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The Role of Alignment between Corporate IT and SBU IT in Creating SBU Agility

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Description

Information technology (IT) is considered to be an important enabler of organizational agility. Yet, managers continue to speak of their frustration with IT-based rigidities that hinder responsiveness to market threats and opportunities. This implies that the IT function is not always aligned to the aims of an agile business. Prior research has not investigated this issue in multi-business organizations where strategic business units (SBUs) compete across distinct market segments. To establish synergy across the organization, management defines a corporate IT platform to be shared by SBUs. In contrast, each SBU defines its own IT portfolio to increase local flexibility. This study examines whether the multi-level alignment between SBU IT and corporate IT affects SBU agility. In a survey of 94 multi-business organizations, the study finds that multi-level IT alignment enhances SBU agility and facilitates the alignment between SBU IT and SBU business strategy, which in turn also affects SBU agility.

Location

Innovation Campus, Building 233, Rm G12

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Abstract

Information technology (IT) is considered to be an important enabler of organizational agility. Yet, managers continue to speak of their frustration with IT-based rigidities that hinder responsiveness to market threats and opportunities. This implies that the IT function is not always aligned to the aims of an agile business. Prior research has not investigated this issue in multi-business organizations where strategic business units (SBUs) compete across distinct market segments. To establish synergy across the organization, management defines a corporate IT platform to be shared by SBUs. In contrast, each SBU defines its own IT portfolio to increase local flexibility. This study examines whether the multi-level alignment between SBU IT and corporate IT affects SBU agility. In a survey of 94 multi-business organizations, the study finds that multi-level IT alignment enhances SBU agility and facilitates the alignment between SBU IT and SBU business strategy, which in turn also affects SBU agility.

1. Introduction

It is generally accepted that in business environments characterized by fierce competition and fickle customer demand, organizations should be agile to handle rapid change and to capitalize on emerging opportunities (Sambamurthy et al., 2003, Tallon and Pinsonneault, 2011). Organizational agility is defined as "the ability to detect and seize market opportunities with speed and surprise" (Sambamurthy et al., 2003, p. 238). In an effort to be more agile, organizations are increasingly relying on information technology (IT) to facilitate communication, improve information flows and to speed up decision making under changing conditions (Mathiassen and Pries-Heje, 2006). However, research has also shown that inflexible legacy systems, disparate application silos and rigid IT platforms can hinder and sometimes even impede organizational agility (van Oosterhout et al., 2006). This raises an interesting question: Does IT help or hinder organizational agility?

In large multi-business organizations about half of all capital investment is allocated to IT in an effort to establish synergy across strategic business units (SBUs) and to allow semi-independent SBUs to grow and diversify by competing within distinct market segments (Tanriverdi, 2006). In this context, IT investment is geared on the one hand towards the creation of a stable corporate IT platform for managerial control, efficiency and predictability across SBUs (Agarwal and Sambamurthy, 2002, Ross, 2003), while on the other hand it is geared towards independence where each SBU defines its own portfolio of IT applications as well as which IT platform capabilities will be leveraged to support the SBU's unique needs (Agarwal and Sambamurthy, 2002, Fonstad and Subramani, 2009).

The tension[1] between the corporate IT platform and SBU IT portfolio poses a particular challenge to the understanding of the role of IT in creating agility. In particular, it is unclear whether the multi-level alignment between corporate IT and SBU IT effects SBU agility. It is also unclear whether it affects local alignment between the SBU IT and its business strategy (otherwise know as *business-IT alignment*). This tension is the focus of this study where we introduce the construct *multi-level IT alignment*, defined as the congruence between the corporate IT platform and SBU IT portfolio, to investigate two research questions:

1. Does multi-level IT alignment enhance SBU agility?
2. Does the relationship between multi-level IT alignment and SBU business-IT alignment affect SBU agility?

To answer these two questions, this study investigates two types of IT alignment, viz. multi-level IT alignment and SBU business-IT alignment, to develop a deeper understanding of agility and performance at the SBU level. We then conduct a field study of business and IT executives in 94 multi-business organizations that span three countries – US, Australia and Germany. The study finds that multi-level IT alignment has a significant positive effect on SBU agility and, in turn, on SBU performance. It also finds that multi-level IT alignment has a significant effect on the SBU's business-IT alignment, which also affects SBU agility.

Further, our study provides an important addition to the empirical research that has primarily been concerned with the role of IT in enabling agility in single-segment organizations (Lu and Ramamurthy, 2011, Tallon and Pinsonneault, 2011) and overlooked the way multi-business organizations balance business priorities and IT requirements at the corporate level and the SBU level. Thus, there is still a limited understanding of how IT relates to agility in contemporary multi-business organizations and this study addresses this gap.

2. Theoretical Development

Multi-business organizations leverage IT at the corporate and SBU levels to compete across distinct market segments (Robins and Wiersema, 1995). At the SBU level, each SBU defines its own IT applications to increase local flexibility. At the corporate level, upper management defines a set of IT-enabled capabilities for greater managerial control and efficiency across the organization (Agarwal and Sambamurthy, 2002, Ross, 2003, Weill et al., 2002). This creates a corporate-wide IT platform to be shared by SBUs[2]. By increasing managerial control, this IT platform allow organizations to better coordinate its various business functions and to rapid react to emerging threats and opportunities across distinct market segments.

In other words, the IT platform provides a set of capabilities that can be leveraged by SBUs to strengthen and broaden the SBU's own IT portfolios, thus increasing the potential of each SBU to employ IT to enhance agility. This implies that the role of the corporate IT in creating SBU agility is realized thought its relationship with the SBU level IT. This implies that the multilevel alignment between the SBU IT portfolio and

[1] Tensions often arise because SBU IT prioritizes the SBU's unique needs and often seeks to transfer IT costs to the corporate level. In contrast, corporate level IT seeks to minimize costs by standardizing IT capabilities across SBUs.

[2] We define IT platform as the organization's specific IT assets – including data, hardware, network, applications and services – that are shared by multiple SBUs.

the corporate IT platform is an important enabler of SBU agility. This suggests the following hypothesis:

H1: Multi-level IT alignment is positively associated with SBU agility.

In the same way that multi-level IT alignment increases the SBU's ability to employ IT to create agility, it also enhances the SBU's ability to use IT for supporting key business functions. Perhaps the most important function of IT at the SBU level is to enable the SBU's business strategy (Chan et al., 1997, Fonstad and Subramani, 2009). This requires effective use of IT to achieve business-IT alignment locally. If multi-level IT alignment facilitates the effective use of IT within SBUs, it is reasonable to expect that it will influence an SBU's ability to achieve business-IT alignment. This suggests the following hypothesis:

H2: Multi-level IT alignment is positively associated with SBU business-IT alignment.

Further, business-IT alignment facilitates collaboration between business and IT managers within SBUs, which in turn makes it easier for SBUs to be responsive in the presence of unexpected changes (Fonstad and Subramani, 2009, Preston and Karahanna, 2009). Unlike prior IT alignment research that focused on the effects of alignment on performance (Sabherwal and Chan, 2001), recent research has drawn attention to the emerging role of agility as a key outcome of alignment (Tallon and Pinsonneault, 2011). As Tallon and Pinsonneault explain, organizations are building business-IT alignment in a way to become more agile in anticipation of unforeseen market changes. This is an important finding at a time when agility is an enduring managerial concern (Luftman et al., 2012). In particular, this finding indicates that the value of business-IT alignment is in preparing organizations for change. At the SBU level, this implies that the benefit of business-IT alignment is a function of whether it enables the SBU to be more agile. Thus,

H3: SBU business-IT alignment is positively associated with SBU agility.

On the other hand, existing research on the effects of business-IT alignment on performance has produced mixed results. While the overall cumulative evidence points to a direct positive effect (Sabherwal and Chan, 2001, Preston and Karahanna, 2009), some studies did not find a a direct relationship (Palmer and Markus, 2000, Tallon and Pinsonneault, 2011). In particular, Tallon and Pinsonneault (2011) have found that the effect of business-IT alignment on performance is indirect and fully mediated by agility. They draw attention to the fact that the relationship between business-IT alignment and performance may need to be revisited given that agility (and not performance) has been found to be a key outcome of alignment.

This finding may suggest that the role of business-IT alignment within organizations is changing. As applied to our study, if the value of business-IT alignment within SBUs is more a function of the extant to which it prepares them for future changes, it will be increasingly difficult to capture direct effects of SBU business-IT alignment on SBU performance. We highlight this prediction in the following hypothesis:

H4: SBU business-IT alignment is not associated with SBU performance.

In contrast, recent research has shown that the ability to respond efficiently and effectively to emerging market threats and opportunities is a key predictor of performance (Lu and Ramamurthy, 2011, Tallon and Pinsonneault, 2011). Agile organizations are more likely to realize higher performance because they are better

able to cope with rapid and unforeseen market changes, adapt and transform to expand into new markets, leverage existing resources to capitalize on emerging opportunities and to reduce costs of operation (Sambamurthy et al., 2003). Whether agility helps organizations to revise their behaviors based on unfolding events or to prepare them for unforeseen market discontinuities, it remains a key competence to the realization of superior performance. This suggests the following hypothesis:

H5: SBU agility is positively associated with SBU performance.

3. Research Methodology

3.1. Sample Characteristics and Data Collection

We tested our hypotheses on a cross-sectional sample of organizations based in the United States, Germany and Australia. This global sample includes financial services, energy, IT and communications, manufacturing, wholesale and retail companies. The organizations selected are all moderate-to-heavy users of IT and operate in markets that favor differentiation from competitors. Our approach is based upon key informants with the organizations studied. We identified a competent key informant as: chief information officer or management executive typically at the general manager level in a strategic business unit (SBU). In addition to being well-informed on organizational IT initiatives, such informants are also able to compare the flagship business unit to direct competitors.

Respondents were randomly sourced from a commercial contact list. One hundred and two executives responded to our survey questionnaire, yielding a 9% response rate. Eliminating responses with missing data left 94 respondents. These organizations were primarily traditional users of IT; nearly one third were service related firms (30 firms), followed by banking and insurance (16 firms), manufacturing (13 firms), wholesale and retail trade (11), IT services (10) and various other retail and telecommunication firms (14 firms). The median business unit in our data had 500 employees. All respondents were senior managers with 75% of respondents in a chief information officer (CIO) position, 15% in a SBU IT executive role, 5% in a corporate executive role (CEO) and the remaining 5% in a SBU executive position. The mean number of years in their current position is 8 years and the median number of years in the organization is 12.

The psychometric properties of the variables in this study are all well established in the literature to support the nomological network that underpins this research. Further, we expect strong effect sizes and high reliability. This expectation is based on the composite reliability statistics for our measures. In the section “Data Analysis and Results” we report various statistics and conduct post-hoc power tests. We find that N = 94 firms can be justified, given our theory, accuracy of measurement, effect sizes and achieved power.

3.2 The Measures

After a thorough review of the literature, we developed a survey instrument (see Appendix) to collect data for validating the main constructs and testing our research hypotheses. The measures of SBU agility and SBU performance have been taken from the literature. The measures of multilevel IT alignment and SBU business-IT

alignment were developed for the purposes of this study. To strengthen our tests, we controlled for SBU size and industry type, which may influence SBU performance.

We measured the SBU agility construct employing an adapted version of Tallon and Pinsonneault's (2011) eight-item measurement scale. This scale assesses the ability of a SBU to easily and quickly respond to market changes (in relation to competitors) in each of three areas: customer demand, innovation, and pricing. Similarly, the performance measures employed in this study were concerned with the SBU's business performance relative to its competition. We adapted the five-item performance scale from Powell and Dent-Micallef (1997). Consistent with prior research on the business unit level of analysis – where it is hard to collect objective performance data – (Chan et al., 1997), this scale was designed as a subjective measure of financial performance, consisting of questions about the SBU's profitability, sales growth, revenue and market share in relation to competitors. Finally, we developed measurement scales for the multilevel IT alignment and SBU business-IT alignment constructs.

The above measures were all refined using qualitative feedback derived from a pilot test of academics and senior executives[3]. In the next section, we report the psychometric properties of our measures and present the study results.

4. Data Analysis and Results

Data analysis was conducted with partial least squares (PLS), a structural equation modeling technique that uses a principal-component-based estimation approach (Chin, 1998). The following features make PLS especially appropriate to this study. While PLS is less suited to testing well-established complex theories due to a lack of a global optimization criterion to assess overall model fit (Hair et al., 2012), it is advantageous compared to covariance-based-structural equation modeling when analyzing predictive research models that are in the early stages of theory development (Fornell and Bookstein, 1982). The latter is the case of the current research. To the best of our knowledge, no prior research has operationalized and tested the effects of multilevel IT alignment on SBU agility.

Further, PLS is more appropriate when dealing with small sample sizes (Henseler et al., 2009). This is especially relevant for this study, as our final sample size was 94 observations. Obtaining survey responses from the C-level executives sampled in this study is difficult and the sample size is comparable to other studies of IT alignment (Oh and Pinsonneault, 2007, Bergeron et al., 2004).

4.1. Assessing the Measurement Model

To ensure the validity of all measures, we examined key informant bias, non-response bias, common method bias and convergent and discriminant validity. To measure the impact of key informant bias, *t*-tests were used to examine differences of opinion between corporate IT executives (n=74), corporate executives (n=5), business unit IT managers (n=12), and business unit management (n=3) on several variables (including performance). No significant differences were detected. Similarly, to test for non-response bias, we used the extrapolation procedure proposed by

[3] Feedback was received from 6 IT and business executives and from two prominent academics at the Centre for Information Systems Research (CISR) at MIT.

Armstrong and Overton (1977). No systematic differences existed between early and late respondents and across countries, suggesting that non-response bias is not a major concern. We also note that our global sample of companies provides additional confidence that our results are free from non-response bias.

To assess common method bias we applied Harmon's ex post one-factor test (Podsakoff and Organ, 1986). The results of this test indicated no dominant single factor, suggesting that common factor bias is probably not an issue. However, as Podasakoff et al. (2003) note, the one-factor test is relatively insensitive and they strongly recommend designing the questionnaire itself to reduce common method bias, albeit injecting a note of caution that scale validity should not be sacrificed for the sake of reducing this bias. Here, the scale items for multilevel IT alignment, SBU business-IT alignment and SBU agility and performance were separated from each other by blocks of questions relating to other constructs not part of this study. Within the blocks relating to the modeled constructs some items had the directionality of their scales reversed to encourage careful answering. As Podasakoff et al. (2003) note, these steps should help reduce common method bias.

Exploratory analyses of the underlying questionnaire items were undertaken to assess construct-to-item loadings, cross-loadings, Cronbach's alphas, composite reliabilities, and the average variance extracted for each construct in the model. This enabled us to assess reliability, internal consistency, and discriminant validity for each measure included in the study. Table 1 displays validity and reliability statistics and the correlation matrix.

	CA	CR	AVE	1	2	3	4
1. SBU Agility	0.85	0.88	0.50	**(0.70)**			
2. Multilevel IT Alignment	0.67	0.79	0.50	0.45	**(0.70)**		
3. SBU Performance	0.90	0.92	0.71	0.41	0.23	**(0.84)**	
4. SBU Business-IT Alignment	0.70	0.81	0.54	0.46	0.64	0.25	**(0.73)**

Notes:
CA = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted; The bold numbers on the diagonal are the square root of the AVE; Off-diagonal elements are correlations among constructs.

Table 1. Correlation between Constructs

In order to assess the *reliability* of each measure in the study, we examined how each item relates to the latent constructs. We found that all of the loadings for the measures in the study are significant and load more highly on their own construct than on others. This provides support for the reliability of our measures. *Internal consistency* is assessed using Cronbach's alpha and composite reliability. Nunnally (1978) suggests 0.7 for reliability applicable in early stages of research development while Werts et al. (1978) suggest 0.8 for composite reliability. The results in Table 1 suggest that the measures in this study have good internal consistency.

To assess *discriminant validity* we examined the Average Variance Extracted (AVE). Values for AVE greater than 0.50 are desirable because they suggest that the constructs account for the majority of the variance in their indicators. As shown in Table 1, all AVE values are equal to or greater than 0.50. Next, we compared the square root of the AVE (the diagonal values in Table 1) with the off-diagonal correlations to demonstrate discriminant validity (Fornell and Larcker, 1981). In Table 1, the square root of the AVE for all constructs exceed 0.70 and each is greater than

off-diagonal elements that represent correlation between the constructs. Thus, it is possible to conclude that each measure is tapping a distinct and different construct.

We also examined the correlation between our subjective measure of performance and objective measures of financial performance obtained from a commercially available data-base. The objective measures included net income and revenue. We obtained these data for 43% of the firms in our sample. This gave us some added confidence in the validity of the subjective measures. Another validity concern is the potential multicollinearity among constructs, which could produce unstable path estimates. Thus, we performed a collinearity test and the results showed minimal collinearity among constructs with the VIFs < 2, far bellow the conservative cut-off threshold of 5.

4.2. Assessing the Structural Model

To test the derived hypotheses we assessed relationships' path coefficients and their significance values. To do so we applied the bootstrapping procedure (with a number of 500 bootstrap samples and 94 bootstrap cases) to evaluate the significance of the paths. The results are shown in Figure 1.

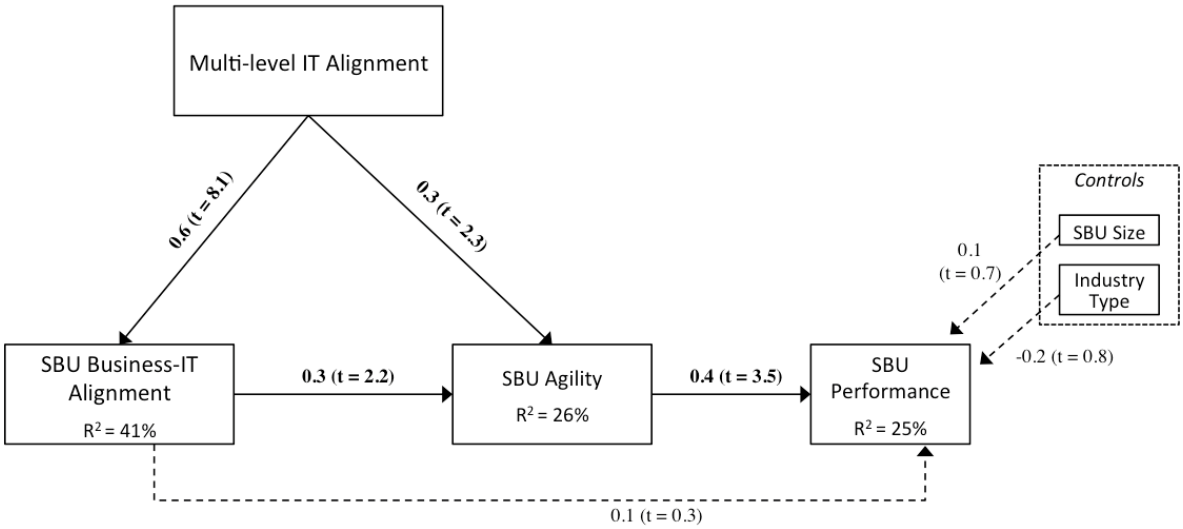

Figure 1. Information on the Structural Model

Figure 1 shows positive and significant effects of multilevel IT alignment on both SBU agility (β = 0.3; p < 0.05) and SBU business-IT alignment (β = 0.6; p < 0.001). These results support Hypotheses 1 and 2. It also shows that SBU business-IT alignment has a significant effect on SBU agility (β = 0.3; p < 0.05), thus supporting Hypothesis 3. Together, these findings not only show that both multilevel IT alignment and SBU business-IT alignment have a direct effect on SBU agility but they also indicate that multilevel IT alignment has an indirect effect on SBU agility through SBU business-IT alignment. To test for significance of this mediation effect, the z-statistic (Sobel, 1982) is applied. Results of a Sobel test (z = 2.20, p < 0.05) indicate that SBU business-IT alignment mediates the relationship between multidimensional IT alignment and SBU agility. To identify whether it completely or partially mediates this relationship, we examine the direct effect when the mediator is present in the model and also when the mediator is removed from the model. Our analysis indicates that SBU business-IT alignment *partially* mediates that relationship. This mediation effect

has also been refereed to as *complementary mediation*, which occurs when both the indirect effect ($z = 2.20$, $p < 0.05$) and the direct effect ($\beta = 0.3$; $p < 0.05$) are significant and point to the same direction (Zhao et al., 2010).

While SBU business-IT alignment has a significant positive effect on SBU agility (Hypothesis 2), our analysis reveals that it is not associated with SBU performance ($\beta = 0.1$; p = n/s). In contrast, we found that SBU agility has a strong significant effect on SBU performance ($\beta = 0.4$; $p = 0.001$). These findings not only support Hypotheses 4 and 5 but they also indicate that SBU agility mediates the relationship between SBU business-IT alignment and SBU performance. Results of a Sobel test ($z = 1.89$, $p < 0.1$) confirm that SBU agility *fully* mediates the relationship between SBU business-IT alignment and SBU performance. As Zhao et al. (2010) explain, this mediation effect has also been refereed to as *indirect-only mediation* and occurs when the indirect effect is significant ($z = 1.89$, $p < 0.1$) and the direct effect is not ($\beta = 0.10$; p = n/s).

5. Concluding Remarks

The objective of this study was to examine the role of the multi-level alignment between corporate IT and SBU IT in enhancing SBU agility. To do so, we investigated two research questions: 1) Does multi-level IT alignment enhance SBU agility? 2) Does the relationship between multi-level IT alignment and SBU business-IT alignment affect SBU agility?

With regard to the first research question, we found that multi-level IT alignment is a key enabler of SBU agility. This suggests that, by building a multi-level alignment relationship between SBU IT and corporate IT, a SBU is better able to position itself to leverage IT resources to rapidly cope with unanticipated market changes. With regard to the second research question, we found that multi-level IT alignment facilitates SBU business-IT alignment, which in turn also enhances SBU agility. Taken together, our findings indicate that multi-level IT alignment is a major enabler of SBU agility given that it affects agility not only directly but also indirectly by facilitating SBU business-IT alignment.

This study contributes to the evolving literatures on IT alignment and agility by developing a multi-level conceptualization of IT alignment, which has not been done previously, and testing its consequences on SBU agility. Overall, our study indicates that managers need to go beyond focusing on business-IT alignment to better understand how the multi-level relationship between corporate IT and SBU IT enables SBUs to be more agile in responding to emerging threats and opportunities.

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APPENDIX

Measurement items.

AG: AGILITY (1: Strongly disagree; 5: Strongly agree)

Compared to our three nearest competitors, my strategic business unit can more easily and quickly…

AG1: Respond to changes in aggregate customer demand.

AG2: Customize a product/service to suit an individual customer.

AG3: React to new product/service launches in the market.

AG4: Introduce new pricing schedules in response to changes in competitor's prices.

AG5: Expand into new regional and/or international markets.

AG6: Expand or reduce the variety of products/services available for sale.

AG7: Adopt new technologies to increase the throughput of products/services.

AG8: Switch suppliers or partners.

PER: BUSINESS PERFORMANCE (1: Strongly disagree; 5: Strongly agree)

PER1: We are more profitable than our competitors.

PER2: Our sales growth exceeds that of our competitors.

PER3: Our revenue growth exceeds that of our competitors.

PER4: Our market share growth exceeds that of our competitors.

PER5: Overall, our performance is better than our competitors.

MIA: MULTI-LEVEL IT ALIGNMENT (1: Strongly disagree; 5: Strongly agree)

MIA1: Corporate IT platform capabilities are falling short of the SBU's IT requirements.

MIA2: Many corporate IT platform capabilities are duplicated within the SBU IT application portfolio.

MIA3: The corporate IT platform capabilities are not being fully leveraged by the SBU IT application portfolio.

MIA4: Overall, the corporate IT platform capabilities meet the needs of the SBU IT application portfolio.

BIA: SBU BUSINESS-IT ALIGNMENT (1: Strongly disagree; 5: Strongly agree)

BIA1: The existing SBU IT application portfolio lacks capabilities that are necessary to effectively execute the SBU strategy.

BIA2: The existing SBU IT application portfolio provides sufficient support for the execution of our SBU strategy.

BIA3: The potential of the SBU IT application portfolio is not fully considered when SBU strategy decisions are made.

BIA4: Overall, the SBU IT application portfolio meets the needs of the SBU strategy.