Operational IT Business Alignment as the Missing Link from IT Strategy to Firm Success

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ABSTRACT

Strategic IT business alignment deals with the capability of IT to both shape and support business strategy. It can be interpreted as an organizational learning process that combines business and IT knowledge to support business objectives and can positively affect organizational profitability by creating superior strategies that achieve a competitive advantage. These strategies have to be implemented because strategies are only effective when they are translated into actions readily. Therefore, we introduce the concept of operational IT business alignment, reflecting the functional integration at the structural level and representing the link between business and IT structure. Using structural equation modeling and data from 136 banks, we show that operational IT business alignment positively impacts dynamic IT and business capabilities and in turn strategic alignment and firm performance.

Keywords
Strategic Alignment, Operational Alignment, IT Renewability, Business Renewability, Competitive Advantage.

INTRODUCTION

A key question in IS research is how IT can be used to create a competitive advantage (Sambamurthy, Bharadwaj and Grover, 2003). Addressing this issue, one strand of the Resource-based view (RBV) deals with so-called dynamic capabilities (Teece, Pisano and Shuen, 1997). Eisenhardt and Martin (2000) use the term “dynamic capabilities”, in particular addressing volatile environments, and focus on the manipulation of resources to create new strategies.

The literature on alignment is another strand of research engaged in IT business value that focuses on the interaction between the business and the IT domain. There is a general consensus among researchers and practitioners alike that IT business alignment (ITBA) is necessary to improve business performance. But the way how to achieve it remains unclear (Feurer, Chaharbaghi, Weber and Wargin, 2000). Alignment is predominantly viewed under a strategic perspective, whereas research into the structural level is rare and research simultaneously considering both levels seems to be non existent (compare Bergeron, Raymond and Rivard, 2004).

This study combines both strategic and operational levels of alignment and dynamic capabilities to address the question how can IT be used to achieve a competitive advantage. Furthermore, we adopt a process level perspective because literature suggests that the role of IT should primarily be measured through its intermediate process-level effects (Barua, Kriebel and Mukhopadhyay, 1995). Additionally, following recent research, non-IT resources are considered to account for complementary effects (Wade and Hulland, 2004).

This paper thus extends prior research by explicitly considering:

- complementary non-IT-resources (i.e. business skills)
- dynamic capabilities in both the IT domain (IT renewability) and the business domain (business renewability)
- IT business alignment at a strategic and an operational level

Furthermore, the interrelationships between the alignment perspectives, the dynamic capabilities and competitive advantage are investigated. Our research questions in this paper are:

Q1: How are the operational and strategic levels of ITBA interrelated?
Q2: What is the influence of business skills and IT and business renewability on competitive advantage?
Theoretically, we draw on the knowledge-based theory that suggests that a firm’s ability to successfully deploy IT depends on the development of interrelated knowledge between the business and IT domain with organizational routines as mechanisms of knowledge integration (Grant, 1996).

RELATED LITERATURE

Dynamic Capabilities

In markets where the competitive landscape is shifting the dynamic capabilities by which firm managers “integrate, build and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al., 1997) become a source of sustained competitive advantage due to their complexity, causal ambiguity, and path dependency. In particular, the manipulation of knowledge resources is critical in such markets (Grant, 1996; Kogut, 1996). According to the knowledge-based theory that builds on the RBV (Alavi and Leidner, 2001), dynamic capabilities can be interpreted as information intensive routines, reconfiguring all types of resources but primarily knowledge (Leonard-Barton, 1992). Organizational routines refer to regular and predictable patterns of activity among the human capital (Nelson and Winter, 1982) and are mechanisms of knowledge integration that are particularly effective when tacit knowledge and informal communication are involved (Grant, 1996).

Alignment

The inability to realize value from IT partly results from a lack of alignment between the business and the IT strategies of a firm (Henderson and Venkatraman, 1993). Strategic alignment is viewed as a dynamic process of continuous adaptation and change that can be interpreted as an organizational learning process that combines business and IT knowledge in order to support business objectives (Reich and Benbasat, 1996).

Drawing on the knowledge-based theory, the four alignment domains (IT and business strategy, IT and business structure) of the Strategic Alignment Model (SAM) (Henderson and Venkatraman, 1993) can be interpreted as different areas of knowledge. Individuals within each area specialize in specific types of knowledge which is efficient for knowledge acquisition. To produce an organizational outcome knowledge from the different areas must be applied together requiring the transfer of knowledge (Grant, 1996). Thus, alignment processes that promote knowledge sharing are essential in determining IT profitability (Tallon, Kraemer and Gurbaxani, 2000).

RESEARCH MODEL

First, the constructs and then the hypotheses are introduced. Figure 1 depicts the research model. Table 1 summarizes references and key indicators.

![Figure 1. Research Model](image-url)
Constructs and Hypotheses

The dependent variable: competitive advantage

“Competitive advantage grows fundamentally out of value a firm is able to create for its buyers that exceeds the firm’s cost of creating it” (Porter, 1985) and basically can be achieved by cost leadership or differentiation. Based on “superior” products or services a firm can achieve a relative performance plus with respect to the competitors over some period of time that is called competitive advantage (Bhatt and Grover, 2005).

In this paper, the term competitive advantage is understood as an outcome (Peppard and Ward, 2004) and refers to a firm’s ability to achieve a better position than its competitors in a relevant market such as a region, for example.

Renewability

In this paper, we use the term renewability to refer to the dynamic nature of IT and business capabilities. According to Teece et al. (1997), the” term ‘dynamic’ refers to the capacity to renew competences so as to achieve congruence with the changing business environment”. The term renewability in our understanding goes beyond the notion of adaptability, integration and reconfiguration in that it points not only to the (re)deployment of existing resources, but also to the development of new ones.

Business renewability enables the organization to adapt to changing market conditions and allows for quick responses to market forces and uncertainty in the environment (Lucas and Olson, 1994). The greater the flexibility, the more options the firm has for diversifying into less related end products, for example.

H6: Therefore, it can be argued that business renewability contributes positively and directly to competitive advantage.

Renewability of the IT domain was mostly researched in terms of IT infrastructure flexibility (Byrd and Turner, 2001). IT infrastructure flexibility determines the ability of the IS department to respond quickly and cost-effectively to systems demands which evolve with changes in business practices or strategies (Duncan, 1995). Therefore, IT emerges as critical enabler of business transformation (Porter and Millar, 1985).

H2: Thus, we hypothesize that IT renewability is positively and directly related to business renewability.

Strategic alignment is seen as an evolutionary process of continuous adaptation (Henderson and Venkatraman, 1993) that benefits from renewability regarding the IT (Weill, Subramani and Broadbent, 2002) and the business domain.

H3, H4: Hence, using the dynamic capabilities approach we argue that both IT and business renewability have a positive and direct influence on strategic alignment.

IT Business Alignment

The construct strategic ITBA reflects the functional integration at the strategic level and represents the link between business and IT strategy. It deals with the capability of IT to both shape and support business strategy. Most research found a positive influence of alignment perspectives on IS effectiveness (Chan, Huff, Barclay and Copeland, 1997; Sabherwal and Chan, 2001; Tallon et al., 2000).

H5: Therefore, we hypothesize a positive and direct relationship between strategic alignment and competitive advantage.

These strategies have to be implemented, though, because “strategies are only effective when they are translated into actions readily” (Feurer et al., 2000). Therefore, operational ITBA reflects the functional integration at the structural level. In terms of the SAM it thus reflects an internal alignment perspective and focuses on operational processes. This construct is somewhat under-researched in the literature and is therefore built on sets of enablers identified in prior research. In particular, relationships (cognitive dimension), shared domain knowledge, and formal and informal interaction have been identified as the most significant enablers (Reich and Benbasat, 1996, 2000; Tiwana, Bharadwaj and Sambamurthy, 2003). We refer to these sets of enablers as cognitive enablers, knowledge enablers, and communication enablers.

IT renewability interpreted as knowledge-based routines (Grant, 1996) can be enhanced by operational ITBA through providing the IT domain with cross-domain knowledge (Reich and Benbasat, 2000), facilitating knowledge-sharing by frequent interaction and cognitive linkage between the IT and the business domain (Reich and Benbasat, 1996; Tiwana et al., 2003), and increasing the responsiveness to a changing environment by promoting the ability to renew IT competence as a means to preserve the relationship between the business and the IT domain (Young-Ybarra and Wiersema, 1999).

H1: Therefore, operational ITBA is hypothesized to positively and directly influence IT renewability.
Business Skills
Lots of studies investigated technical and managerial IT and business skills in various forms and mostly discovered a (strong) positive link to some performance measures (e.g. Bassellier and Benbasat, 2004; Bharadwaj, 2000; Mata, Fuerst and Barney, 1995). In the context of the knowledge-based theory, business skills are a form of specialized knowledge to perform productive tasks that is necessary to transform inputs to outputs (Grant, 1996). Although, it is acknowledged that undifferentiated human capital is valuable but cannot be a source in particular of a sustained competitive advantage (Mata et al., 1995), human capital is most valuable and most inimitable when it is firm-specific and developed in a process of learning (Hatch and Dyer, 2004). Correspondingly, it was found that human capital is associated with higher performance, particularly if educated and trained in an organization-specific manner (Carmeli and Tishler, 2004).

H7: Therefore, we hypothesize that business skills are positively and directly related to competitive advantage.

Control Variables
Organizational maturity is the degree to which organizational processes are systematized and formalized through rules, procedures, and management practices (Raymond, 1990). Organizational maturity is known as formalization and requires that organizational processes are well understood. What is well understood does not include causal ambiguities and can be made explicit (Nonaka, 1994), for example in the form of up-to-date documentation. This may result in an improved business performance (see Raymond, 1990).

Organizational or firm size in our survey is defined by the total assets of the banks. On one hand, large firms often possess resources that can positively influence outcomes, e.g. scale and scope economies or network effects (Bhatt and Grover, 2005). On the other hand, large firms tend to be more inflexible and have higher administration costs than small firms (Li and Ye, 1999). Thus, a larger size can lead to inertia and a resistance to change (Kelly and Amburgey, 1991). Therefore, we expect that the firm size is negatively and directly related to competitive advantage.

Variability of the environment is often referred to as environmental dynamism or turbulence. It is a critical factor confronting practically all organizations and stems from frequent changes to various environmental variables (Lu and Ramamurthy, 2004). Therefore, we refer to variability as the rate of change to tasks, customer preferences, and market conditions. Environmental munificence was positively related to performance due to an externally-oriented strategy and focusing on time-based competition (Li and Ye, 1999). According to the RBV, such environment helps firms to achieve a competitive advantage, because it decreases the ability to imitate resource configurations due to rapid changes (Eisenhardt and Martin, 2000). Thus, we hypothesize that business renewability as well as competitive advantage is positively influenced by “variability”.

MODEL DETAILS
We first present the research methodology and the instrument construction, followed by the presentation of the research results.

Research Methodology
This study employs a survey among German banks and focuses on the SME credit process. In 2005, questionnaires were mailed to Germany’s top 1,000 banks (according to total assets). 136 completed questionnaires were returned, resulting in a response rate of 13.6% covering about 21% of the Total Assets of these banks. Our sample is statistically representative regarding firm size (assets). The constructs are operationalized at a business process level. The questionnaire was mailed to the chief credit officer in each bank accompanied with a cover letter explaining the intention of the survey. This approach involves two perspectives.

Empirical research regarding alignment at the operational level is very rare. Therefore, as suggested by Eisenhardt (1989), the indicator questions have been derived mainly from validated questionnaires from the literature and adapted to our purpose. Operational ITBA is modeled as second-order construct and is based on three sets of enablers. These sets are identified reflecting the studies by Reich and Benbasat (1996; 2000) and Tiwana et al. (2003), and used to allocate enablers cited in literature. All other constructs are operationalized as first-order constructs. Table 1 presents a summary of the constructs and indicators including some references (please note that the original indicators used in the survey are in German and are translated here).
The constructs are measured using three and four items per construct. Credit process managers were asked to rate each of the items using a five-point-Likert scale where “1” indicates “I completely agree” and “5” indicates “I do not agree”. The scale was complemented by an item “I do not know”.

**Results**

We used Partial Least Square (PLS) employing PLS-Graph 3.00 to assess the measurement and the structural model. As a rule of thumb, it is often suggested that PLS requires a sample size ten times greater than the largest number of paths entering
the model. Our sample of 136 banks exceeds this threshold by more than three times (for a critical discussion regarding this rule of thumb see: Goodhue, Lewis and Thompson, 2006). The model to be tested is a second-order factor model with reflective measures. In a first step the measurement model was assessed. Each construct showed the required internal consistency, convergent validity, and discriminant validity (tables 2 and 3). Table 2 shows the construct intercorrelations that are in all cases lower than the square root of the average variance extracted (shaded diagonal elements), demonstrating a good fit between indicators and constructs. Table 3 exhibits the psychometric properties with the loadings and T-statistics of each indicator listed in table 1 (Comp R. = Composite Reliability).

| Business skills | 0.778 |
| ITBA: knowledge | 0.249 |
| ITBA: communication | -0.03 |
| ITBA: cognition | 0.041 |
| Business Flexibility | 0.269 |
| Competitive Advantage | 0.537 |
| IT Flexibility | 0.167 |
| Strategic Alignment | -0.05 |
| Variability | 0.017 |
| Formalization | 0.058 |
| Firm Size | 0.132 |

Table 2. Correlations of square root of average variance extracted (shaded cells) and latent variables

<table>
<thead>
<tr>
<th>Construct</th>
<th>PLS Loadings (T-Statistics)</th>
<th>Comp. R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business skills</td>
<td>0.80 (10.86), 0.71 (7.93), 0.82 (13.81)</td>
<td>0.820</td>
</tr>
<tr>
<td>ITBA: knowledge</td>
<td>0.89 (37.40), 0.83 (16.95), 0.70 (7.75)</td>
<td>0.855</td>
</tr>
<tr>
<td>ITBA: communication</td>
<td>0.93 (68.76), 0.94 (104.46), 0.94 (74.10)</td>
<td>0.846</td>
</tr>
<tr>
<td>ITBA: cognition</td>
<td>0.81 (18.93), 0.81 (21.14), 0.78 (16.36)</td>
<td>0.960</td>
</tr>
<tr>
<td>Business Flexibility</td>
<td>0.79 (9.62), 0.65 (5.95), 0.77 (8.57)</td>
<td>0.788</td>
</tr>
<tr>
<td>Competitive Advantage</td>
<td>0.85 (21.45), 0.71 (8.58), 0.73 (11.20)</td>
<td>0.811</td>
</tr>
<tr>
<td>IT Flexibility</td>
<td>0.73 (9.09), 0.85 (22.03), 0.82 (18.49), 0.84 (19.25)</td>
<td>0.887</td>
</tr>
<tr>
<td>Strategic Alignment</td>
<td>0.92 (37.40), 0.73 (5.45), 0.80 (7.19)</td>
<td>0.861</td>
</tr>
</tbody>
</table>

Table 3. Psychometric Properties

The second-order construct operational ITBA was measured by three multi-item scales assessing sets of enablers for ITBA. The results for “knowledge” ($\beta = 0.40$, T-value = 7.99, $p < 0.001$), “cognition” ($\beta = 0.43$, T-value = 9.18, $p < 0.001$), and “communication” ($\beta = 0.45$, T-value = 7.87, $p < 0.001$) show significant paths, indicating that the second-order construct was reliably measured.

Finally, the structural model was tested to assess the relationships among various latent constructs. Paths are interpreted as standardized regression weights that correspond to the hypotheses stated in the previous section. The statistical significance of the estimates was calculated by using the bootstrapping procedure with replacement of 500 sub-samples (Chin, 1998). Tests of the hypotheses rely on magnitude, sign, and statistical significance of the path coefficients of the structural model. Figure 2 represents the results. With the exception of the path between business renewability and competitive advantage, all path coefficients are significant (see Figure 2), supporting the corresponding hypotheses.
CONCLUSION

Before concluding, some limitations of this study need to be mentioned. First, the development of the operational alignment construct was difficult because of the limited attention in prior literature. Therefore, the measurement model for alignment was developed and based on items derived and adapted from the literature. Second, due to length restrictions of the questionnaire we could not use all of the indicators used in the many prior contributions to the other constructs. Third, competitive advantage and alignment were measured at the same point of time, therefore the results do not reflect long-term impacts. Fourth, we only used answers from the business side, which might have an influence on the results.

Considering these limitations, we can report that overall, the model of competitive advantage proposed, including the second-order construct operational ITBA, is well supported by the data, and all independent constructs of the model were found to be influential in contributing directly or indirectly to competitive advantage. The stated hypotheses could be supported at different levels of significance. One hypothesis stating the direct and positive influence of business flexibility (H6) was not supported, although there is evidence in the literature for an impact. Further research has to look into the reasons.

While prior research has mostly emphasized strategic aspects of ITBA, this study provides a more granular perspective by focusing on the process level and simultaneously researching operational and strategic levels. Results of this study show that it is important to integrate knowledge in both the business domain (business renewability) and across domains (ITBA). ITBA focuses on the ability to extract knowledge from the IT domain and apply it within the business domain to fully exploit IT and to take advantage from IT opportunities and vice versa.

Contributing to prior research we could show that:

- both strategic IT business alignment and business skills positively influence competitive advantage
- operational alignment positively influences IT renewability and indirectly strategic alignment
- IT renewability positively affects business renewability
- both IT renewability and business renewability positively influence strategic alignment
- strategic alignment and business skills positively influence competitive advantage

Notably, business skills were found to strongly influence competitive advantage. The importance of incorporating business skills (of business people) into the analysis of IT value can be demonstrated considering a study of Bhatt and Grover (2005) who find that business skills of IT personnel are only weakly related to competitive advantage. Thus, omitting “original” business skills in our model would mean leaving out a very important variable.

We expect promising results from further research especially incorporating IS usage and further alignment perspectives as well as from explicitly considering turbulent environments.
REFERENCES


