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Strategy Matters: The Role of Strategy Type for IT Business Value

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ABSTRACT

There is a general consensus among practitioners and researchers alike that IT business alignment improves business performance. Typically, alignment is analyzed at a strategic level. Yet, it has to be implemented in daily operations to be effective. Therefore, in this paper we introduce the concept of operational IT business alignment, reflecting the functional integration at the structural level and representing the linkage between business and IT structure. Using structural equation modeling and data from 136 banks we show that operational IT business alignment positively impacts IS usage and IT flexibility and in turn process performance. Especially, it is shown that the effect of IT business alignment strongly depends on the type of business strategy a firm follows.

Keywords

IT business alignment, IT flexibility, IT value creation, process performance, business strategy.

INTRODUCTION

A key question in IS research is how IT can be used to improve business performance (Sambamurthy, Bharadwaj and Grover 2003). Although there seems to be a causal relationship between IT and profit, this relationship is rather indirect and complex and additional moderating factors are relevant (Lee 2001). First, in agile environments success is contingent on whether IT is sufficiently flexible to support continuous resource reconfigurations (Teece, Pisano and Shuen 1997). Second, there is strong evidence that IT benefits rely on the fit between organizational and IT factors (Devaraj and Kohli 2000) which is generally discussed as IT business alignment. Third, actual usage of IS has been identified as an important factor for driving business performance by IT.

Since the seminal work of Miles and Snow (1978), business strategy is known to profoundly influence firm performance. Also, different types of business strategy are associated with different kinds of information systems (Sabherwal and Chan 2001) and account for differences in information management sophistication (Gupta, Karimi and Somers 1997). But how are business strategy and IS business value related? Therefore, our research question is:

What is the impact of business strategy type on IT business value creation?

We contribute to theory by empirically revealing that research on the business value of IT has to consider a firm's strategy type as this determines the patterns of IT value creation.

RESEARCH MODEL AND THEORETICAL FOUNDATION

This section derives the relevant constructs and interrelations relevant to our research model (IS usage, flexibility, IT business alignment, and process performance) from literature. The following figure depicts the network of nomological relationships addressed in this research model.

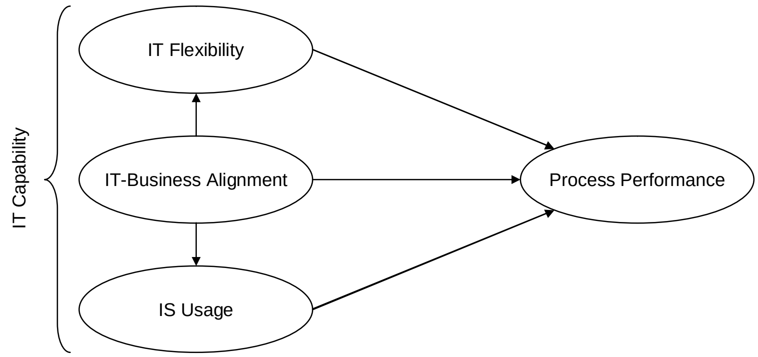

Figure 1. Nomological Network of Relationships

IS Usage

Information systems are used to support a firm's organizational objectives, for example to improve operational efficiency or to achieve competitive advantage. Various models suggest that actual or intended usage is driven by perceived usefulness and ease of use (Venkatesh, Morris, Davis and Davis 2003). Existing studies on IS usage predominantly focus on the individual or task level (DeLone and McLean 2003; Doll and Torkzadeh 1998). Although IS usage is widely addressed in literature, the process-level impact has hardly been analyzed.

Accordingly, we define IS usage in the context of a business process as the extent to which an organization deploys IS to support operational tasks. The use of IS has to be investigated in detail to explain how IS affect the organization (Lee, Lim and Wei 2004). Impacts from IS require "appropriate" use (Soh and Markus 1995). Thus, expecting higher benefits from *more/higher* usage neglects the *appropriateness* of this usage. Instead of addressing the level of usage, the appropriateness is addressed by determining whether the full functionality of a system is being used for the intended purposes (DeLone and McLean 2003).

Regarding business process performance as the dependent variable for assessing the business value of IT (Melville, Kraemer and Gurbaxani 2004), we derive the following hypothesis for our research model.

H1: More appropriate IS usage has a direct and positive impact on business process performance.

IT Flexibility

Based on Koste and Malhotra (1999) and Teece et al. (1997) we define IT flexibility as the ability to renew IT competences to match changing business requirements with little penalty in time, effort, cost or performance. It has been shown that in uncertain and changing business environments, flexibility of a firm is a crucial aspect of success (Ybarra-Young and Wiersema 1999). IT plays a vital role in ensuring this ability to readjust and reconfigure. Byrd and Turner (2000; 2001) propose a direct link between IT flexibility and competitive advantage. Kumar (2004) introduces a framework for analytically assessing the business value of an IT infrastructure that explicitly considers IT flexibility. He shows that the flexibility of an IT infrastructure can have a distinct impact on its business value, especially in turbulent environments.

Correspondingly, flexibility is seen as an attribute of IT strategy "that would contribute positively to the creation of new business strategies or better support of existing business strategy" (Henderson and Venkatraman 1993). Incorporating IT flexibility into our model leads to the following hypothesis:

H2: IT flexibility has a direct and positive impact on business process performance.

IT Business Alignment

The alignment literature addresses the role of linkage between the IT and the business domain for value creation and mostly focuses on strategic aspects. Accordingly, strategic alignment, which is the extent to which IT strategy supports and is supported by the business strategy (Reich and Benbasat 2003), was proposed in the Strategic Alignment Model (SAM) (Henderson and Venkatraman 1993). Research based on the SAM mostly proposes a positive relationship between IT business alignment and value creation (Sabherwal and Chan 2001; Tallon, Kraemer and Gurbaxani 2000). Although the SAM incorporates strategic and structural levels of alignment types and domains, most research focuses on the strategic level, leaving a gap at the daily operational level (see review by Bergeron, Raymond and Rivard 2004).

According to Reich and Benbasat (Reich and Benbasat 1996; Reich and Benbasat 2003) alignment can be defined "as the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives and plans". In this paper, we address alignment at an operational level. This construct reflects the functional integration at the structural level and represents the link between business and IT organizational structure, highlighting the importance of ensuring internal coherence between the organizational requirements and the delivery capability of the IT domain (Henderson and Venkatraman 1993). The construct operational IT business alignment builds on sets of enablers identified in prior research and consists of the three enablers shared domain knowledge, communication, and cognitition.

We partly adopt the classification of Reich and Benbasat (Reich and Benbasat 2000) for evaluating IT business alignment. The enablers *shared domain knowledge* and *communication* have been adopted from their work. In our empirical survey, their second enabler, "IT implementation success", is not relevant since the IT systems deployed in the banks investigated (see next section) were mostly in place for several years. Furthermore, considering our focus on operational alignment, the *connection dimension*, referring to connections between IT and business units in IS development phases, could not be estimated and has also been excluded.

Instead, we add a *cognitive dimension* of alignment as proposed by Tiwana, Bharadwaj, and Sambamurthy (2003b). They split their linkage construct into cognitive and structural linkages. Structural linkages refer to the strength and frequency of social interactions; cognitive issues refer to the mutual understanding of common goals. The structural linkages dimension closely resembles the communication dimension of Reich and Benbasat.

Regarding the relationships with the other constructs, we hypothesize that operational IT business alignment positively influences the level of IS usage. The reason is that the relationships between the business and IT domain lead to an increased responsiveness (Teo and Ang 1999) regarding the necessity to train and inform users and to understand the importance of a reliable IT service for the business (Reich and Benbasat 1996).

H3: Operational IT business alignment has a direct and positive impact on IS usage.

Further, we hypothesize that IT flexibility can be enhanced by operational IT business alignment by means of increasing business knowledge availability to the IT domain through shared knowledge (Reich and Benbasat 2000). The basis for these effects is the structural linkage provided by frequent interaction between the IT and the business domain (Reich and Benbasat 1996; Tiwana, Bharadwaj and Sambamurthy 2003a) that facilitates knowledge sharing and mutual understanding.

H4: Better operational IT business alignment has a direct and positive impact on IT flexibility.

Process Performance

In order to assess the influence of IT at the process level, we focus on the core banking process of granting credits (credit process), particularly for small and medium sized enterprises (SME).

We employ a process-level measure of actual IT impacts that maps directly to the activities within the credit process. In general, business process performance can be measured along three dimensions: costs, quality and time (Mooney et al. 1996). Performance represents the quality of internal processes. We focus on quality for several reasons. First, most banks do not know their precise processing costs. Second, process quality is very important in the credit business due to regulatory issues: granting, processing, and monitoring a credit has to be concordant with regulatory and bank-internal requirements regarding risk evaluation and documentation rules. Third, if an error is not detected before the credit is granted, it may cause a higher ratio of bad loans.

The resulting overall research model is depicted in Figure 2.

Business Strategy

Business strategy represents an underlying pattern guiding an organization considering opportunities and risks regarding the environment and resources of the firm (Croteau and Bergeron 2001; Gupta et al. 1997). Miles and Snow (1978) propose four types of business strategy: *prospector, analyzer, defender* and *reactor*. The first three types are consistent regarding strategy selection and are reported to improve organizational performance as long as the implementation of their strategies is effective. *Reactors* lack a consistent strategy (DeSarbo, Benedetto, Song and Sinha 2005) and are regularly outperformed by the other three types (Croteau and Bergeron 2001; Sabherwal and Chan 2001).

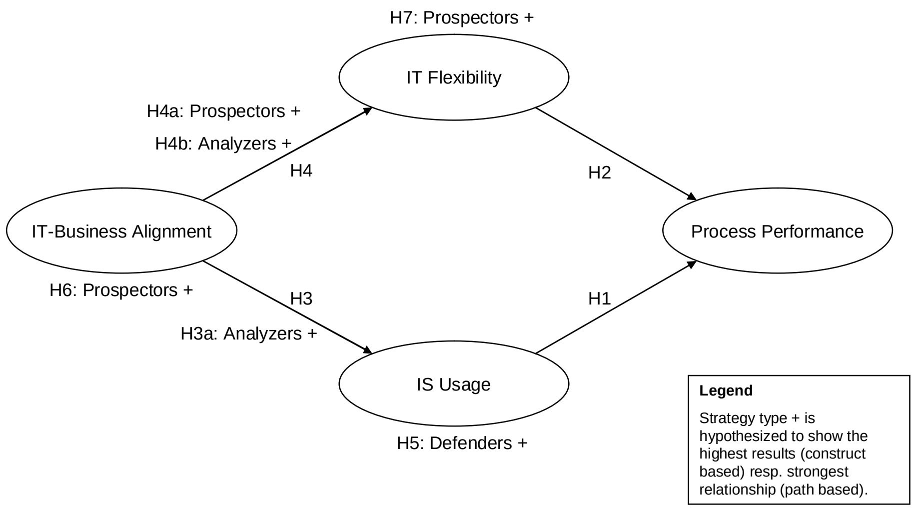

Figure 2. Research Model

Prospectors deploy a first-mover strategy, develop new technologies and markets and constantly seek for business opportunities (DeSarbo et al. 2005). Thus, prospectors can be expected to be focused on flexibility for rapid adaptation (Sabherwal and Chan 2001). To cope with rapid change, IT and business have to be operationally closely aligned. Therefore, we propose that prospectors, compared to analyzers and defenders, exhibit the following particularities:

H4a: Prospectors show a more distinct effect of operational alignment on IT flexibility.

H6: Prospectors have a higher level of operational alignment.

H7: Prospectors have a higher level of IT flexibility.

In contrast, *defenders*, which follow a conservative strategy, are expected to focus on operational cost efficiency with a limited exploitation of technical and market options (DeSarbo et al. 2005), leading to less frequent adjustments. Thus, these firms, that can be termed *secure followers*, are more interested in cost efficient technologies than in deploying new technologies, leading to

H5: Defenders have a higher level of appropriate IS usage.

Analyzers share both prospector and defender characteristics and tend to prefer a 'second-but-better' strategy (DeSarbo et al. 2005). Positioned between the former two strategy types (Tavakolian 1989), analyzers follow new technology and product developments quickly, but regularly do not act as a first mover. Thus, they are *fast followers* and tend to make effective use of their information technology which in turn leads to higher performance (Croteau and Bergeron 2001; Gupta et al. 1997).

H3a: Analyzers show a more distinct effect of operational alignment on IT flexibility.

H4b: Analyzers show a more distinct effect of operational alignment on IS usage.

METHODOLOGY

This study employs a survey among German banks and focuses on the SME credit process. In 2005, questionnaires were mailed to chief credit officers of Germany's 1,020 largest banks, leading to a response rate of 13.3%.

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; Ray, Barney and Muhanna 2004). Business processes are the basis for building and materializing capabilities (Helfat and Peteraf 2003; Lee et al. 2004; Teece et al. 1997). Nevertheless, empirical research regarding alignment at this level is very rare. Therefore, the construction and assessment of the variables was an important task and had to be done concordant to an accepted instrument or framework (Tallon et al. 2000) and adapted to the research context. As suggested by Eisenhardt (1989), the indicator questions have been derived mainly from validated questionnaires from literature and adapted to our purpose. Operational IT business alignment is modeled as second-order construct and is based on three sets of enablers as outlined before. Table 1 in the appendix presents a description of all used indicators and scales.

RESULTS

We used Partial Least Square (PLS)[1] to assess the measurement model and the structural model. All constructs are formed by reflective indicators. Operational IT business alignment was measured as a molar second-order construct based on three enablers (knowledge, communication, and cognition). In a first step, referring to the strategic types, the sample of 136 banks was split into three groups – 31 prospectors, 64 analyzers, and 43 defenders, based on their self-assessment. Subsequently, the measurement model was assessed for each strategy type group. With one exception (process performance for prospectors), each construct showed the required internal consistency, convergent validity, and discriminant validity (Table 3 in the appendix).

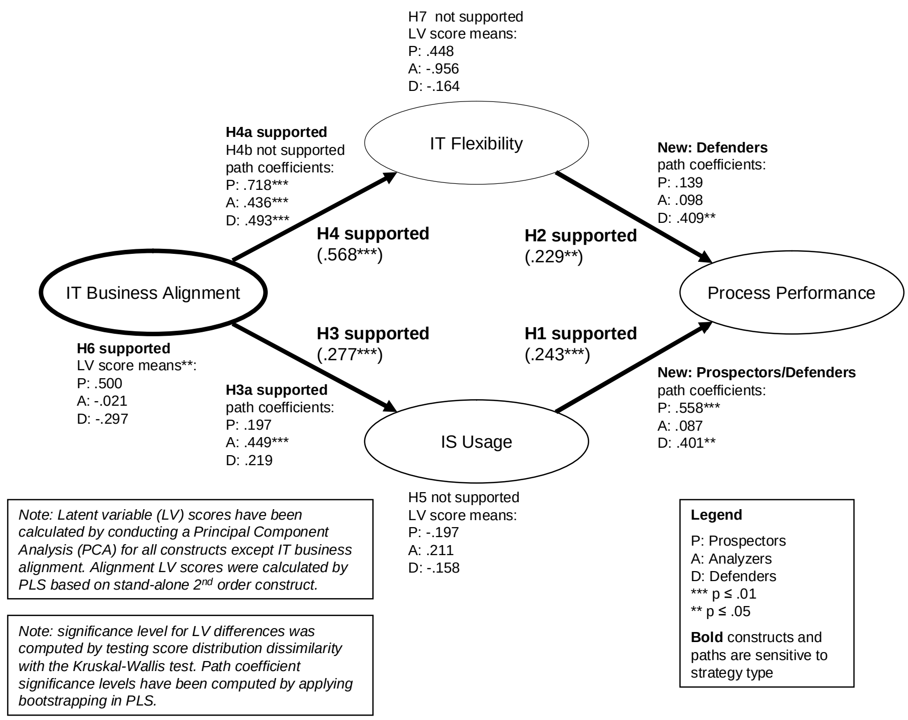

Figure 3. Results

The structural model was tested to assess the relationships (H1-H4) based on the total sample (n=136). The statistical significance of the estimates was calculated by using the bootstrapping procedure with 500 sub-samples (Chin 1998b). As can be seen in Figure 3, the path related hypotheses H1-H4 could generally be confirmed[2].

In a second step the model was re-estimated for the three sub-samples of different strategic types. The resulting path coefficients and their significance level can again be found in Figure 3 for P(rospectors), A(nalyzers), and D(efenders). Differences in path coefficients among strategy type groups have been checked for significance applying the procedure put forward in (Keil, Tan, Wei, Saarinen, Tuunaninen and Wassenaar 2000, 315). While the relationship between alignment and flexibility (H4) is still supported in all models, the remaining results structurally differ between the different strategic types.

Regarding the impact of strategic types all but three hypotheses could be supported. While H4a was strongly supported indicating a much larger effect of alignment on flexibility for prospectors, the reverse hypothesis H4b stating the same particularity for analyzers could not be supported.

Differences in constructs score distributions were tested by applying the non-parametric Kruskal-Wallis test. Detailed results can be found in Table 2 in the appendix. Hypotheses H5 and H7 proposing differences in the level of IT flexibility and IS usage for different strategy types were not supported. LV score distributions for both constructs did not differ significantly among strategy type groups.

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[1] PLS-Graph 3.0, build 1126 from W. Chin (www.plsgraph.com).

[2] Table 4 in the appendix presents all path coefficients and T-values.

In particular, the profound impact of strategy types on the path coefficients as well as on IT business alignment should be noted. Additionally, we found impacts of strategy type regarding the linkage of IT flexibility and IS usage with business process performance as well. Those differences have not been hypothesized before but nevertheless did emerge from the data. All constructs and paths sensitive to strategy type are depicted in bold font in Figure 3.

DISCUSSION AND LIMITATIONS

We found significant relationships between operational IT business alignment, IT flexibility, IS usage, process performance, and strategic type. One of the results is the robust significant relationship between IT business alignment and IT flexibility for all strategic types and for the total sample. Nevertheless, differences in path coefficient magnitude are significant; prospectors show the strongest relationship while analyzers and defenders show almost the same results. Regarding the relationship between alignment and usage, analyzers show the strongest (and only significant) path coefficient.

This leads to the insight that prospectors direct their alignment efforts to increase flexibility rather than to improve efficient usage, while analyzers tend to do the opposite. Because defenders were argued to have the least frequent adjustment requirements, this renders the necessity for superior operational alignment less important. This is also consistent with the result that defenders show the lowest mean of the alignment construct scores.

We can now especially relate our insights to findings of Sabherwal and Chan (2001). In their study they mapped business and IS strategy attributes to business and IS strategy types derived from Miles and Snow (1978) and measured the congruence of business and IS patterns to determine the level of alignment. Then, alignment is linked to business performance. The importance of alignment for performance was found to be significant for prospectors and analyzers but not for defenders. Thus, an emphasis on alignment may not be beneficial for business success in the case of defenders. Taking into consideration that our study focused on operational alignment and treated strategic types as a control variable rather than as a construct in the PLS model, we can support this finding.

Taking a look at paths leading to process performance, we found structural differences not hypothesized before. Defenders show the highest (and only significant) path coefficient for the association of flexibility and process performance while prospectors show the highest value for the usage-performance path. This comes as a surprise at first sight. But one can argue that a lower level of the independent construct (although not significantly found in the data) might lead to a higher sensitivity regarding the transformation of, e.g., additional flexibility into increased process performance.

Besides the typical limitations of empirical work (limited representativeness of sample, limited transferability of findings to other systems, processes, industries, and nations, possible common method bias), the particular shortcomings of this work are as follows: First, due to splitting the sample into three subgroups, the remaining data sets, in particular for prospectors, are relatively small and thus may lead to statistical bias. Second, the measurement of strategy types is simplified because treating them as pure archetypes may be not sufficient for modeling real-world strategies. Usually, firms follow mixed strategies between the idealized types. Third, performance and alignment were measured at the same point of time; therefore the results do not reflect long-term impacts.

CONCLUSION

To the best of our knowledge, this research is the first to investigate a process-based model of operational IT business alignment that analyzes the impact of different types of business strategy. By applying a process-based model of operational alignment and the IT business value creation process, we could show that strategy type has a profound impact on alignment as well as on the relationships between alignment, flexibility, IS usage, and process performance. Accordingly, we suggest to control for the strategy type in future studies on the business value of IT.

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APPENDIX

Construct (references)	Key indicators[3]
Process performance (Chan, Huff, Barclay and Copeland 1997; Chang and King 2005; Cragg, King and Hussin 2002; Croteau and Bergeron 2001; Ray et al. 2004)	• I am satisfied with the profitability of the SME credit process. • The share of bad loans is too high to meet our own demands. • The share of loans treated by intensified loan management is too high.
IS usage (Devaraj and Kohli 2003; Massetti and Zmud 1996)	• We use all functionalities provided by the core system. • Functionalities provided by the core system should be used more intensively. • All available IT applications available in the SME credit process should be used more intensively.
IT flexibility (Byrd and Turner 2001; Young-Ybarra and Wiersema 1999)	• The IT unit is able to quickly change information systems to consider new credit products. • The IT unit is able to quickly change information systems to better support the operation of the credit process. • The IT unit reacts flexibly to change requests of the business department. • The IT unit implements change requests of the business department in an effective and efficient manner.
IT business alignment – cross-domain knowledge dimension (Bassellier and Benbasat 2004; Broadbent and Weill 1993; Reich and Benbasat 1996)	• The IT employees are capable of the interpretation of bank-technical problems and to develop appropriate solutions. • The IT employees are knowledgeable about the business activities of the credit process. • The IT unit develops and implements change requests in a way useful for the business units.
IT business alignment – communication dimension (Broadbent and Weill 1993; Chung, Rainer and Lewis 2003; Reich and Benbasat 1996)	• There are regular meetings between the IT unit and the business unit to control IT changes processes. • There are regular meetings between the IT unit and the business unit to discuss potential process improvements. • There are regular meetings between the IT unit and the business unit to ensure an effective and efficient change process.
IT business alignment – cognition dimension (Bhatt 2003; Broadbent and Weill 1993; Chung et al. 2003; Reich and Benbasat 1996)	• IT unit and business unit are equal partners when changes of the core application has to be carried out.. • IT unit and business unit mutually consult each other very often. • Changes to IS are carried out in close collaboration between IT and business unit.
Strategy types (Croteau and Bergeron 2001; Hult, Ketchen Jr and Nichols Jr 2002)	Please select one: • We are always the first to introduce new technologies and products. (prospector) • We track the actions of the competitors and follow very fast. (analyzer) • We adopt new technologies, products and processes only if they have proved of value with the competitors for some time. (defender)

Table 1. Operationalization of Constructs[4]

[3] Indicators (except for strategy type) were measured by a 5-Likert scale (“1” indicates “I completely agree” and “5” indicates “I do not agree”).

[4] Original questionnaire was written in German.

construct	prospectors (I): mean, S.D. (n)	analyzers (II): mean , S.D. (n)	defenders (III): mean , S.D. (n)	Mann-Whitney test (I vs. II) (Z score, P)	Mann-Whitney test (I vs. III) (Z score, P)	Mann-Whitney test (II vs. III) (Z score, P)	Kruskal-Wallis test (χ^2, P) df=2
ITBA	.500, 1.340 (28)	-.021, .937 (63)	-.297, .705 (42)	-2.01, .044	-2.93, .003	-1.40, .161	8.87, .012
IF	.448, 1.255 (26)	-.956, .955 (54)	-.164, .769 (35)	-1.89, .070	-1.82, .068	-.42, .676	4.13, .127
IU	-.197, .949 (28)	.211, 1.0770 (53)	-.158, .896 (33)	-1.73, .084	-.50, .617	-1.38, .169	3.69 .158
PP	.0.261, .893 (27)	-.103, .953 (63)	-.030, 1.133 (40)	-1,76, .078	-1.03, .305	-.56, .573	2.94, .230

Table 2. Inter-group Comparison of Constructs

	Composite Reliability and Average Variance Extracted					
Construct	Prospector (STR1)		Analyzer (STR2)		Defender (STR3)	
	CR	AVE	CR	AVE	CR	AVE
ITBA (2nd order)	.917	.551	.840	.374	.776	.283
ITBA-Qualitative	.881	.712	.781	.546	.800	.574
ITBA-Cognitive	.921	.796	.850	.653	.809	.586
ITBA-Interaction	.986	.958	.942	.843	.949	.861
IT Flexibility (IF)	.933	.778	.864	.617	.858	.602
IS Usage	.812	.591	.821	.606	.803	.580
Process Performance (PP)	.609	.378	.829	.622	.886	.725

Table 3. Psychometric Properties of the Constructs

	Path Coefficients (T-Values)		
Path	Prospector (STR1)	Defender (STR2)	Analyzer (STR3)
ITBA à IF	.718*** (7.0205)	.436*** (3.1814)	.493** (2.5764)
ITBA à IU	.197 (.7484)	.449*** (4.1870)	.219 (.6656)
IF à PP	.139 (1.0145)	.098 (.5476)	.409** (2.3654)
IU à PP	.558*** (3.2084)	.087 (.4030)	.401** (2.3718)
n	*31*	*64*	*43*

Table 4. Path Coefficients and T-Values