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Dynamic Strategic Alignment Competency: A Theoretical Framework and an Operationalization

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Abstract
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Keywords: dynamic capabilities framework, strategic alignment, dynamic capabilities, competitive advantage, strategic IS management, fit

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Abstract

This essay addresses two questions: "How does sustained strategic alignment create value and provide competitive advantage for a firm?" and "How can strategic alignment that is sustained over time be conceptualized and quantified?" We build on the Dynamic Capabilities Framework and suggest that an organization's ability to achieve a high degree of strategic alignment is an enduring competency that allows the organization to respond to the rapidly changing competitive environment. By developing a strategic alignment competency, organizations are able to sustain alignment over time. We couple this theoretical understanding of how alignment provides value with extant research to develop an operationalization of the dynamic strategic alignment competency. Our operationalization considers the degree of alignment as well as the maturity of the business processes that enable IT and business strategies to co-evolve. Our paper contributes to research on strategic alignment in two ways. First, we address the criticism that much work on strategic alignment needs more substantial theoretical backing by providing the Dynamic Capabilities Framework as a theoretical base for alignment research. Second, we move beyond static, single-time-period examinations of alignment to explain a dynamic approach to alignment, one that includes an operationalization of the strategic alignment competency. In sum, we argue that while technology itself may not be a source of competitive advantage, the dynamic capability to sustain alignment between IT strategy and business strategy is a source of competitive advantage.

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Introduction

The alignment of IT strategy with business strategy is a topic of enduring importance. Strategic alignment has remained among the top concerns of executives for over two decades and has led CEOs to take a more active interest in IT [Brancheau et al., 1996; Chan and Reich, 2007; Dickson et al., 1984; Luftman et al., 2005]. In addition, CIOs are increasingly being called upon to help formulate not only IT strategy, but business strategy as well [Tam, 2007]. As CEOs focus more on IT and CIOs move into an expanded strategic role, their need to understand how to align IT strategy with business strategy, and to maintain that alignment over time, remains strong. Alignment is pursued because it has been demonstrated repeatedly that firms' business and financial performance can be improved when organizations are able to align IT strategy with business strategy [Agarwal and Sambamurthy, 2009; Chan and Reich, 2007; Hirschheim and Sabherwal, 2001; Reich and Benbasat, 1996; Reich and Benbasat, 2000]. Given this interest from practitioners, it is unsurprising that strategic alignment has been one of the most-frequently examined topics in IS research [Chan and Reich, 2007]. It seems likely that strategic alignment research will continue to be an important research agenda.

The first research question that this essay addresses is "How does sustained strategic alignment create value and provide competitive advantage for a firm?" In spite of the demonstrated value of strategic alignment, and in spite of the voluminous research on this topic, strategic alignment research has been described as "largely atheoretic" [Chan and Reich, 2007, p. 311]. We endeavor to provide a theoretical explanation for how sustained strategic alignment provides value by viewing extant research through the lens of the Dynamic Capabilities Framework [Teece et al., 1997]. We explain that the ability of an organization to develop a strategic planning process that fosters alignment is an enduring competency that can be a source of competitive advantage. This theoretical

explanation for how dynamic alignment is developed and how it can benefit the organization across time is the primary theoretical contribution of our paper.

The second research question that this essay addresses is "How can strategic alignment that is sustained over time be conceptualized and quantified?" Numerous approaches to quantifying static, cross-sectional alignment exist, but dynamic operationalizations of alignment have yet to be described [Venkatraman, 1989]. Longitudinal explorations of alignment continue to be suggested as a potentially fruitful area of research [Chan and Reich, 2007]. To address this need, we propose an operationalization of alignment that extends Venkatraman's (1989) well-known work. We explain that (1) the degree of alignment and (2) the maturity of alignment, can be combined to create a measure of dynamic alignment. The degree of alignment has traditionally been measured as an end state using factor or variance models, where antecedents and outcomes of alignment can be measured [Brown and Magill, 1994; Chan and Reich, 2007; Chan et al., 2006; Reich and Benbasat, 2000]. We link this end state perspective to the process perspective in order to develop our measure of dynamic strategic alignment [Chan and Reich, 2007]. Process models explain that business and IT strategies must co-evolve as they reciprocally impact one another [Agarwal and Sambamurthy, 2002]. As business and IT strategic planning become integrated with one another, they are allowed to co-evolve and greater maturity of the alignment process is observed [Luftman, 2000; Luftman and Kempaiah, 2007]. Linking the end state and process perspectives on alignment allows us to develop our operationalization of dynamic strategic alignment, the primary methodological contribution of this paper.

The paper proceeds as follows. First, a theoretical framework for our study is provided. Here we review literature on alignment, noting the roots of alignment research in strategic management literature and focusing on how that work has been developed in

IS research. The various types of alignment that have been investigated in extant research are discussed. We observe that much research in strategic alignment is described as atheoretic [Chan and Reich, 2007] and then propose that the Dynamic Capabilities Framework [Teece et al., 1997] can be used as a basis from which to explain that the ability to develop strategic alignment is an enduring organizational capability and a potential source of competitive advantage. Second, we move to a discussion of how to quantify the dynamic strategic alignment competency of a firm. We begin by explaining that a static, cross-sectional measure of the degree of alignment serves as a building block for our operationalization. We then describe that it is not only the degree of strategic alignment, but also the maturity of the process that develops and maintains strategic alignment that provides benefit to the organization. The maturity of alignment is thus the second building block in our operationalization. With these two building blocks in place, we complete our explanation of how to measure a firm's dynamic strategic alignment competency. Third, we discuss how our ideas might be investigated in future research. Our suggestions for future work include multiple methodologies and longitudinal analysis of alignment. Fourth and finally, we summarize and review our contributions in the Conclusion.

Theoretical Framework

Alignment is a broad topic, one that has arisen from the idea that organizations should strive to "match", "align," or "fit" their organizational resources to the competitive context in which the organization is situated [Andrews, 1971; Chandler, 1962; Venkatraman and Camillus, 1984][1]. A general definition of alignment has been offered as "the degree to which the needs, demands, goals, objectives, and/or structure of one component are

[1] The terms "fit", "linkage", "integration", "congruence", and "harmony" have been used as synonyms for alignment. Differences are slight; therefore, we adopt "alignment", the most commonly-used term. For a discussion of these other terms, see Chan and Reich [2007].

consistent with the needs, demands, goals, objectives, and/or structure of another component" [Nadler and Tushman, 1980, p. 40]. This or any other single definition for alignment is difficult to apply in all settings because several specific types of alignment have been developed. These various types of alignment address not only the organization's strategy and competitive context, but also the organization's resources, the IT department's strategy, and how the IT department's resources have been developed. Here, we briefly summarize five types of alignment that have been described by researchers. We present this discussion of the various types of alignment as a prelude to narrowing our focus to one specific type of alignment: strategic alignment, which is defined as the alignment between IT strategy and business strategy.

Five Types of Alignment

Among the first descriptions of alignment in literature is the idea of aligning business resources with business strategy. This type of alignment has been referred to as *business alignment* [Sabherwal et al., 2001] and was built upon the idea that a business's structure and resources should evolve to support the strategic mission of the business [Andrews, 1971; Chandler, 1962]. Chandler argued that businesses should have a long-term coordinated strategy rather than allowing the individual functions within the firm to operate independently. He defined strategy as the creation of long-term goals, the selection of courses of action that would enable the achievement of the goals, and the subsequent allocation and deployment of resources to achieve the goals. He succinctly summarized his arguments as "structure follows strategy." Similarly, Andrews's (1971) concept of strategy is described in terms of the strength or weakness of the resource position of the firm [Wernerfelt, 1984]. When business alignment occurs, the business is well-positioned to execute its strategy and performance benefits will accrue [Andrews, 1971; Chandler, 1962]. Researchers have examined this type of

alignment both in strategic management research as well as in IS research [Das et al., 1991; Miles and Snow, 1978; Sabherwal et al., 2001; Shortell and Zajac, 1990; Thomas and Ramaswamy, 1996].

As IS research began to become more widely accepted within the business disciplines, the logic of business alignment was applied within the IT department to describe a second type of alignment. If alignment between business resources and business strategy yielded performance benefits, researchers conjectured that alignment between IT resources and IT strategy should also yield benefits. This type of alignment is referred to as *IT alignment* [Sabherwal et al., 2001]. Again, the logic behind this type of alignment is that when IT strategy is formulated and then IT resource deployment is guided by that IT strategy, the organization is well-positioned to execute its IT strategy. The successful execution of an appropriate IT strategy enables the organization to achieve its goals. Empirical research on IT alignment has also identified performance gains [Brown and Eisenhardt, 1997; Camillus and Lederer, 1985; Keen, 1991].

The third type of alignment that has been studied is known as environmental alignment or *contextual alignment* [Miller, 1992]. Businesses should strive to align their strategy with the competitive context in which they exist [Drazin and Van de Ven, 1985]. The competitive context includes the industry context, the macroeconomic context, and other national and cultural factors [Baets, 1992; Chan and Reich, 2007; Scott Morton, 1991]. This type of alignment has its roots in the Industrial Organization paradigm that explains that businesses develop strategy in response to the structure of the industry in which they compete [Bain, 1968; Mason, 1939; Porter, 1979; Porter, 1981]. Researchers have explored contextual alignment for decades and continue to discuss its impact on organizational performance [Pavlou and El Sawy, 2007; Venkatraman and Prescott,

1990]. When strategy is appropriate for the given context; that is, when the strategy is aligned with the context, performance gains can be achieved.

Structural alignment, a fourth type of alignment, describes the congruence between business resources and IT resources [Sabherwal et al., 2001]. As with the other types of alignment, structural alignment has been investigated both in strategic management as well as in IS, and performance benefits have been observed [Brown and Eisenhardt, 1997; Ein-Dor and Segev, 1982; Henderson and Venkatraman, 1993; Jelinek and Schoonhoven, 1990].

A fifth type of alignment, known as *strategic alignment*, examines the link between IT strategy and business strategy [Sabherwal et al., 2001]. Strategic alignment is then described as "…the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives, and plans" [Reich and Benbasat, 2000, p. 82]. Others provide similar descriptions for strategic alignment, including "applying IT in an appropriate and timely way and in harmony with business strategies" [Luftman and Brier, 1999, p. 109], and as "using IT in a way consistent with the firm's overall strategy." [Palmer and Markus, 2000, p. 242]. Much of the work on alignment in IS has examined this type of alignment, and research on strategic alignment remains a major focus of IS researchers [Agarwal and Sambamurthy, 2009; Boynton and Zmud, 1987; Hirschheim and Sabherwal, 2001; Oh and Pinsonneault, 2007; Pyburn, 1983; Reich and Benbasat, 1996; Reich and Benbasat, 2000].

Figure 1 shows that business alignment, IT alignment, strategic alignment, and structural alignment are all developed within the boundary of the firm. The remaining type of alignment, contextual alignment, necessitates interaction with forces outside the

boundary of the firm[2]. The degree of each of these five types of alignment, as well as the business strategy, the business resources, the IT strategy and the IT resources, then impact the organization's performance. This model represents a synthesis of several similar widely-applied and tested models in alignment research [Baets, 1992; Henderson and Venkatraman, 1993; MacDonald, 1991; Sabherwal et al., 2001]. Strategic alignment between IT strategy and business strategy is the primary focus of IS researchers; thus, it is the focus of the remainder of this paper.

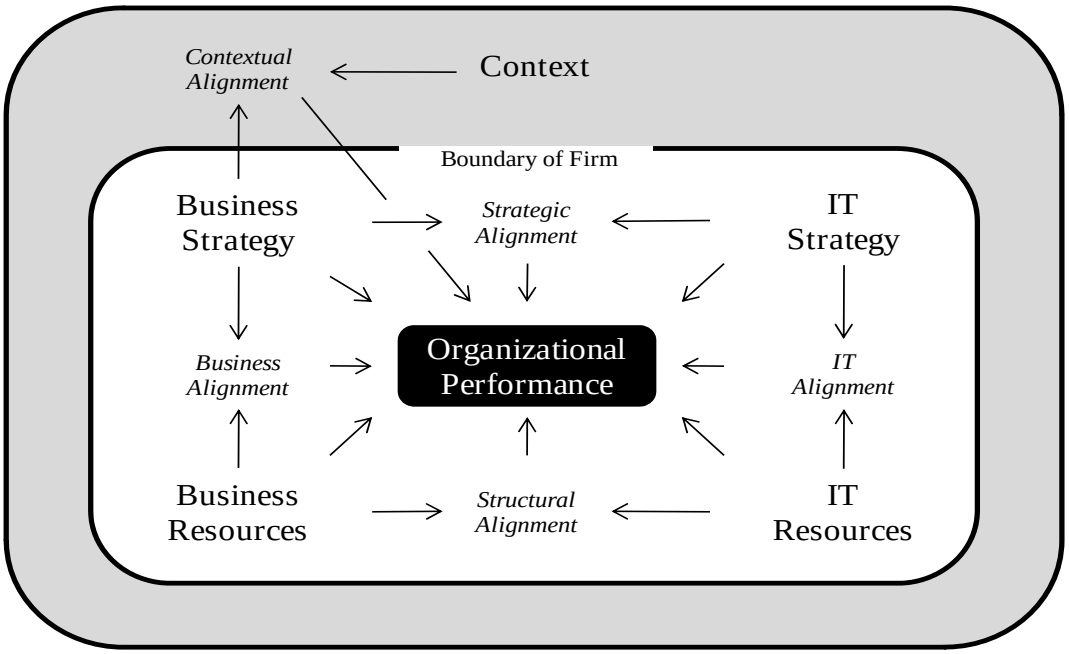

Figure 1. Alignment Model

[2] While it is also possible to consider how business resources, IT resources, and IT strategy could each be aligned with the context, we assume that the business itself creates strategy to determine how each of its subcomponents will respond to the environment and how resources will be deployed to respond to the environment. Thus, we do not consider alignment between business resources and context, IT resources and context, or IT strategy and context. We assume these types of alignment to be subsumed within contextual alignment.

The Dynamic Capabilities Framework

The Dynamic Capabilities Framework was developed partially in response to a limitation of the Resource-Based View (RBV) of the firm, namely that the RBV is a static theory of the firm [Teece et al., 1997; Wade and Hulland, 2004]. The RBV explains that competing firms possess heterogeneous sets of resources and capabilities [Wernerfelt, 1984; Wernerfelt, 1995]. Resources and capabilities that are valuable, rare, difficult to imitate, and difficult to substitute are a potential source of competitive advantage [Barney, 1991]. The RBV defines resources quite broadly, including such items as physical capital (property, plant, and equipment; access to resources), human capital (experience, judgment, relationships of individual managers and workers), and organizational capital (organizational structure, planning processes, controlling and coordinating systems) [Barney, 1991]. Capabilities are defined as competencies that are built by combining resources [Grant, 1991]. Within IS research, it has been explained that a firm's resources and capabilities include the ability "to conceive, implement, and exploit valuable IT applications" and thus, IT may be a source of competitive advantage [Mata et al., 1995, p. 491].

In alignment research, the RBV has been applied to explain that shared domain knowledge between business and IT managers helps produce strategic alignment, improve the quality of project planning, reduce problems with IT projects, and improve organizational performance [Kearns and Sabherwal, 2006-7]. The RBV has also been used to explain how the strategy of a firm influences its productive interactions with other firms [Madhok, 2002]. Finally, without explicitly appealing to the RBV, but clearly using similar reasoning, researchers have explained that the capabilities of an organization allow it to use information resources to build competitive advantage [Johnston and Carrico, 1988].

Again, however, the RBV is a static theory of the firm and while it is well-suited to studies of stable environments, it is limited in its applicability to dynamic environments [Wade and Hulland, 2004]. To address this limitation, the Dynamic Capabilities Framework has been proposed as an extension to the traditional, static interpretation of the RBV.

The Dynamic Capabilities Framework builds on the view that an organization can be described as a set of interrelated operational and administrative routines that evolve based on performance feedback [Zollo and Winter, 2002]. Dynamic capabilities are defined as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" [Teece et al., 1997, p. 516]. The term "dynamic" indicates that organizations must continually monitor and renew functional competencies in response to the rapidly changing competitive context; and the term "capabilities" highlights the importance of management in developing and maintaining those functional competencies.

The Dynamic Capabilities Framework explains that internal technological, organizational, and managerial processes enable firms to generate economic rents in settings of rapid change [Teece et al., 1997]. This framework emphasizes the importance of managerial capabilities rather than firm resources (as in the RBV). While resources can be acquired relatively quickly, capabilities must be built deliberately over time. Managerial capabilities are thus seen as being valuable, rare, inimitable, and nonsubstitutable, because firms lack the organizational capacity to quickly develop new competencies [Dierickx and Cool, 1989]. Dynamic capabilities enable a firm to adjust its strategy and resources to maintain and sustain competitive advantage [Wade and Hulland, 2004]. Without such enduring, dynamic capabilities, competitive advantage could erode quickly. Thus, proven organizational capabilities, potentially including the capability of aligning IT

strategy with business strategy, are valuable because competitive advantage can be built from them.

With regard to alignment, it has been stated that "to the extent that alignments result from skill rather than luck, it is reasonable to regard alignment skill as a strategic resource[3] capable of generating economic rents" [Powell, 1992, p. 119]. Indeed, it has been demonstrated that the ability to achieve strategic alignment is built upon a specific set of IT management competencies [Gupta et al., 1997]. There is no reason or evidence to suggest that these competencies are static and temporary. Instead, it is at least equally if not more plausible that they are dynamic and enduring. If organizations are skilled at aligning IT strategy with organizational strategy, there is no reason to believe that this skill should quickly erode. Instead, this valuable skill should continue to be a part of the organization's operational capabilities. If the organization has developed this competency, it is more likely that it will be able to achieve a high level of alignment in future time periods than other organizations that have not developed this skill. In fact, it has been shown that the ability to achieve a high level of strategic alignment can be strengthened if alignment is sustained over time [Street, 2006].

The Dynamic Capabilities Framework may be particularly relevant to studies of strategic alignment. The fast pace of change in modern business has been noted in IS research, and this reality has been explained as one that must be accounted for in discussions of strategic alignment [Agarwal and Sambamurthy, 2002]. We therefore suggest that strategic alignment, particularly strategic alignment that can be sustained over time, can be understood as a dynamic organizational capability upon which competitive advantage

[3] Dynamic Capabilities theorists prefer the term "capability" to the term "resource" that is used in this quote from Powell's (1992) study, but the implications are the same regardless of the terminology.

can be built. In the next section, we explain how the Dynamic Capabilities Framework can be used to undergird research on strategic alignment that is sustained over time.

Dynamic Strategic Alignment

The vast majority of research on strategic alignment has taken a static or cross-sectional approach, with relatively few studies examining dynamic or longitudinal alignment [Chan and Reich, 2007; Henderson and Venkatraman, 1992; Sabherwal et al., 2001]. In spite of the dearth of research on dynamic alignment, several researchers have noted the potential usefulness of assessing how alignment is sustained over time [Agarwal and Sambamurthy, 2002; Chan and Reich, 2007; Miller, 1992; Sabherwal et al., 2001]. Venkatraman, in his seminal article on the concept of alignment, noted that it is unclear whether the perspectives used to explore static alignment would be applicable for dynamic alignment [Venkatraman, 1989]. He further noted that appropriate ways to specify and test dynamic alignment were needed.

To develop our dynamic operationalization of strategic alignment, we first explain the end-state perspective on alignment, a perspective that makes use of variance models to identify the factors that promote (or inhibit) alignment. This perspective is a valuable one because it allows researchers to measure the degree of strategic alignment at a firm at a given point in time [Venkatraman, 1989]. Second, we explain a differing perspective on alignment, the process perspective, which explains that IT strategy development and business strategy development must be integrated so that these two strategies can reciprocally impact one another [Agarwal and Sambamurthy, 2002]. A particular strength of the process perspective is that enables researchers to assess the maturity of the process by which the IT strategy and the business strategy are aligned [Luftman,

2000; Luftman and Kempaiah, 2007]. These two perspectives are then synthesized to develop our operationalization of dynamic strategic alignment.

The End-State Perspective on Strategic Alignment

As we have previously noted, one perspective that has been adopted by researchers is to examine strategic alignment as an end state. Within this perspective, variance or factor models have been developed to explain that this end state can be achieved by manipulating a number of antecedents. The outcomes can then be observed and quantified [Brown and Magill, 1994; Chan and Reich, 2007; Reich and Benbasat, 1996; Reich and Benbasat, 2000]. These studies generally adopt a contingency theory perspective, explaining that the degree of alignment is contingent on the factors that are identified. Studies that adopt the factor perspective on strategic alignment enable researchers to measure the degree of alignment between a firm's business strategy and IT strategy.

Within the end state perspective, there are six different characterizations of alignment: moderation, mediation, matching, gestalts, profile deviation, and covariation [Venkatraman, 1989]. Venkatraman's framework classifies these characterizations based on the number of variables in the equation, the degree of specificity of the functional form of alignment, and the presence or absence of a criterion variable [Bergeron et al., 2001; Venkatraman, 1989]. Here, we focus on the characterization of alignment as profile deviation, a common approach to the issue of strategic alignment in IS research [Hirschheim and Sabherwal, 2001; Tallon, 2007] as well as management research [Drazin and Van de Ven, 1985; Miller, 1992][4].

[4] We believe that our operationalization of dynamic alignment can be adapted to work with each of the six perspectives on alignment. In the interest of space, we choose to focus here on only one of the six possible characterizations of alignment.

In the profile deviation characterization of fit, an ideal strategy profile is assumed to exist for a particular type of organization. Adherence to the profile results in higher performance; deviations from that profile result in lower performance. Adherence to the profile is measured and the degree of alignment is calculated. This alignment score can then be compared to the organization's performance. The degree of adherence to the ideal profile is measured by calculating the weighted Euclidian distance from the ideal profile [Bergeron et al., 2001; Venkatraman, 1989]. To compute such a measure, the researcher develops an ideal strategic profile, adds weights to identify the relative importance of each dimension of strategy[5], and uses a baseline model to assess the power of the test [Venkatraman, 1989]. We calculate the degree of alignment using equation (1),

$$Alignment_{jt} = 1 + \sqrt{\sum_{i=1}^{n} \left\{ b_i \left(X_{ijt} - I_{ijt} \right)^2 \right\}} \quad (1)$$

where b_i represents the weight of strategy dimension *i*, X_{ijt} represents the score for the score for strategy dimension *i* for firm *j* at time *t*, and I_{ijt} represents the ideal score for strategy dimension *i* for firm *j* at time *t*. Firms with a relatively low score on this measure are better-aligned than are firms with relatively high scores[6]. This equation enables a researcher to quantify the degree of strategic alignment that an organization has achieved and to evaluate it as high or low relative to other organizations.

[5] Some researchers include differential weights for each dimension of strategy [Tallon, 2007; Venkatraman and Prescott, 1990]. Because this is the most general approach, it is the one we have taken here. Other researchers assume equal importance for each dimension [Drazin and Van de Ven, 1985; Hirschheim and Sabherwal, 2001; Miller, 1992]. Either approach may be justifiably taken, depending upon the focus of the study and the strategy dimensions chosen.

[6] An organization that perfectly matches the ideal alignment profile would have a score of 1 on this measure. Because Equation (1) will be used later in this paper as part of a larger multiplicative model, a constant is added to avoid the possibility of an organization achieving a score of 0 on this measure. Adding a constant is a linear transformation and does not change the functional form of the model.

This equation is well-known (e.g. Venkatraman and Prescott 1990), and one element must be added to it to begin the move towards a dynamic measure of alignment. It seems likely that the more recently a firm has achieved a high degree of alignment, the more likely that firm is to continue to achieve alignment. Similarly, the more frequently a firm can achieve a high degree of alignment, the more likely that firm is to continue to achieve alignment. Furthermore, if an organization has significant resources committed to achieving a high degree of alignment, the more likely the firm is to continue to achieve alignment. Restated, inertia may exist for the degree of alignment. Previous performance on this metric can be used as a weight to quantify the likelihood that a high degree of alignment can be sustained.

One approach to measuring this historical degree of alignment would be to adapt what is known as the Recency, Frequency, and Monetary Value (RFM) approach to customer segmentation in marketing research. As the name indicates, RFM segments customers by (1) recency, the time since the customer made his or her most recent purchase, (2) frequency, the number of purchases the customer made within a designated time period, and (3) the monetary value of the average purchase amount [e.g. [Bauer, 1988; Bitran and Mondschein, 1996; Cullinan, 1977; Fader et al., 2005]]. Customers who have purchased recently, frequently, and who have purchased a large monetary value are considered to be the most likely to purchase again.

In strategic alignment, such an approach would quantify (1) the recency, R_{jt}, with which a certain degree of alignment has been achieved by firm *j* at time *t*, (2) the frequency, F_{jt},, with which a certain degree of alignment has been achieved by firm *j* at time *t*, and (3)

the monetary value of the resources devoted to IT by firm *j* at time *t*, MV_{jt}[7]. This weight is shown in equation (2).

$$RFM\ Weight_{jt} = \left\{ \frac{(R_{jt} + 1)}{(F_{jt} + 1) \times (MV_{jt} + 1)} \right\} \quad (2)$$

Such a weight would enable the historical degree of alignment to be used as a weight in an expanded version of equation (1). The logic behind using such a weight is to incorporate not only the present state of alignment, but also the track record of the firm with regard to alignment. A firm that is aligned, that has recently been aligned, that has frequently been aligned, and that has significant financial resources devoted to maintaining alignment should not be rated equally with an organization that has only recently achieved alignment and has no comparable track record. It is thus necessary to add a weight such as has been shown in equation (2). By adding equation (2) to equation (1), the alignment of the firm as well as the historical record of the firm's alignment can both be considered. Appending this weight to equation (1) yields equation (3)[8].

[7] Variables could be measured in the following manner. R_{jt} could be measured in years. For instance, if a firm achieved an alignment score of 2 or less in the previous year, R_{jt} would be 1, meaning that the firm was last in a state of "alignment" 1 year ago (the choice of "2" as indicating "alignment" is relative – other levels of alignment greater or less than 2 could be chosen as the criterion for "alignment." This choice of 2 is for illustrative purposes only.). F_{jt} could also be measured in years. If a 5-year window of time is being examined, and if the firm has been in a state of alignment (again defined as "having achieved an alignment score of 2 or less") in 5 out of the last 5 years, F_{jt} is equal to 5. Finally, MV_{jt} could be measured as the percentage of the overall operating budget that is devoted to IT, similar to [Kobelsky, Richardson, Smith, and Zmud 2008]. For instance, a firm where only 8% of the overall operating budget is devoted to IT would have an *MV* measure of 0.08. Note that constants are added to the variables R_{jt}, F_{jt}, and MV_{jt} to avoid multiplying or dividing by 0. As we have previously noted, adding a constant is a linear transformation and does not change the functional form of the model.

[8] A numerical example where this formula is employed will be provided in the next section of the paper to demonstrate the use and feasibility of this measure.

$$Weighted\ Alignment_{jt} = \left\{1 + \sqrt{\sum_{i=1}^{n} \left\{b_i\left(X_{ijt} - I_{ijt}\right)^2\right\}}\right\} \times \left\{\frac{(R_{jt}+1)}{(F_{jt}+1) \times (MV_{jt}+1)}\right\} \quad (3)$$

One approach to measuring dynamic alignment would be to use equation (3) to perform measurements such as this one periodically, and compare the values achieved at different points in time to assess the progress towards (or regress from) strategic alignment over time. As the business and the IT department change over time, the degree of strategic alignment will vary over time as well.

A more sophisticated approach however, and the one that we propose, is to measure not only the degree of alignment, but also the depth or maturity of the process of aligning IT strategy with business strategy. We therefore now turn to a discussion of the process perspective on strategic alignment to describe how the maturity of alignment can also be assessed.

The Process Perspective on Strategic Alignment

In addition to the factor perspective on strategic alignment, an alternate perspective is to view strategic alignment as a process rather than as an end state [Baets, 1992; Chan and Reich, 2007; Henderson and Venkatraman, 1993; Powell, 1992; Thompson, 1967]. The argument behind this perspective is that strategic alignment cannot be definitively achieved when the business environment is continually changing, thus giving rise to new information needs within the firm and necessitating changes in organizational strategy [Galliers, 2004]. Instead of assessing the degree of alignment, the process perspective encourages researchers and practitioners to assess the interactions of the IT department with the business as a whole to see how interactions and linkages between the two facilitate the co-evolution of IT strategy and business strategy [Agarwal and Sambamurthy, 2002].

The idea of strategic alignment being sustained over time was first explored when the Capability Maturity Model was extended into IS research to develop the "Strategic Alignment Maturity Model" (SAMM) [Luftman, 2000]. This process model explains that as organizations pursue the goal of strategic alignment, alignment moves from being (1) an initial or ad-hoc process, to (2) a committed process, to (3) an established focused process, to (4) an improved or managed process, and finally, to (5) an optimized process. When the strategic alignment process can be characterized as initial or ad-hoc, interaction between the IT and business strategists of the organization is minimal and it is unlikely that strategic alignment will result. In a committed process, the business has recognized the need to contemporaneously define IT and business strategies and has agreed to do so moving forward, but this process is in the early stages and alignment is still unlikely. An established, focused process is in place when IT is becoming an established part of business strategic planning; alignment is a goal, but is likely not yet a reality. In an improved or managed strategic alignment process, IT is recognized as a value center, IT assets are used to develop and sustain competitive advantage, and IT capabilities may enable a business to take a new strategic direction. Finally, in an optimized process, IT is integral to the business's strategic plans and IT strategic planning is fully integrated with business strategic planning. The greatest benefit to an organization is found when strategic alignment is an optimized process [Luftman, 2000]. Thus, the SAMM model explores the "maturity" of strategic alignment and focuses not on the goal of *alignment*, but on the goal of *developing a process that will enable ongoing alignment*. In this way, the maturity of strategic alignment can be understood as a dynamic capability that enables alignment to be sustained across time and provides competitive advantage.

Two additional studies have explored the idea of dynamic alignment. The "punctuated equilibrium" process model explains that strategic alignment may experience relatively long periods of minor, evolutionary change, and relatively short periods of sweeping, revolutionary change [Sabherwal et al., 2001]. This study argues that punctuated equilibrium is a valuable perspective from which to view the dynamics of alignment. While the study does not seek to elucidate the causes of evolutionary or revolutionary change, nor does it seek to identify factors that may influence, enable, or promote alignment, its value lies in the explanation of the uneven ways in which alignment evolves.

The remaining study that discusses alignment over time recognizes that both contextual factors and technological capabilities are dynamic. Given this reality, frequent adjustments to both organizational strategy and IT strategy are required for an organization to compete successfully in the marketplace. The authors argue that "alignment" may be too static of a concept for today's rapidly-changing business context. Instead, a better goal is the "co-evolution" of IT strategy and business strategy [Agarwal and Sambamurthy, 2002]. Co-evolution is defined as the reciprocal and iterative development of the capabilities of the IT function and the capabilities of the business. This perspective dovetails with the concept of alignment maturity where IT and business strategic planning are coupled so that they can mutually inform one another. It further dovetails with the idea of alignment as an enduring dynamic capability that allows the organization to respond to environmental changes to sustain competitive advantage. Suggestions for enabling co-evolution include giving the CIO visibility among the senior executives, evaluating the performance of senior executives in part by noting their innovative use of IT, allowing IT to provide innovative ideas that will shape the business, embedding IT in multiple departments and business processes, using IT to provide

strategic flexibility to the business, and allowing IT executives to collaborate with business unit and regional managers to develop new capabilities. These suggestions are similar to those made elsewhere that explain that shared domain knowledge and strategic business plans contribute to sustained strategic alignment [Chan et al., 2006; Reich and Benbasat, 2000].

We propose that the maturity of alignment be measured in a manner similar to the way it is measured in the work on the SAMM model. An instrument, perhaps based on the SAMM model research [Luftman, 2000], could be developed that would enable alignment maturity to be assessed. The most straightforward assessment would be similar to the one in the SAMM model, where the maturity or the alignment process of firm *j* at time *t*, is measured on an ordinal scale from 1 to 5. This measure of maturity shown in equation (4) is the second of the building blocks for our operationalization of dynamic alignment.

$$Alignment\ Maturity_{jt} = \frac{1}{M_{jt}} \tag{4}$$

The measure of alignment maturity works in the following manner. If, for instance, M_{jt} indicates that firm *j* has an "optimized process", and thus is at the highest possible level of maturity, 5, the alignment maturity measure in equation (4) will equal 1/5. In contrast, if M_{jt} indicates that firm *j* has an ad-hoc or initial process, firm *j* is at the lowest possible level of maturity, 1, and the alignment maturity level calculated in equation (4) will be 1/1 = 1. Thus, a high value for M_{jt} yields a lower value on this measure. A lower score on this alignment maturity measure is more desirable.

In sum, the process perspective on strategic alignment considers how the interactions and linkages between IT and the business create an environment where strategic

alignment can be developed and sustained. We note here that the end-state perspective on strategic alignment and the factor perspective on strategic alignment are not mutually exclusive. In fact, researchers have observed that there is particular benefit to be gained from linking these two perspectives [Chan and Reich, 2007]. It is to this topic that we now turn.

Linking the End-State and Process Perspectives on Strategic Alignment

We suggest that alignment should be understood as both an end state as well as a process. Alignment is not simply a question of degree, as the end state perspective often assumes. Assessing the degree of alignment does not indicate how alignment can be sustained over time within a firm. For instance, it may be the case that IT strategy and business strategy at organization *A* have been aligned, but with IT in a "lagging" role where it must conform itself to the business strategy after the business strategy has been defined, a situation that mitigates against sustained alignment and the co-evolution of strategy [Agarwal and Sambamurthy, 2002]. Or, it could be that organization *A* has achieved a high degree of alignment, but has done so serendipitously, not in a way that can be duplicated in future time periods to ensure that alignment endures. In such an instance, Organization *A* should be contrasted with Organization *B*, one that has achieved a high degree of alignment through a mature strategic planning process that enables the co-evolution of IT and business strategies. A single measure of the degree of alignment is thus limited by not assessing the process by which alignment is achieved.

Similarly, if Organization *C* has a mature process for achieving alignment, Organization *C* would be expected to show a high degree of alignment. Nevertheless, alignment cannot be conclusively described as "high" without being measured as so. It remains a possibility that Organization *C,* with its mature alignment process, may have a

breakdown in a crucial subprocess that ultimately prevents alignment. Thus, a process measurement of alignment maturity that does not consider the degree of alignment is limited as well.

In sum, there is benefit to be gained from examining both the degree of alignment as well as the maturity of the process of strategic alignment. For these reasons, we suggest that both the degree of alignment as well as the maturity of the alignment process should be measured together. By assessing both, it can be understood how highly aligned the IT and business strategies are and whether that alignment is likely to endure over time. When alignment is likely to endure over time, it becomes a dynamic capability and a potential source of competitive advantage. While IT itself may be a commodity and not meet the criteria of being valuable, rare, inimitable, and nonsubsitutable [Carr, 2003], the ability to align IT strategy with the business strategy to enable the organization to fulfill its strategic mission may indeed meet these criteria. An alignment competency, or a dynamic capability for strategic alignment, can indeed be valuable, rare, inimitable, and nonsubstitutable, and thus can be a source of competitive advantage.

Restated, firms can have a high degree of alignment without having a highly mature alignment process. Also, a mature alignment process can exist without guaranteeing a high degree of alignment. The goal for a firm to develop a high degree of alignment that is facilitated by a mature alignment process. This type of alignment is a dynamic, enduring capability built upon established business processes. It is a capability that enables the organization to continually address the changing context in which it competes. An organization with this competency is well-positioned to develop and sustain competitive advantage.

Operationalizing Dynamic Strategic Alignment

We are now in a position to combine the two building blocks for our operationalization of dynamic strategic alignment. Where the factor model provided the background for the first building block of our operationalization of dynamic alignment, the process model provides the background for our second. Our dynamic measurement of alignment, shown in equation (5), places a profile deviation measurement, weighted by the historical degree of alignment, alongside a maturity measurement. This operationalization represents a comprehensive quantification of a firm's dynamic strategic alignment competency.

$$\underset{Competency_{jt}}{Dymamic\ Alignment} = \left\{1 + \sqrt{\sum_{i=1}^{n}\left\{b_i\left(X_{ijt} - I_{ijt}\right)^2\right\}}\right\} \times \left\{\frac{(R_{jt}+1)}{(F_{jt}+1)\times(MV_{jt}+1)}\right\} \times \left\{\frac{1}{M_{jt}}\right\} \quad (5)$$

Table 1 presents a numerical example of how our operationalization might be applied. In this scheme, a lower score means that the organization has a greater alignment competency. The higher the degree of alignment, the more mature the process for developing alignment, the more recently the firm has been aligned, the more frequently the firm has been aligned, the more resources the organization has available to sustain alignment, the lower (i.e. the "better") the alignment competency score will be.

Table 1. Numerical Example of Dynamic Strategic Alignment Competency Calculation

Our proposed measure of an organization's dynamic strategic alignment competency would work in the following manner. Assuming that data for 5 years are available, analysis reveals that hypothetical organization *O* has an alignment value of 1.1949 at time *t* (as shown below). *O* has an RFM weight of 0.3086 and a measured maturity rating of 4 at time *t* as shown below. Multiplying these scores together as shown in equation (4) yields a Dynamic Strategic Alignment Competency score for *O* at time *t* of 0.0922. In this scheme, lower alignment competency scores indicate that an organization has a strong alignment competency. Higher alignment competency scores indicate the opposite.

Degree of Alignment

Strategy Dimension	Ideal Score	Measured Score	Difference	Squared Difference	Weight	Alignment Score
D_1	0	-0.2	0.2	0.04	0.2	0.008
D_2	1	0.9	0.1	0.01	0.2	0.002
D_3	-1	-0.7	0.3	0.09	0.2	0.018
D_4	0	0.1	0.1	0.01	0.2	0.002
D_5	1	0.8	0.2	0.04	0.2	0.008
				0.19		0.038
					Alignment [from equation (1)]:	1.1949

RFM Weight

Recency (R_{jt})	1	(i.e. the firm was "aligned", perhaps defined as "having an alignment score on equation (1) of 2 or less", last year)
Frequency (F_{jt})	5	(i.e. the firm has been "aligned", again defined as "having an alignment score on equation (1) of 2 or less", 5 out of the last 5 years)
Monetary Value (MV_{jt})	8%	(i.e. 8% of the firm's operating budget is devoted to IT)
		RFM Weight [from equation (2)]: 0.3086

Alignment Maturity

Maturity (M_{jt})	4	(i.e. the firm has an "improved, managed process")
		Alignment Maturity [from equation (4)]: 0.25

Dynamic Strategic Alignment Competency [from equation (5)]: 0.0922

Future Research

In this paper, we have proposed that strategic alignment is a dynamic competency that can be developed by an organization as a source of competitive advantage. To test this

proposition, we suggest the following research agenda. Initially, an instrument should be developed to assess the maturity of the alignment process, M_{jt}. This instrument should build upon the work done with the SAMM model and other related research that examines long-term alignment [Chan et al., 2006; Reich and Benbasat, 2000] and the co-evolution of strategy [Agarwal and Sambamurthy, 2002] to develop constructs and individual items for the instrument. Theories of agility [Sambamurthy et al., 2003], evolutionary complexity [Lycett and Paul, 1999; Teo and King, 1997], and ecology theory [Scheiner and Willig, 2008] could further inform the development of this survey and the conceptualization of the alignment construct.

Next, this survey instrument should be used to assess the degree of alignment and the maturity of alignment. These assessments will ideally be taken over a number of years to assess how strategic alignment is sustained over time. Then, testing can be done to see whether firms with a demonstrated alignment competency (i.e. a high score on our alignment competency measure) demonstrate superior performance. This will provide an initial empirical test of our operationalization of dynamic alignment. This phase could explore alignment as profile deviation (as has been explained in this paper), or other conceptualizations of alignment could be considered, including mediation, moderation, matching, gestalts, and covariation.

Additionally, archival data could be used to perform a similar test of our operationalization. One approach would be to utilize the descriptions of Defenders, Analyzers, and Prospectors [Miles and Snow, 1978] to develop ideal strategic profiles for organizations. Each of the organizations in the study would be classified as one of these

three types[9]. It would also be feasible to use the descriptions of IS for Efficiency, IS for Flexibility, and IS for Comprehensiveness [Hirschheim and Sabherwal, 2001] to develop a profile of each IT strategy[10]. Based on the concept of strategy as profile deviation [Drazin and Van de Ven, 1985; Venkatraman, 1989] and the concept of alignment maturity, the alignment competency of a group of firms could be assessed. In addition to testing the usefulness of our operationalization, a secondary contribution of this proposed study is that it will demonstrate the use of archival data as a basis for measuring strategic alignment. While a number of studies have been conducted using survey data to calculate strategic alignment [Chan et al., 1997; Hirschheim and Sabherwal, 2001; Kearns and Sabherwal, 2006-7; Palmer and Markus, 2000], the use of archival data to study this topic in IS has not, to our knowledge, been undertaken. One particular advantage of this approach is the ability to examine historical data and assess how alignment is sustained over time. The development of organizational strategy profiles and IT strategy profiles using archival data is closely related to this second contribution.

Finally, the logic of dynamic strategic alignment competency could be extended to multi-firm organizations. Most current explorations of strategy look at the firm level. Cross-organization alliances and communities of organizations are a growing reality in modern business [Applegate, 2006]. Fruitful research remains to be done examining both vertical alliances (supply chains) as well as horizontal alliances within an industry.

[9] Organizations not fitting one of these three types could be considered to be of Miles and Snow's fourth type of organization, a Reactor. Consistent with earlier literature, we consider Reactors as not having a distinct strategy or as being in transition between strategies. Therefore, Reactors would not be included in analysis [Hambrick, 1983; Shortell and Zajac, 1990; Thomas and Ramaswamy, 1996].

[10] Organizations not fitting one of these three types could be excluded based on the rationale for excluding Reactors [Hirschheim and Sabherwal, 2001].

Conclusion

In this essay, we have addressed two primary questions. The first is, "How does sustained strategic alignment create value and provide competitive advantage for a firm?" We have explained that strategic alignment is sustained by the development of a dynamic competency for alignment. While technology itself may not be a source of competitive advantage because of its ubiquity, the dynamic competency of an organization to align IT strategy with business strategy is a capability that must be developed over time. We have argued that this capability is valuable, rare, inimitable, and nonsubstitutable, and thus a source of competitive advantage. By providing this explanation, we have provided theoretical underpinnings for this and future strategic alignment research. This is the primary theoretical contribution of this paper.

The second question that this essay has addressed is "How can strategic alignment that is sustained over time be conceptualized and quantified?" We have provided an operationalization of the strategic alignment competency that is composed of (1) the degree of alignment and (2) the maturity of alignment. Thus, we have suggested a single measure of alignment that quantifies an organization's current state of alignment, that organization's history of alignment, and the ability of that organization's strategic planning processes to produce or maintain alignment. This operationalization of alignment is the primary methodological contribution of our paper.

We believe that our work is new and provides fertile ground for research into sustained strategic alignment, which will yield actionable insights for practitioners. We look forward to opportunities to empirically test and practically apply our ideas.

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