

Chapter I

Investigating the Relationship between Strategic Alignment and IT Business Value: The Discovery of a Paradox

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Although business executives remain skeptical about the extent of payoffs from investment in information technology (IT), strategic alignment or the alignment of information systems strategy with business strategy continues to be ranked as one of the most important issues facing corporations. In this paper, we report on the results of a process-level study to investigate the relationship between strategic alignment and IT payoffs. An analysis of survey data from 63 firms finds a positive and significant relationship between strategic alignment and IT payoffs, a relationship that holds for all firms irrespective of their strategic intent or goals for IT. However, in exploring minor differences in strategic alignment between firms with different goals for IT, we uncovered evidence of an alignment paradox. This paradox shows that while strategic alignment can lead to increased payoffs from IT, this relationship is only valid up to a certain point beyond which, paradoxically,

further increases in strategic alignment appear to lead to lower IT payoffs. Finally, we offer some suggestions for why this paradox might exist, specifically around issues of environmental uncertainty, industry clock-speed, and the need for organizational flexibility.

INTRODUCTION

Although executives continue to voice concern for payoffs from investment in information technology (IT), strategic alignment or the alignment of information systems (IS) strategy with business strategy, has emerged as one of the most important issues facing executives in Europe and America (CSC 2000; Price Waterhouse 1996). Although IT business value and strategic alignment are often treated separately, researchers argue that a firm's inability to realize sufficient value from IT is due in part to an absence of strategic alignment (Henderson and Venkatraman 1993; Prairie 1996). If, as these researchers suggest, IT payoffs are indeed a function of strategic alignment, then an absence or deficiency in payoffs from IT may point to a misalignment between the business and IT strategies. Equally, if a corporation tries to reposition or change its strategic alignment, consideration may need to be given to any subsequent shift in the value the corporation realizes from IT investment, with downstream implications for firm performance. This question—long debated by both academics and IS practitioners—leads to the first and most important question in this paper, namely: what is the nature of the relationship between strategic alignment and IT payoffs and, in particular, does strategic alignment have a positive impact on IT business value?

Although low levels of strategic alignment may undermine payoffs from IT, some researchers sound a word of caution for corporations who try to improve IT payoffs through strategic alignment. For example, Jarvenpaa and Ives (1994) argue that for corporations competing on a global scale, tight fit between the IS and business strategy might reduce strategic flexibility and force a firm down a path from which it cannot escape.¹ If this argument is valid, then there is a point beyond which increased alignment may weaken a corporation's ability to respond to environmental threats and opportunities, with the possibility that a reduction in flexibility may also erode IT payoffs. This would then imply that beyond a hypothetical inflection point, greater strategic alignment could, paradoxically, lead to lower IT payoffs. This leads to our second and final research question in which we ask if there is an *alignment paradox*, such that beyond a certain point, increased strategic alignment could, by limiting a corporation's ability to react favorably to environmental challenges, result in lower payoffs from IT? If our findings support the existence of an *alignment paradox*, then in subsequent research, we may question if IS

executives are willing to accept less than perfect alignment in order to maintain some sense of strategic flexibility, even if this decision should entail a less than optimal level of IT payoffs.

In this paper, we explore both of these questions in the context of a process-oriented model of IT business value and strategic alignment – both variables are examined at the process-level rather than at the firm level. In the next section, we motivate this choice through a review of recent literature on strategic alignment and IT payoffs. After this, we present a theoretical model and hypotheses to more fully investigate the relationship between strategic alignment and IT business value. We then describe how the model was tested using data from a series of matched surveys. This is followed by a review of our results and a discussion of an *alignment paradox* uncovered by our analysis. Finally, we conclude and identify areas for further research.

LITERATURE REVIEW

The field of business policy, from which strategy research has emerged, has its origins in the concept of matching or aligning organizational resources with environmental threats and opportunities (Andrews 1980). Accordingly, a business strategy reflects decisions that align corporate resources and capabilities with environmental threats and opportunities (Andrews 1980; Bourgeois 1985). This interpretation has implications for how we define and interpret strategic alignment. For example, by viewing strategic alignment as a snapshot of the link between business and IS strategies, we can focus on the content of strategic alignment, or specifically what aspects of IT are aligned with what aspects of the business strategy. Previous research on strategic alignment has often applied this approach. For example, Reich and Benbasat (1996) apply the term “linkage” to “the degree to which the IT mission, objectives, and plans support and are supported by the business mission, objectives and plans” (p. 56). Similarly, Broadbent and Weill (1993) define strategic alignment as “the extent to which business strategies were enabled, supported, and stimulated by information strategies” (p. 164).

One way to identify the content of strategic alignment is to identify if the business plan links or refers to the IT plan, and vice versa (Broadbent and Weill 1993; Kearns 1997; Reich and Benbasat 1996). However, in reviewing whether strategic alignment has been achieved, we accept that cross-referencing between the written IS and business plans (which would illustrate the content of strategic alignment) is at best a surrogate or proxy for “true” alignment since planned-strategy can be different from realized-strategy (Mintzberg 1978). This would imply that efforts to relate strategic alignment to IT payoffs should extend beyond an

examination of the content of written plans to include measures of actual or realized IS and business strategy and from this, to compute an actual measure of realized strategic alignment to compare against a measure of realized IT business value.

Where studies of strategic alignment exclude measures of firm performance, there is often an implicit assumption that greater levels of strategy alignment are preferable to lower levels of strategic alignment. Among those studies that have considered the performance impacts of strategic alignment, there is often a wide variation in the type of performance metrics used. For example, Venkatraman (1989a) and Chan, Huff, Barclay and Copeland (1997) use metrics such as net margin, market share, revenue growth, return on investment, cash flow and profitability. Yet, with the exception of Chan *et al.* (1997), the empirical literature has remained silent on the degree to which strategic alignment has impacted IT business value (where IT business value mediates the link between strategic alignment and firm performance). In that study, four items measured the impact of IT on efficiency, managerial effectiveness, market linkages and product/service enhancement. However, in combining these IT business value items with three items on end-user information satisfaction to form a variable labeled “IS effectiveness”, their research could only offer an indirect assessment of the link between strategic alignment and IT business value. However, as the main focus of this research is on the link between strategic alignment and IT business value, this research – insofar as we are aware – represents the first time that this relationship has been empirically tested.

Research on IT Business Value

One of the most comprehensive bodies of research on the performance impacts of IT employs econometric techniques. As such, econometrics can provide useful insights into a range of IT impacts using theories of production economics, information processing or industrial organization (Bakos and Kemerer 1992). Although the performance impacts of IT span multiple dimensions (Tallon, Kraemer, Gurbaxani and Mooney 1997), econometric studies tend to view IT impacts in one dimension such as value added or productivity. Therefore, a criticism of econometric methods involves their limitations in capturing impacts such as quality improvements, increased managerial effectiveness and enhanced customer relations. While econometric techniques may offer a high degree of objectivity, they provide somewhat limited insights into the process by which IT payoffs are created and, therefore, ultimately measured. In order to provide such insights, researchers advocate a behavioral or perception-based approach to IT business value using multiple process-level measures at various points throughout the corporation. While there are several ways to model business processes, one of the best known

ways is the “value chain” – a framework that divides a firm’s activities into distinct business processes (Porter 1985). By considering the impact of IT on each process and on inter-process linkages, executives can obtain a more detailed understanding of how IT investments impact firm performance. Furthermore, while econometric techniques employ financial or objective measures of IT payoffs, we may consider using executives’ perceptions to identify and assess payoffs from IT at the process-level.

Executives’ Perceptions of IT Business Value: Fact or Fiction

The use of perceptual measures as a proxy or surrogate for objective measures of IT payoffs has been criticized by some researchers who believe executives may give an inaccurate assessment of IT payoffs due to personal biases and the complex nature of the IT evaluation process. Research has alleviated some of these concerns by showing, for example, that executive perceptions correlate with objective measures of firm performance. In one study by Venkatraman and Ramanujam (1987), senior executives were asked to rate their company’s performance against that of major competitors using criteria such as sales growth, income growth and return on investment. In finding a strong correlation between perceptual and objective measures, the authors suggested that “perceptual data from senior managers . . . can be employed as acceptable operationalizations of [business economic performance]” (p. 118). In other research, executives’ perceptions of IT business value were found to correlate with economic measures of IT performance such as revenues per IT dollar, net income per IT dollar and firm-wide productivity (Tallon, Kraemer and Gurbaxani 1998).

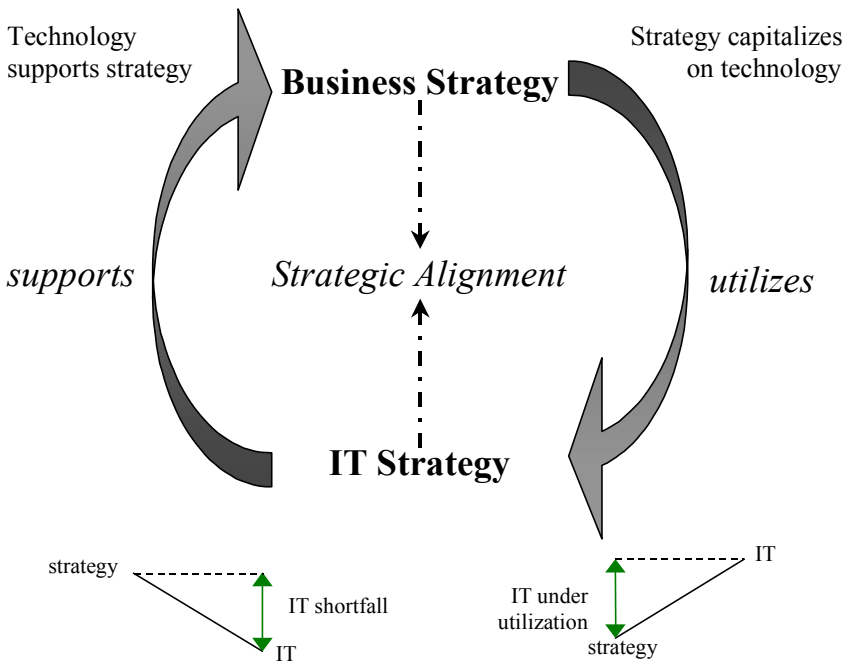
Further supporting the use of executives’ perceptions in evaluating payoffs from IT, DeLone and McLean (1992) argue that business executives are ideally positioned to act as key informants in a qualitative assessment of IT impacts in their firms. There is a twofold basis for this argument. First, as direct consumers of IT, business executives can rely on personal experience when forming an overall perception of how IT has impacted different aspects of firm performance at the process-level (Davis and Olson 1985; Rockart and Flannery 1983). Second, as business executives become more involved in IT investment decisions, they are increasingly exposed to the views of peers and subordinates as to the performance of previous IT investments (Watson 1990). Taken together, these arguments confirm that business executives are an important source of information on IT impacts, thereby supporting the use of executives’ perceptions in evaluating payoffs from IT investment.

THEORETICAL MODEL AND HYPOTHESES

While previous research on strategic alignment considers business and IS strategy at the firm level, a key contribution of our research is to focus instead on the process-level in order to gain deeper insights into the relationship between strategic alignment and IT payoffs. As outlined above, the value chain divides a business into a sequence of processes, allowing us to locate primary business activities and IT support for these activities. By focusing on how IT supports key processes, we hope to provide a more comprehensive assessment of the link between strategic alignment and IT business value.

A second contribution of this research is our definition of, and related approach to measuring, strategic alignment. While strategic alignment is typically defined as a measure of the extent to which IT supports the business strategy, this paper employs a two-dimensional definition based on the notion of *IT shortfall* (IT fails to support the business strategy) and *IT under-utilization* (business strategy fails to utilize existing IT resources to the fullest extent possible). In Figure 1, we provide a graphical representation of these dimensions of IT shortfall and under-utilization by depicting the bi-directional relationship between the business and IT strategy. The interaction between both strategies will feature prominently in measuring strategic alignment. For example, perfect strategic alignment will exist when the IT

Figure 1: Dimensions of Strategic Alignment



strategy fully supports the business strategy and when the business strategy, in turn, has fully capitalized on the capabilities offered by the IT resources. This suggests that misalignment can occur through a lack of IT support for the business strategy (possibly caused by a lack of IT spending) or, alternatively, by failure to capitalize on IT resources (possibly caused by excessive spending on IT or by failure on the part of executives to understand the business opportunities presented by IT).

Strategic Alignment and IT Business Value

The espoused positive relationship between strategic alignment and payoffs from IT has been a core belief of IS researchers for the past decade, though there has been little empirical evidence to confirm or refute this belief. With reference to Figure 1, efforts to improve strategic alignment involve eliminating or at least reducing the gap between business and IT strategy, where a gap refers to either IT shortfall or IT under-utilization. For example, in the case of IT shortfall, where the implementation of the business strategy is hampered by inadequate levels of IT support, increased IT spending or a re-allocation of existing IT resources towards the most critical processes can help a firm to achieve its business goals. In the case of IT under-utilization, the introduction of new business activities around existing IT capabilities can help a corporation to make more effective use of its IT resources.

If IT provides strong support for the business strategy consistent with high levels of strategic alignment, there is likely to be a small gap between the business and IS strategy (meaning low levels of IT shortfall). Business executives should subsequently find that this high level of IT support allows IT to have a significant impact on key performance criteria within each business process. If, on the other hand, there is a low level of support for the business strategy, consistent with misalignment between the IS and business strategy, business executives will likely find that IT has a lower impact on firm performance. This argument leads to the following hypothesis:

***Hypothesis 1:** Higher levels of strategic alignment lead to higher levels of IT business value.*

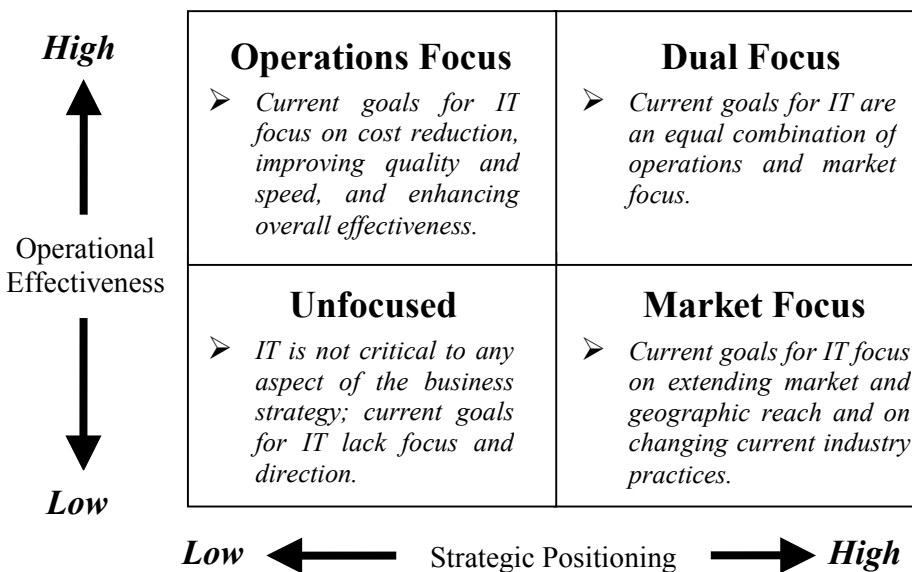
Strategic Intent for IT

While theory might suggest that alignment between the business and IS strategy contributes to greater payoffs from IT, it is unclear if this relationship will hold for all corporations. For example, if IT is seen as a strategic resource and critical to the future success of the business, then by implication, strategic alignment may be seen as a competitive necessity and every effort may be made to achieve and maintain strategic alignment. However, if IT is only seen in a support or non-strategic role,

there may be less emphasis on strategic alignment. For example, McFarlan, McKenney and Pyburn (1983) argue that “where information services are – and should be – in the support role, . . . less effort needs to be made to ensure alignment of IS and corporate strategy” (p. 156). Meanwhile, if IT is seen as a vehicle for organizational change, executives may feel that a more intense form of strategic alignment or a tighter fit between the business and IS strategy is warranted. This argument suggests that strategic intent or corporate goals for IT may be related to strategic alignment, and that therefore, we should consider some mechanism for measuring strategic intent for IT.

Based on Porter’s argument that firm performance is related to two strategic foci: operational effectiveness and strategic positioning (Porter 1996), we created a two-dimensional framework using these foci to represent strategic intent for IT. There are critical differences between each dimension. For example, operational effectiveness entails performing similar activities better than rivals while strategic positioning entails performing different activities or performing similar activities but in very different ways. Firms that focus on operational effectiveness “get more out of their inputs than others because they eliminate wasted effort, employ more advanced technology, motivate employees better, or have greater insight into managing particular activities . . . operational effectiveness includes, but is not limited to, efficiency” (Porter 1996; p. 62). Greater efficiency comes from using IT to control or reduce operating costs and to improve factor productivity, while effectiveness comes from using IT to increase flexibility and responsiveness to

Figure 2: Classification of Firms by Strategic Intent for IT



changing market needs. Alternatively, the primary emphasis in operational effectiveness is on using IT for internal purposes though this does not exclude the use of IT for market-oriented ends. In contrast, strategic positioning involves using IT to achieve greater market reach or to identify entirely new market opportunities. As shown in Figure 2, we can use this relationship between goals for IT and business foci to create an a-priori classification of firms based on whether companies use IT for operational effectiveness, strategic positioning or both.

Using a “low” to “high” scale for both dimensions, we constructed a 2x2 framework. Firms in the lower left quadrant have little or no focus on operational effectiveness or strategic positioning and so, are labeled *unfocused* as a way to highly their apparent indifference towards IT. For firms in this quadrant, strategic alignment is unlikely to be a major concern. In contrast, firms in the upper left quadrant have clearly defined goals for IT around operational effectiveness, but with less emphasis on using IT for strategic positioning. We label these firms as *operations focus* to reflect their use of IT to control operating costs and boost the effectiveness of business operations by improving quality, speed, flexibility and time-to-market. Firms in the lower right quadrant have a reverse emphasis on IT – they focus more on using IT for strategic positioning than for operational effectiveness. Such *market focus* firms use IT to achieve strategic positioning or to create a value proposition for their customers. While market focus firms concentrate their IT spending on more external or market-based initiatives, they may still be proficient at using IT in operations though this is purely a way to support their market-based objectives. Finally, a significant number of firms recognize that IT can support both operational effectiveness and strategic positioning simultaneously. Corporations with this *dual focus* approach use IT for both operational effectiveness and strategic positioning. Consequently, IT is likely to be key to the success of these companies and so executives are likely to emphasize the need for tight fit between the business and IS strategy.

In considering each of these foci (unfocused, operations focus, market focus and dual focus), as we move from being unfocused through dual focused, there is likely to be an increasing emphasis on strategic alignment and using IT to support the business. This leads to the following hypothesis:

Hypothesis 2: *Corporations with more strategic goals for IT will have higher levels of strategic alignment while those with less strategic goals (where IT is in a purely support role) will have lower levels of strategic alignment.*

DATA COLLECTION AND ANALYSIS

Previous research by the authors involved the development of a 30-item survey instrument to measure payoffs from IT at the process-level, where the value

chain was used as a process model of the firm. The 30 items were divided across six business processes (i.e., process planning, supplier relations, production & operations, product & service enhancement, sales & marketing and customer relations)—with five items per process. All items were based on an extensive review of the literature. As a way to focus responses on realized rather than expected impacts, the following lead-in question was applied: “To what extent does IT boost firm performance in the following areas? Please restrict your appraisal to value already realized rather than value expected in the future.” All items were rated on a seven-point Likert scale, where “1” denotes “not at all” (low payoffs) and “7” denotes “to a great extent” (high payoffs). The set of business value items were subsequently validated in a global survey of 304 corporations that also included four items to measure strategic intent or corporate goals for IT (see Tallon, Kraemer and Gurbaxani (2000) for a more detailed description of the survey validation).

Having validated the business value items, the next stage of the research was to develop items for both business and IS strategy. To facilitate a more direct assessment of the link between strategic alignment and IT business value, the text of the 30 IT business value items was duplicated in two independently-developed surveys designed to measure business and IS strategy, respectively. As the original IT business value items reflected realized IT payoffs, it was felt that measures of business and IS strategy should focus on strategy as implemented rather than strategy as formulated. Consequently, in the business strategy instrument, the lead-in question for the same set of 30-items was: “To what extent have the following items been implemented as part of your business strategy?” Meanwhile, in the IS strategy instrument, IS strategy was operationalized as IT use where the lead-in question preceding the 30-items was: “To what extent is your company using IT for each of the following?”

After some initial testing among a small set of companies and the incorporation of comments received from a panel of CIOs, the surveys were mailed out to a sample frame of single segment, single line-of-business corporations² identified through the S&P Compustat database. Different respondents were identified for each of the surveys as follows: IT business value (CEO, COO, CFO or a functional VP), business strategy (strategic planner or corporate development officer) and IS strategy (CIO, CTO or senior IT manager). As part of a parallel study, surveys were also sent to executives in publicly traded businesses in Ireland (the same criteria for number of segments and respondents was applied).

Using a matched survey approach meant that we could only consider data collection for any company to be “complete” if we received at least one IT business value survey, one IS strategy survey and one business strategy survey. Whereas we mailed IT business value surveys to at least one business executive, we only mailed one copy of the business and IS strategy surveys to the individuals identified above.

Table 1: Survey Response Rates

| | U.S. | Ireland | Total* |
|---|-----------|-----------|------------|
| <u>Sample Frame</u> | | | |
| Corporations (single segment) | 477 | 64 | 542 |
| <u>Respondents</u> | | | |
| Business Executives | 118 | 31 | 151 |
| IT Executives | 90 | 20 | 111 |
| Strategic Planners | <u>80</u> | <u>24</u> | <u>105</u> |
| Individual respondents | 288 | 75 | 367 |
| <u>Survey Matching (within firm)</u> | | | |
| Complete set of surveys received | 46 | 16 | 63 |
| Missing one survey (match 2 only) | 33 | 5 | 38 |
| Missing two surveys (match 1 only) | <u>56</u> | <u>12</u> | <u>68</u> |
| Corporations responding | 135 | 33 | 169 |
| <u>Response Rate (% of sample frame)</u> | | | |
| Corporations responding | 28.3% | 51.6% | 31.2% |
| Complete surveys (fully matched) | 9.6% | 25.0% | 11.6% |

Totals are inclusive of responses from a Dutch firm that returned 4 surveys.

A detailed summary of all responses received is shown in Table 1. Complete data (or fully matched surveys) was received for 63 corporations, giving an overall response rate of 11.6%. An analysis of non-responding companies found no evidence of response bias on measures of revenues, profitability, employee count or total assets³. Furthermore, no significant country-differences were found in comparing the 46 U.S. and 17 E.U. (i.e., Irish and Dutch) companies for which complete data had been received

Modeling Strategic Alignment

Venkatraman (1989b) devised a framework showing six perspectives of fit from the strategy literature – perspectives that can be used to reflect alignment between the business and IT strategy. Of these, moderation is the most appropriate since this captures the interaction between the business and IS strategies as indicated in Figure 1. Although there are different ways to model moderation, earlier research by Chan *et al.* (1997) revealed that an interaction or product term was more appropriate and parsimonious than more complex polynomial forms. To model this interaction between the business and IS strategy, each of the 30 items from the IS strategy survey was paired with (and multiplied by) the corresponding item in the business strategy survey to produce 30 strategic alignment terms (recall:

the text of the items in each survey was identical so that one-to-one matching was possible). Since factor analysis on the business and IS strategy items in their respective surveys found that the items factored into six process groups, the 30 strategic alignment items were grouped into the same process headings, and averages were taken to yield six process-level measures of strategic alignment.

As part of the measurement process, it was also recognized that firms could react differently to strategic alignment. For example, a corporation that saw IT as being critical to the business process might be disappointed with a particular measure of strategic alignment while another corporation that used IT for support purposes alone might appear indifferent with the same measure of strategic alignment. To allow for this, we introduced weights to represent the importance of IT to each business process. Data on the importance of IT in each process was collected from respondents in each survey and was averaged to give an overall measure of IT importance in that process. So, at the conclusion of this step, for each of the 63 firms in our dataset, we had – for each of the six processes in the value chain – a measure of business strategy, IS strategy, strategic alignment and IT business value.

Finally we examined data on strategic intent for IT as a way to classify firms into one of the four cells shown in Figure 2 (specific details of the classification technique are given in Tallon *et al.* 2000). Table 2 summarized the results of this classification.

Table 2: Classification of Firms by Strategic Intent for IT

| Strategic Intent for IT | Number | % |
|-------------------------|--------|------|
| Unfocused | 13 | 20.6 |
| Operations Focus | 26 | 41.3 |
| Market Focus | - | - |
| Dual Focus | 24 | 38.1 |

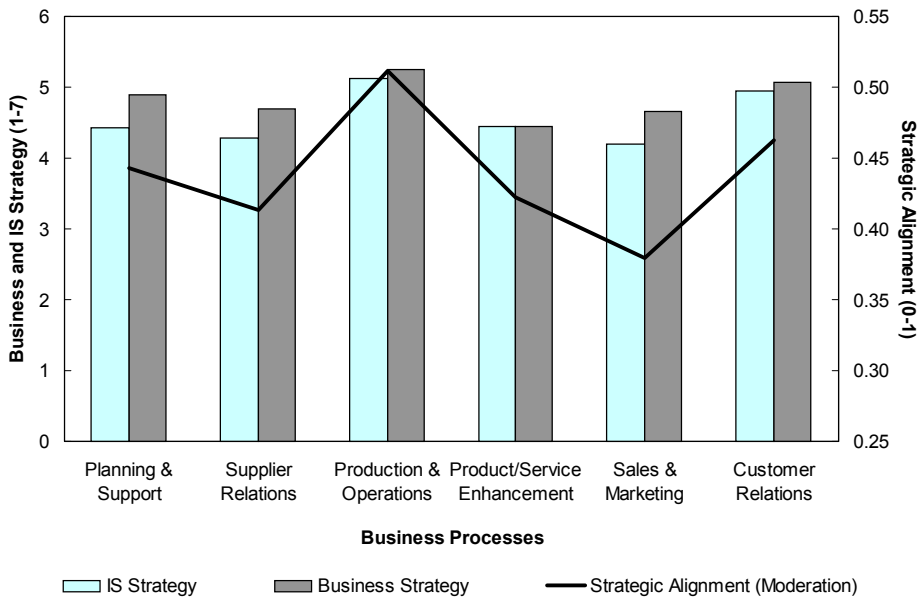
It is interesting to note from Table 2 that no companies were assigned to the market focus cell. In previous research (Tallon *et al.* 2000), it was noted that market focus firms accounted for some 8% of the total population of corporations, and that these companies tended to be smaller in revenue terms and were almost exclusively based in the business and professional services sector. This included, for example, firms involved in outsourcing, consulting and health care management services. Besides the fact that there were only 63 firms with complete data in the present study

and that 8% of this number would represent only 5 firms, our decision to focus on large multi-billion dollar companies in areas such as manufacturing, transport and utilities, wholesale and retail, and financial services meant that there was a low probability that smaller, market focus firms would be identified in our later survey.

REVIEW OF FINDINGS AND DISCUSSION

An analysis of the business and IS strategy data for each of the six processes reveals some interesting facts. As indicated in Figure 3, strategic alignment is highest in production and operations and customer relations indicating that there is a significant degree of IT support for business activities in these processes. Meanwhile, strategic alignment is lowest in sales and marketing, suggesting low levels of IT support for these activities and perhaps signaling a problem for firms who consider sales and marketing activities to be important to the success of their business.

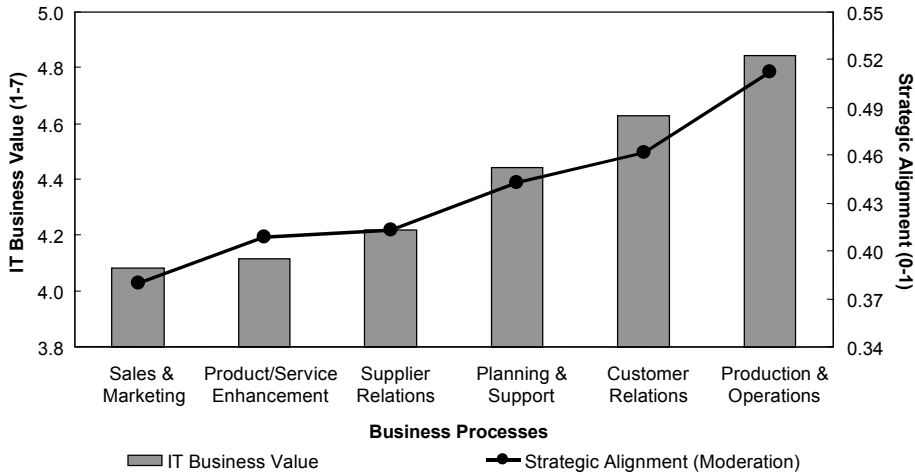
Figure 3: Relating Strategic Alignment to Business and IS Strategy



In the arguments leading to the first hypothesis, we suggested that strategic alignment could have a positive impact on IT business value such that in processes where strategic alignment is higher, we might expect to find evidence of higher IT

business value. Even when we consider that companies may have different strategic intent or goals for IT, there is still a basis for arguing that this relationship between strategic alignment and IT business value will be sustained across all corporations.

Figure 4: Strategic Alignment and IT Business Value (H1)



As shown in Figure 4, when we compare each process-level measure of strategic alignment in Figure 3 with the corresponding process-level measure of IT business value, a positive relationship emerges (the processes on the bottom axis in Figure 4 have been sorted to make this association more apparent). This relationship indicates that IT business value is related to strategic alignment such that increased IT business value may result from greater alignment between the business and IT strategies. Consistent with our earlier comments on Figure 3, production and operations and customer relations have the highest level of IT business value and strategic alignment, while sales and marketing has the lowest level of IT business value and strategic alignment. In summary, therefore, there is support for hypothesis 1 from which we can conclude that an inability to realize payoffs from IT is due, at least in part, to an absence of, or deficiency in strategic alignment.

Investigating the Existence of an Alignment Paradox

The second hypothesis asked if firms with more focused or strategic goals for IT would report increased levels of strategic alignment. As shown in Table 3, when we examined strategic alignment for each of the three foci – unfocused, operations focus and dual focus – a pattern of results emerged that suggested that

as firms pursue more strategic goals for IT, they also reported increased levels of strategic alignment. Specifically, unfocused firms had lower levels of strategic alignment throughout the value chain indicating consistently low levels of IT support for the business strategy. Meanwhile, operations focus firms had higher strategic alignment throughout the value chain, though particularly in production and operations, consistent with using IT for efficiency and effectiveness. Finally, dual focus firms had the highest level of strategic alignment across the value chain with the highest values being found in production and operations and customer relations – processes that are consistent with using IT for internal (efficiency and effectiveness) and external (marketing and customer) purposes.

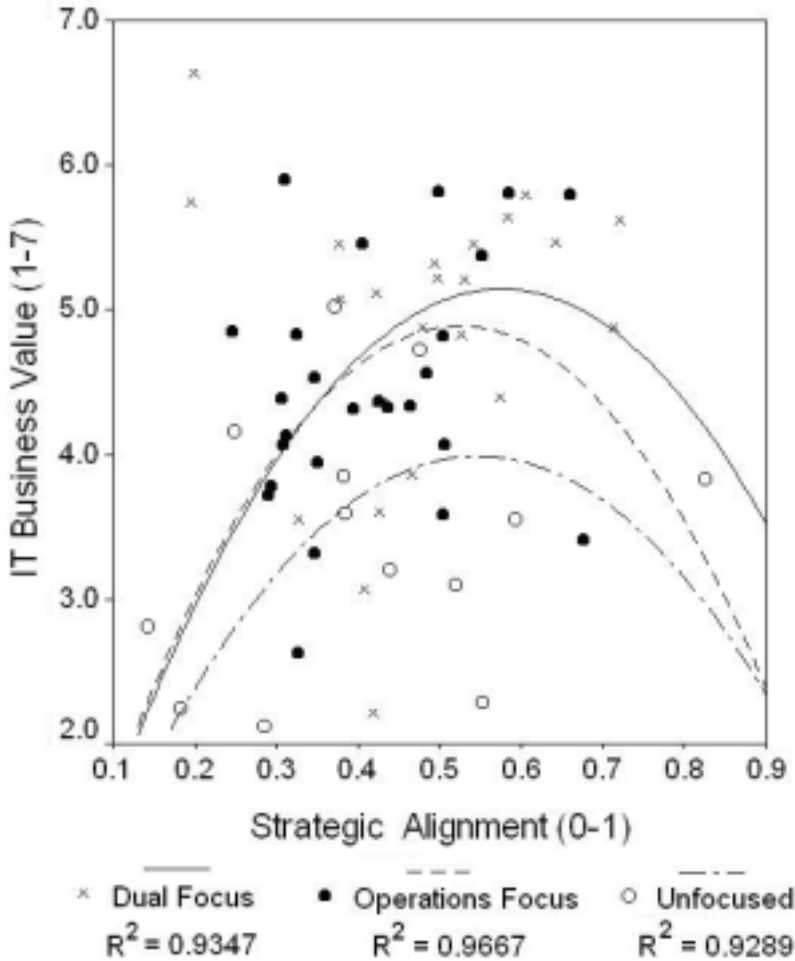
Table 3: Strategic Alignment by Strategic Intent for IT (H2)

| Value Chain Processes | Strategic Alignment (Range: 0-1) | | | F (sig.) ¹ |
|---------------------------------|----------------------------------|------------------|------------|-----------------------|
| | Unfocused | Operations Focus | Dual Focus | |
| Process Planning and Support | 0.393 | 0.437 | 0.477 | 1.019 |
| Supplier Relations | 0.325 | 0.341 | 0.486 | 1.917 |
| Production and Operations | 0.455 | 0.503 | 0.499 | 0.259 |
| Product and Service Enhancement | 0.391 | 0.401 | 0.462 | 0.367 |
| Sales & Marketing Support | 0.352 | 0.373 | 0.402 | 0.364 |
| Customer Relations | 0.376 | 0.454 | 0.518 | 1.399 |

¹ F statistics are not significant.

Although Table 3 provides support for hypothesis 2 in that firms with more focused goals for IT realize higher levels of strategic alignment, a one-way analysis of variance failed to find significant differences in process-level measures of strategic alignment, though significant differences had been found for IT business value. Since there is a positive link between strategic alignment and IT business value, it seems unusual that there were no significant differences in terms of strategic alignment. One possible reason for this would be if strategic alignment exhibited diminishing marginal returns so that the gain in IT payoffs from each successive increase in strategic alignment is smaller. Another reason could be that for dual focus firms especially, increased strategic alignment – while helping to increase IT payoffs – could somehow have an adverse impact on the ability of the corporations to be flexible in how they respond to external events. For corporations that fail to identify this possibility and instead pursue ever-higher levels of strategic alignment, there might be an adverse outcome in which greater strategic alignment in fact leads to a decline in payoffs from IT.

Figure 5: An Alignment Paradox (Scatter Plot)



To investigate this further, we created a scatter graph containing, for each firm, a firm-level measure of strategic alignment and IT business value (these measures are averages of the six process-level measures). As seen in Figure 5, when we fitted a second-degree polynomial curve to the data for each focus type, the shape of each curve suggests that higher levels of strategic alignment did indeed erode IT payoffs. While we may have expected the critical level for dual focus firms to be higher than for operations focus or unfocused firms, that did not occur as the critical level of strategic alignment for all three foci was almost the same, falling in the range 0.48 to 0.56. It was also interesting to find in Figure 5 that for each focus type, there are only a small number of firms to the right of the critical point, meaning that for the vast majority of corporations, strategic alignment is still positively related to IT business

value. Nevertheless, the inverted shape of each curve supports – for each focus type – the existence of an alignment paradox. Consequently, efforts to improve IT payoffs through strategic alignment are only likely to succeed up to a point. As we move beyond that point, further increases in strategic alignment may have an adverse impact on IT payoffs – a paradoxical outcome that holds for all firms irrespective of their strategic intent for IT.

Factors Related to the Alignment Paradox

Identifying what factors determine the location of this point is important to understanding the limits of the relationship between strategic alignment and IT payoffs and on being able to find ways to avoid any adverse impacts of strategic alignment. One factor that may play a role in the location of this point is the extent of environmental uncertainty and corporations' desire to maintain flexibility in order to respond to external events. For example, in a turbulent environment where corporations are faced with multiple challenges, flexibility in the business or IS strategy may be the difference between success and failure. If corporations are tightly aligned, they may not be able to initiate the necessary changes in the business strategy – IT legacy systems that had supported a previous business strategy and around which the corporation has grown may become a limiting factor as corporations strive to alter the business strategy. In a more stable environment, corporations may be more willing to pursue strategic alignment since the need to retain flexibility is not as important as in a turbulent setting.

To investigate the possible impact of environment on strategic alignment, we included a series of questions on clock-speed in the business strategy survey. Clock-speed refers to industry variables such as length of product life cycle, percentage of revenues received from new product launches, pace of product price changes and rate of customer turnover (Mendelson and Ziegler 1999). Corporations in high clock-speed industries such as semiconductors, PC hardware production or biotechnology face highly dynamic environments characterized by frequent product changes and falling product prices. Respondents to the strategic planner's survey were asked to identify these operational indicators for a flagship product or service. Since firms in the same industry are likely to report the same clock-speed, we split our data into industry groups using 2-digit SIC codes, and then further split the companies in each sector into smaller subgroups according to strategic intent for IT. This allowed us to focus on the largest sectors in our data: manufacturing, transport/utilities, wholesale/retail and financial services.

As shown in Table 4, when we examined clock-speed by sector and by focus type, we found that in each sector, dual focus firms had higher clock-speed than both unfocused and operations focus firms. This means that dual focus firms have shorter product life cycles (and faster product launches) and receive a higher

Table 4: Industry Clock-speed - Key Operational Indicators

| | Manufacturing | Transport and Utilities | Wholesale and Retail Trade | Financial Services |
|--|---------------|-------------------------|----------------------------|--------------------|
| <u>Length of Life Cycle of Product / Service (months)</u> | | | | |
| Unfocused | 49.6 | - | 15.0 | - |
| Operations Focus | 62.5 | 102.0 | 36.3 | 78.0 |
| Dual Focus | 59.3 | 32.0 | 21.0 | 32.0 |
| <u>Percentage of Sales from Products/Services Launched in the Last Two Years (%)</u> | | | | |
| Unfocused | 31.8 | - | 22.5 | - |
| Operations Focus | 28.7 | 10.5 | 26.0 | 25.5 |
| Dual Focus | 50.8 | 18.0 | 57.5 | 61.7 |

percentage of sales from products launched over the last two years. For example, in financial services, dual focus firms earn over 60% of their revenues from recent product launches compared with 26% for operations focus firms. Dual focus firms also have a product life cycle of only 32 months as against 78 months for operations focus firms. If we try to relate these measures of clock-speed to measures of strategic alignment from Table 3, we find that firms with greater clock-speed also report higher strategic alignment but the addition of the data in Figure 5 might then suggest that this relationship between clock-speed and strategic alignment is incomplete. Specifically, while dual focus firms may have higher strategic alignment, there is a possibility that due to having higher clock-speed, they are somehow forced to rethink any move that involves an increase in strategic alignment if at the same time, this could lead to a reduction in the payoffs they realize from their IT investment.

From a managerial viewpoint, it is important to recognize that environmental uncertainty and clock-speed are opposite sides of the same coin. In a sector with shrinking product life cycles, falling prices and frequent product launches, there is likely to be a great deal of uncertainty. Faced with this, efforts to pursue tighter strategic alignment by adopting certain types of IT may not be optimal in the long-term if this entails, for example, locking a corporation into a particular limiting IT infrastructure or set of technology choices. If changes in the environment call for a change in IT at some future point, earlier choices may prevent the corporation from responding. Since dual focus firms are particularly open to the environment through their emphasis on customers and market issues, efforts to boost short-term IT support for the business strategy could possibly limit organizational flexibility and so prevent the firm from pursuing future business opportunities. While there is considerable scope for future research in this area, the prospects of an alignment paradox – especially if accompanied by turbulent conditions – is troubling for firms

who consider strategic alignment as a way to realize a greater return on their IT investments.

CONCLUSION

Although researchers have frequently argued that strategic alignment enables corporations to realize greater IT payoffs, there has been very little empirical research to confirm or deny this claim. In this paper, we use a model of the value chain to evaluate the link between strategic alignment and IT business value. We define strategic alignment as a bi-directional relationship between business and IT strategy. Specifically, strategic alignment reflects IT shortfall (the extent to which IT supports the business strategy) and IT underutilization (the extent to which business strategy capitalizes on IT). Strategic alignment is then modeled as an interaction or product term involving multiple process-level measures of business and IS strategy. To test the relationship between strategic alignment and payoffs from IT, we analyzed data from 63 firms. The results of this analysis confirm that strategic alignment is related to payoffs from IT at the process-level. From this, we can conclude that firms that use IT to provide greater support for the business strategy will realize greater payoffs from IT. Despite this, our findings also point to the existence of an apparent alignment paradox – strategic alignment may lead to greater payoffs from IT, but this relationship is only valid up to a certain critical level of strategic alignment. Beyond this point, further strategic alignment in fact leads to a decline in IT payoffs.

In the next phase of this research, we plan to explore different variables that might give rise to an alignment paradox. There is also a need to investigate the relationship between strategic alignment and organizational flexibility and to identify if management practices can reduce any of the negative consequences of strategic alignment. We encourage researchers to consider these important issues.

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ENDNOTES

- ¹ Decisions involving IT infrastructure may have long-term implications that restrict or limit a firm's ability to enact future changes in the business strategy. For example, in describing Dell's decision to reject SAP as a solution to Dell's integrated resource planning needs, Kraemer, Dedrick and Yamashiro (2000) cite a leading Dell IT executive as saying, "SAP is like cement, flexible when poured but rigid once it hardens" (p. 14).
- ² Single segment corporations were chosen as a way to control for the differences between business strategy in each segment. For example, in a corporation like GE, business strategies can vary widely across segments.
- ³ Average 1998 revenues for the 63 "complete" companies was \$7.36 billion. Average revenues of incomplete companies (missing at most two surveys) were \$5.49 billion, while non-responding companies (no survey received) had average revenues of \$4.48 billion.

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