the intended or expected outcomes, but certainly also to measure ex post the realized alignment outcomes of the selected (strategic) alternative.

As all investments, investments in IT technology have their own risks. However, in IT context we cannot directly measure the financial return of the investment or its risk by variance, as the original theory suggests. Instead, we have to use surrogate measures, such as “business efficiency” to measure the return or “vendor experience” to measure the risk. In the case the risk sources were dichotomized into two classes: risks appearing outside or inside the organization.

In most cases the benefits gained from IT investments are intangible and very difficult to measure in monetary terms. It is even more difficult to estimate them a priori before the decision is made and implemented. Need to improve actual measurement in areas such as alignment has been clearly expressed (Booth & Philip, 2005). The proposed approach is an attempt to give decision makers more tangible means to evaluate investment alternatives. It is clear that the information used for decision is fuzzy and only an approximation. Therefore, it is crucial to offer decision makers flexibility to make sensitivity analyses with respect to all the inputs used.

In addition, independent on the accuracy of the input data, according to the conditionality principles of the contingency theories claiming that there is no best way to organize, it can be assumed that there is no best way to align business and IT. Therefore, there is no single best way to align but there are tradeoffs between alternative strategies. Special attention was paid to the conceptualization and analysis of the tradeoffs during the alignment process. In the case example, the tradeoffs between risk and return were of interest according to the principles of the investment theory. Therefore, it is important to distinguish between nonalignable, tradeoff, and win-win differences. It is useless to waste time and other resources to negotiate and coordinate if the differences are totally nonalignable or if both sides concerned (business and IT) could win by choosing another strategy.

The proposed approach challenges different types of organizational resources indwelling in different groups. In addition to individual capabilities, social capabilities are needed to agree on the common goals and their structural relations, to provide input data, to make comparisons and tradeoff analyses, and to implement the decisions. By the approach, alignment inevitably becomes a common undertaking over the organization, and thus its potential success will be initiated.

It is often argued that it is impossible derive an ‘ought’ from an ‘is’ (Hume’s Treatise). Following the concepts of the ‘system of constitutive rules’ and ‘institutional facts’ as proposed by Searle (1964), we have developed the alignment approach and the respective support system on various (normative) theories (investment theories, structural alignment theories, etc.). They form the necessary logical gulf between the descriptive ‘is’ and normative ‘ought’.

Alignment skills are rare. Sound theoretical conceptualization and argumentation are needed to increase the understanding of the dimensions of BITA, and respective support methodology is needed to improve the actual decisions leading to better alignment. This paper is an attempt to meet these goals. It is clear that this study is only an opening to combine the alignment and investment issues, that is, to establish an integrated approach that systematically tackles the issues at hand. Still, BITA continues to remain problematic and challenging in many regards.

Although the specific focus of the study is on the alignment between business and IT, the results are applicable to the alignment problem between two or more organizational units in general. A direction for the future research is to repeat the approach in a number of cases. By statistical data it would then be possible to induct general, aligned goal structures, typical win-win and tradeoff differences and further, some general investment strategies for different types of IT investments. According to the conditionality principles of the contingency theories, claiming that there is no best way to organize, it can be assumed that there is no best way to align either. We can still strive towards this ultimate end.
REFERENCES


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**ENDNOTES**

1 Goal space refers to all possible combinations of the values of the different goals. The goal space can be represented for example by a simple list or a graphical tree containing the names of all goals and their possible values. Term is commonly used in multi criteria or multi objective decision making.
<table>
<thead>
<tr>
<th>Business – IT Alignment</th>
<th>Respective features of IT Investments</th>
<th>Properties of the proposed approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Organizational decision level</td>
<td>Strategic - tactical - operational</td>
<td>Investments can be strategic, tactical or operative.</td>
</tr>
<tr>
<td>2. Actualization</td>
<td>Intended - realized strategies</td>
<td>Investment plans are realized during implementation.</td>
</tr>
<tr>
<td>3. Degree of certainty</td>
<td>Certain - risk - uncertain</td>
<td>All investments involve risks.</td>
</tr>
<tr>
<td>4. Transitivity</td>
<td>Process - outcome</td>
<td>Investment process turns to investment outcomes.</td>
</tr>
<tr>
<td>5. Goal / Evaluation criteria</td>
<td>Single - multiple - hierarchical</td>
<td>Investments can be evaluated by a number of goals, hierarchical or other.</td>
</tr>
<tr>
<td>6. Measurability</td>
<td>Tangible - intangible</td>
<td>Most outcomes of investments are difficult to measure.</td>
</tr>
<tr>
<td>7. Progress</td>
<td>Evolutionary - revolutionary</td>
<td>Some investments may support existing business processes whereas others may change them dramatically.</td>
</tr>
<tr>
<td>8. Actor</td>
<td>Individual - group - organization</td>
<td>Organization wide investments are evaluated by a number of people.</td>
</tr>
<tr>
<td>9. Capabilities</td>
<td>Intellectual - social</td>
<td>Investment process requires intellectual and social capabilities.</td>
</tr>
<tr>
<td>10. Is-ought</td>
<td>Descriptive - prescriptive</td>
<td>Investment planning is both descriptive as well as prescriptive activity.</td>
</tr>
</tbody>
</table>