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STRATEGIC IT ALIGNMENT: AN EVALUATION AND PROCESS-LEVEL RECONCEPTUALIZATION OF THE CONSTRUCT

Abstract

Strategic IT alignment is an important construct that has been the subject of considerable scholarly attention. However, a close examination of how the construct has been defined and operationalized in the literature reveals a number of limitations and inconsistencies. In particular, the construct has been defined too broadly and used loosely to account for diverse phenomena. This situation is problematic because it undermines the relevance of IT alignment research for IS scholars and practitioners. This paper reviews enduring challenges to strategic alignment research and proposes a process-level conceptualization for the construct. In particular, the proposed re-conceptualization meets two critical criteria for a good construct conceptualization. First, it offers a definition that is faithful to the essence of the construct domain. Second, it is framed in a manner that enables rigorous operational measurement. This paper contributes to the literature by providing a platform for future theoretical development and empirical research to address the practical IT alignment challenge facing contemporary businesses.

Keywords: *IT alignment, construct definition, construct measurement*

INTRODUCTION

One of the most widely shared and enduring assumptions in IT research and practice is that appropriate alignment of IT investments with the business is a key predictor of IT investment profitability, overall IT effectiveness and improved corporate performance (Henderson & Venkatraman, 1993; Sabherwal & Chan, 2001). The practical and conceptual importance of IT alignment[1] has ensured that it is repeatedly ranked amongst the most important issues facing business executives since the mid 1980s (Benbya & McKelvey, 2006; Preston & Karahanna, 2009). Consistent with this, it has also been the focus of considerable research (Baker, Jones, Cao, & Song, 2011).

However, a key limitation of alignment research is that the construct has not been satisfactorily defined. For example, Luftman (2000, p. 3) defines strategic IT alignment as "applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs". The inclusion of inexact terms in the definition, such as 'appropriate and timely way' and 'in harmony with', makes it difficult to employ such construct definitions in ongoing empirical inquiry.

A key implication of the above limitation is that researchers have found the construct to be hard to operationalize and hard to measure (Chan & Reich, 2007). Another concern is that our review and analysis of the IT alignment literature indicates that the concept has acquired the characteristics of an *umbrella concept*, defined by Hirsch and Levin as "a broad concept or idea used loosely to encompass and account for a set of diverse phenomena" (Hirsch & Levin, 1999, p. 200). For example, Reich and Benbasat defined IT alignment as "the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives, and plans" (Reich & Benbasat, 1996, p. 56). Baker and his colleagues then draw upon this definition to conceptualize and operationalize *dynamic*

[1] For ease of expression we also refer to strategic IT alignment as *alignment* or *IT alignment*.

strategic alignment (Baker et al., 2011). The concept of dynamic strategic alignment refers to alignment as an ongoing process, the construct implies a longitudinal rather than cross-sectional operationalization and therefore it differs from the traditional static notion of alignment as described by Reich and Benbasat. Yet, the same definition is used to refer to distinct constructs and as a consequence the operationalization of dynamic alignment in Baker et al. does not reflect the construct as defined. This is problematic because undermines validity of operational measures (MacKenzie, Podsakoff, & Podsakoff, 2011; Rossiter, 2002, 2008).

To address the above limitations, this paper develops a process-level conceptualization of strategic IT alignment that meets rigorous criteria for operational measurement. Following McKenzie et al.'s criteria for good construct conceptualization and Rossiter's (2002, 2011) approach to construct definition, this paper focuses on "providing a clear conceptual definition and developing indicators that adequately tap the construct domain" (MacKenzie et al., 2011, p. 329). A clear and robust conceptualization of the IT alignment construct is essential for developing good theories and for enabling a cumulative tradition in this research domain.

We develop the theoretical definition of the construct by drawing upon the resource-based view of the firm (Barney, 1991; Bharadwaj, 2000; Sirmon et al., 2011) and the notion of asset orchestration in the dynamic capabilities literature (Helfat et al., 2007; Teece, 2007). Specifically, we recognize the important role of the relationship between resource management and asset orchestration, or what Sirmon et al. (2011) refer to as "resource orchestration", to explicitly model the bi-directional relationship between the business and IT domains (Itami and Numagami, 1992; Chen et al., 2010).

We then draw upon this stream of research to conceptualize the alignment construct across primary processes in the value chain (e.g. production and operations, sales and marketing),

which is in line with previous process-level research on IT alignment (Tallon & Pinsonneault, 2011; Tallon, 2008). We thus refer to a primary process in the value chain as reflected in a set of activities for producing significant outputs of a particular type.

This paper proceeds as follows. We begin by discussing key criteria for conceptualization and operationalization of abstract constructs, such as strategic IT alignment. Following this, we evaluate a range of definitions of the construct employed in prior literature and discuss their limitations with respect to criteria for good construct definitions. We then draw on the emerging literature on IT alignment to reconceptualize the construct in line with the theory of construct conceptualization and measurement. Finally, we present our concluding remarks.

THEORETICAL DEFINITION AND OPERATIONALIZATION OF ABSTRACT CONSTRUCTS

Constructs are abstract concepts that scholars use to build theories (Chambers, 2006). They refer to mental definitions of the characteristics of an object or event (Berka, 1983) and their meaning are given by the theoretical domain in which the object or event is embedded (Winnie, 1967).

A key step in theory building is to specify the theoretical domain (MacKenzie et al., 2011; Venkatraman, 1989) and develop definitions of the construct/s employed in the theory (Rossiter, 2002; Straub, Boudreau, & Gefen, 2004). This is critical because in the absence of precise definitions of constructs it is impossible to develop valid measures of the constructs to conduct empirical enquiry (Rossiter, 2008; Summers, 2001).

Criteria for Good Construct Definitions

The IT literature has long been criticized for its lack of formal and consistent development of constructs (Straub et al., 2004). However, the IT literature is not alone and this issue is

critical in a number of other domains too. For example, the issue has been recognized as critical in such areas as marketing (Jarvis, MacKenzie, & Podsakoff, 2003; Rossiter, 2002), psychology (Borsboom, Mellenbergh, & Van Heerden, 2004) and accounting (Kwok & Sharp, 1998). This underscores the fact that conceptualizing constructs is not a simple exercise. In particular, scholars have struggled with identifying criteria that could be employed for judging or evaluating construct definitions.

One difficulty in conceptualizing constructs is that constructs are mental definitions of the characteristics of an object or event offered by theorists (Berka, 1983). As such, any theoretical definition of a construct cannot be judged as true or false, which would have been a relatively easy criteria to employ (Kahane, 1982). Instead, researchers have had to develop alternative criteria for judging the 'goodness' of construct definitions.

One such criterion is to judge whether construct definitions are reasonable or unreasonable. The reasonableness of a definition refers to its clarity, meaningfulness, acceptability and usefulness (Bagozzi, 2011; Kahane, 1982; Sethi & King, 1991). Kahane (1982) offers an operational set of criteria for evaluating the reasonableness of construct definitions: (1) it should not lead to the inclusion of things that one does not want the definition to refer to, or be too narrow by leading to the exclusion of things; (2) it should not contain vague, ambiguous, obscure, or figurative language; and (3) it should not be viciously circular – that is, contain a grammatical variant of the same term. Kahane's criteria serve as an initial basis to evaluate theoretical definitions of constructs. However, a separate set of criteria is involved in framing the theoretical definition and in assessing the linkage between the definition of a construct and its operational measures.

Conceptualization and Operationalization of Abstract Constructs

A major issue of concern within the IS literature is that construct measures have been defined arbitrarily, and in many different ways, generating confusion about the inferred linkage

between a construct and its operational measures (Petter, Straub, & Rai, 2007; Sethi & King, 1991). This has led to a number of recent papers suggesting that scholars do a better job of grounding the linkage between constructs and their measures (MacKenzie et al., 2011; Petter et al., 2007; Rossiter, 2002).

Most scholars however neglect the relationship between constructs and their measures when designing a study. As Petter at al. (2007) explain, they often focus on the structural paths between measures and scores, rather than the relationship between constructs and measures. This can create several measurement errors, which in turn, affects the structural model and validity of empirical results (Bagozzi, 2011; Jarvis et al., 2003). Indeed, previous research has provided empirical evidence that this issue can heavily affect validity of studies that accounts for abstract constructs (Petter et al., 2007).

Construct conceptualization involves defining the conceptual domain of the construct and developing the theoretical definition (MacKenzie et al., 2011). In this regard, a number of publications have recently advanced procedures to define and measure abstract constructs (Bagozzi, 2011; MacKenzie et al., 2011; Petter et al., 2007; Rossiter, 2002; Rossiter, 2011). According to Rossiter (2002), three elements are necessary to construct definition: (1) **O**, the *object* to be rated, (2) **A**, the *attribute* on which it is to be rated, and (3) **R**, the *rater entity* who does the rating. If the construct is abstract, either its object, its attribute, or both, has components that make up the whole. This is often the case of umbrella concepts such as IT alignment, where various components combine to make up a whole.

To illustrate Rossiter's structured approach to definition of constructs, consider that the abstract object of a particular construct is MANUFACTURING COMPANY Z, and that the attribute on which the company is to be rated is the PERFORMANCE of business units in charge of production. The construct refers to a particular industry and neglecting the object specification can lead to "confusion about what the construct does and does not refer to, and

the similarities and differences between it and other constructs that already exist in the field" (MacKenzie et al., 2011, p. 295). The constituents of the object are the company's business units in charge of production, while appropriate raters would be managers of these units. The components of the attribute PERFORMANCE can then be formative indicators such as PROFITABILITY and PRODUCTIVITY (Petter et al., 2007).

The distinction between reflective and formative measures has important implications for the relationship between a construct and its measures. The relationship is said to be reflective when each measure is viewed as an "imperfect *reflection* of the construct" and formed or *formative* when the measures describe and form the construct (MacKenzie et al., 2011, p. 295). Petter et al. (2007, p. 642) proposes that the decision to model a construct as formed should be based on four criteria: (1) Do the indicators predict the construct? (2) Will dropping a measure change what the construct is measuring? (3) Does a change in one measure of the construct not require a change in all other measures of the construct, and (4) Do the measures have different antecedents and consequences? A construct is modeled as formed when the above criteria are true. Otherwise, it should be modeled reflectively.

ENDURING CHALLENGES TO IT ALIGNMENT RESEARCH

Limitations of Extant Definitions of IT Alignment

In the following section we draw on Kahane's criteria to review extant definitions of the IT alignment construct. Our review finds that definitions of strategic IT alignment are often at odds with criteria for good definitions and do not serve as a good referent for the development of operational measures.

Scholarly inquiry into the alignment of IT and business has been underpinned by the assumption that IT is an important enabler of performance (Henderson & Venkatraman,

1993). This effect arises from the impacts of IT on both operational and strategic performance. Further, scholars have assumed that IT alignment is achieved through multiple decisions regarding business and IT taken over a period of time.

The above core elements of the theory of IT alignment and performance are reflected in the Strategic Alignment Model (SAM) proposed by Henderson and Venkatraman (1993). SAM, which underpinned early research into IT alignment, defines IT alignment as the degree of fit and integration among business strategy, IT strategy, business infrastructure, and IT infrastructure.

The SAM provides a powerful theoretical framework for IT alignment. However, its definition of alignment refers to integration of alignment variables without clearly indicating how the notion of integration relates to, and differs from, fit; in addition, it is not clear if integration refers to the "link" between the business and IT domains or to a firm's "internal coherence" (Henderson & Venkatraman, 1993, p. 9). Finally, the definition is circular since alignment is defined in terms of fit and integration, which are variants of the term alignment. As a consequence, the definition is at odds with Kahane's criteria for good construct definitions.

Table 1 below presents a number of alternative definitions of IT alignment employed in the literature and an evaluation of the definitions based on Kahane's criteria. Our review of alignment definitions indicates that they generally do not meet the criteria for a good definition. Specifically, many definitions are often too broad, circular and in some cases vague and ambiguous (see "Limitations of the Definition according to Kahane's Criteria" in Table 1). For example, definitions are too broad when they refer to subjective sentences about convergence of strategic orientations, strategies being stimulated by information technology, or investments being in harmony with objectives. Vague definitions frequently rely on terms

like goals, mission, objectives, and needs, while circularity refers to the use of terms like harmony, fit, convergence and congruence as synonymous of the term alignment.

TABLE 1
Definitions of IT Alignment and Their Limitations

Study (by year of publication)	**Definition of IT Alignment**	**Limitations of the Definition according to Kahane's Criteria**
Henderson and Venkatraman (1993)	The degree of fit and integration among business strategy, IT strategy, business infrastructure, and IT infrastructure.	Alignment is based on degree of fit and integration but it is not clear how the term "integration" relates to, and differs from, "fit". No indication whether the definition refers to realized or intended alignment.
Reich and Benbasat (1996, p. 56)	The "degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives, and plans".	Assumes that high-level concepts such as mission, objectives and plans exist and can be operationally compared based on degree of support.
Luftman (2000, p. 3)	Alignment refers to "applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs".	Alignment is based on appropriate and timely application of IT and harmony with business strategy. No indication of what the joint agreement (harmony) is between. No indication whether the definition refers to realized or intended alignment.
Palmer and Markus (2000, p. 242)	Alignment refers to "using IT in a way consistent with the firm's overall strategy".	Alignment is based on consistent use of IT with an overall business strategy. No indication of what the joint agreement (consistence) is between.

McKeen and Smith (2003)	Alignment exists when an organization's goals and activities and the information systems (IS) that support them remain in harmony.	No indication of which specific organizational goals and activities need to be in harmony. No indication of what the joint agreement (harmony) is between.
David (2003)	Alignment refers to the formulation, integration, and implementation of decisions made between business and IT to enable an organization to achieve its objectives.	Alignment is based on a decision process to achieve objectives. No indication whether formulation, integration and implementation of decisions are equally weighted. Respondents are critical here but not explicitly considered.
Oh and Pinsonneault (2007, p. 244)	The "degree to which the IT application portfolio converges with business strategies such as reducing costs and increasing revenue".	Even though the definition is targeted for small and medium firms, this is not explicitly specified. Alignment is based on convergence of 2 constituent parts (reduced costs and increased revenue), but there is no indication how "convergence" differs from "alignment".

Challenges to IT Alignment Conceptualization

A recurring issue seen in previous alignment research is that formal corporate strategy is often unknown (Reich & Benbasat, 2000) or, if known, is too ambiguous for business managers to understand (Campbell, 2005). This poses a significant challenge because alignment has been traditionally visualized at the firm level with conceptualizations and measures of the construct presupposing an existing business strategy to which an IT organization can align itself.

For instance, Broadbent and Weill (1997) examine alignment between firm-wide strategy and IT infrastructure, with strategy considered at the corporate level in the context of its planning

processes and organizational structure. On the other side, Sabherwal and Chan (2001) operationalize business strategy by mapping six strategy attributes (defensiveness, riskiness, aggressiveness, proactiveness, analysis, and futurity) to different types of business strategy in Miles and Snow's (1978) typology of defenders, analyzers, and prospectors. IT strategy is classified as "IS for efficiency", "IS for flexibility" or "IS for comprehensiveness" and the study examine whether these IT strategy typologies match requirements of the business strategy.

However, Chen and his colleagues advocate that the lack of valid measures for IT strategy "has likely exacerbated the level to which this construct has been inconsistently applied" (Chen, Worth, Preston, & Teubner, 2010, p. 235). They also argue that the dynamics of IT strategy are often neglected since most alignment studies attempt to identify a certain IT strategy that must fit with a particular business strategy – in other words, IT strategy profiles are "developed to conform to a particular business strategy type assuming an ideal form of alignment" (Chen et al., 2010, p. 249). As a result, extant approaches to alignment neither recognize IT in a position to drive far-reaching changes in business strategy nor acknowledge that IT alignment may be impacted by business failure in leveraging existing IT capabilities to exploit market opportunities (Hirschheim & Sabherwal, 2001; Sirmon, Hitt, & Ireland, 2007; Tallon & Kraemer, 2003).

As an alternative to traditional firm-level approaches to alignment, Tallon (2008) and Tallon and Pinsonneault (2011) conceptualized and measured alignment at the process-level. There is recent interest in evaluating alignment at the process-level since actual strategy is executed through a series of business activities and alignment varies from process to process based on differences in strategic focus and IT use (Palmer & Markus, 2000; Sabherwal & Chan, 2001; Tallon, 2008). In summary, reasons why visualizing alignment at the process level is desirable include: (1) "business strategy is implemented using a series of processes or activities as a

value chain, shop, or network"; (2) "differences in strategic foci could mean that some processes are more important than others"; and finally (3) to focus on alignment at the firm-level context ignores the influence of specific strategic foci (Tallon 2008, p. 228). In other words, the issue is not whether alignment is tight across all processes but whether alignment is tight in areas that matter most to the firm's success. For example, in niche service firms IT alignment might be critical to operations but is far more important in customer relations where success is defined.

It is worth noting, however, that the intention of process-level approaches to alignment is not to trivialize firm-level research but rather to build on it since the analysis views alignment as the link between IT use and business activities, which are process-level manifestations of how firm-level strategies are executed (Tallon & Pinsonneault, 2011; Tallon, 2008).

Recent empirical findings on the process-level approach to alignment reveal that alignment may be critical in some processes but not in others. Hence, the primary locus of alignment ─ i.e. the processes where alignment is tightest ─ is of paramount importance given the need for firms to execute their strategic foci around specific processes (Tallon & Pinsonneault, 2011; Tallon, 2008). When alignment is weak in these key processes, performance could falter as firms struggle to execute their chosen strategic focus. We believe that these findings greatly contribute to the discussion about the importance of context in IS research and how IT alignment should be conceptualized and measured.

Challenges to IT Alignment Measurement

Most studies in the literature measured IT alignment by applying one of three contingent forms of fit – matching, moderation or profile deviation (Chan & Reich, 2007). Although these forms of fit have been pivotal in allowing IT researchers to repeatedly find that alignment shapes firm performance, there is a vocal stream of criticism directed at what these measures overlook.

For instance, Chan and Reich (2007) call for adjustments to these measures since the literature has evolved to see alignment as a complex interaction between business activities and IT use rather than cross-referencing between business and IT plans (Sabherwal & Chan, 2001). Oh and Pinsonneault (2007) question the validity of these measures since they use the absolute or Euclidean distance between IT and business strategy while ignoring the level of either strategy. For example, a matching alignment measure will not distinguish between scores – assessed in a Likert type scale – such as (business strategy = 5, IT strategy = 3) or (business strategy = 2, IT strategy = 4) since the Euclidean distance in each case is two. With moderation the focus is on the product term rather than the individual components of the product term. Thus, moderation considers (business strategy = 2, IT strategy = 3) and (business strategy = 6, IT strategy = 1) to be identical in all respects. Profile deviation is similarly problematic since it too looks at the Euclidean distance between the actual level of IT support and the desired level of IT support based on the needs of the actual business strategy. Moreover, profile deviation has also been criticized for how ideal profiles are constructed (Sabherwal and Chan, 2001).

These approaches limit the comprehension of complex and reciprocal relationships among business activities and IT use (Kumar and Benbasat, 2004). In other words, the way alignment has traditionally been measured contradicts the argument that IT can be a catalyst for change (Porter, 1996). These approaches do not allow for the independent contribution of each alignment component in the prediction of corporate performance. Hence, it is reasonable to ask what insights have been lost due to the construction of these measures. By forcing all alignment measures to fit within an Euclidean framework, firms that are woefully misaligned by being unable to provide adequate IT support for their existing business needs will appear no different from those that are failing to leverage existing IT capabilities due to lack of management vision.

Despite the limitations of extant alignment measures based on matching, moderation and profile deviation, the intent of this research is not to cast aside matching, moderation or profile deviation but rather to highlight that the lack of methodological rigor to conceptualize and develop measures for the IT alignment construct has led to inappropriate use of these methods.

Importantly, Tallon and Kraemer (2003) propose revising and extending alignment measurement by explicitly recognizing two dimensions of alignment: IT shortfall and IT underutilization. The former dimension exists when IT fails to support the execution of the business strategy, while the latter comes about when the business strategy fails to leverage existing IT resources to the fullest extent possible. Together, the IT shortfall and IT underutilization dimensions explicitly address "how IT is aligned with the business", and "how the business should or could be aligned with IT" (Luftman, 2000, p.3). These two dimensions are consistent with the core logic of leverage in the resource-based view (RBV) of the firm (Bharadwaj, 2000; Sirmon, Hitt, Ireland, & Gilbert, 2011) and also reflect the bi-directional relationship between business strategy and IT use (Chen et al., 2010; Itami & Numagami, 1992).

In a recent empirical study with 317 U.S. and E.U. firms, Tallon (2012) found evidence that both IT shortfall and IT underutilization impact on our ability to realize the relationship between alignment and firm performance. If IT underutilization is misinterpreted as IT shortfall (as has been the case), then firms may respond to a mistaken belief that IT support is lacking by increasing the flow of IT support and investment into an area that is already overflowing with underutilized IT resources. This may require moving critical IT resources from processes that are already experiencing an IT shortfall – further hurting performance in those areas – or raising the overall level of IT spending with no firm guarantee of an improvement in IT business value.

RECONCEPTUALIZATION OF STRATEGIC IT ALIGNMENT

Domain of the Construct

In today's fast-moving business environment strategic IT decisions are integral components of the business strategy (El Sawy, 2003). As a consequence, it is becoming increasingly difficult to disentangle strategic business processes from IT capabilities. In this context, superior performance is contingent on the firm's ability to exploit valuable IT capabilities to execute the differentiating components of the business strategy (Mata, Fuerst, & Barney, 1995; Porter, 1996).

Corporate strategy has been defined as "the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and allocation of resources necessary for carrying out these goals" (Chandler, 1962, p. 13). Prior research has examined the strategy concept from two perspectives: content (what the strategy is) and process (how the strategy is formed and implemented) (Helfat et al., 2007; Snow & Hambrick, 1980). Here we draw on the former perspective to conceptualize realized strategic IT alignment. Actual (or realized) strategy then refers to what firms are doing rather than what they plan to do. In other words, it consists of high-impact capabilities that must be supported and coordinated through the management system (Kaplan & Norton, 2006). These capabilities "implement the differentiating components of the strategy" (Kaplan & Norton, 2006, p. 261) across the value chain and therefore comprise the firm's strategic content (Helfat et al., 2007).

As Porter explains, "the essence of strategy is in the activities – choosing to perform activities differently or to perform different activities than rivals" (Porter, 1996, p. 64). In this context, superior performance lies in the capabilities that managers build to execute the firm's strategic foci (Eisenhardt & Martin, 2000; Sirmon et al., 2011). This argument is echoed in the RBV literature where it is argued that possession of rare, valuable, inimitable and

nonsubstitutable resources and capabilities provide a basis for superior performance (Bharadwaj, 2000).

RBV and dynamic capabilities. The RBV literature reports that the presence of IT capabilities has a positive effect on both organizational performance (Bharadwaj, 2000) and sustained competitive advantage (Mata et al., 1995). Research also reports that commonly available IT resources and capabilities are not strategic by themselves (Powell & Dent-Micallef, 1997; Teece, Pisano, & Shuen, 1997). Instead, long-term competitive advantage is contingent on the firm's ability to reconfigure its resource base using dynamic capabilities (Eisenhardt & Martin, 2000; Helfat et al., 2007; Teece, 2007).

By extending on the resource-based theory of the firm, dynamic capabilities are suggested as the source of competitive advantage in the strategic management literature (Ambrosini, Bowman, & Collier, 2009; Grant, 1996; Helfat et al., 2007; Teece et al., 1997) and in the IS literature (Barua, Konana, Whinston, & Yin, 2004; Mithas, Ramasubbu, & Sambamurthy, 2011; Sambamurthy, Bharadwaj, & Grover, 2003). They enable managers to alter the firm's resource base –acquire and shed resources, integrate them together, and recombine them – to generate new value-creating strategies. Therefore, dynamic capabilities[2] are the drivers behind the creation, evolution, and recombination of other resources into new sources of competitive advantage (Eisenhardt & Martin, 2000).

As Teece explains, dynamic capabilities can be disaggregated into the capacity to (1) "sense and shape opportunities and threats", (2) "seize opportunities", and (3) manage "threats and reconfiguration" (Teece, 2007, p. 1319). These primary capabilities are contingent on key activities such as environmental scanning (sensing), resource allocation (seizing) and task monitoring (managing threats), which in turn require appropriate IT support. Teece also adds

[2] The term "dynamic" refers to the capacity to renew competences in the changing business environments. The term "capabilities" emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences.

that managerial processes for learning, coordination/integration and reconfiguration support the three primary dynamic capabilities (sense, seizing and managing) and that together they might be thought of as asset orchestration processes (Teece, 2007, 2009).

In a recent study Sirmon et al. (2011) discuss integrating RBV research with advances in the dynamic capabilities literature. They acknowledge that the concept of asset orchestration can greatly extend the understanding of the resource-based theory of the firm since the influence of resources on firm performance "involves managerial action regarding structuring the firm's portfolio of resources, bundling those resources into capabilities, and leveraging the capabilities to realize competitive advantage" (Sirmon et al., 2011, p. 1406). The study develops a conceptual model that integrates a resource management framework of value creation (Sirmon et al., 2007) with asset orchestration to build a more comprehensive view of RBV.

In the context of business and IT alignment, these managerial activities must enable the execution of a firm's strategy by providing adequate IT support for the business, which in turn must leverage the firm's existing IT capabilities to exploit ongoing market opportunities – see Pavlou and El Sawy (2006) for an operationalization of *IT leveraging* and measurement of the primary dynamic capabilities in the context of product development. This stream of research suggests a distinction between the *IT support relationship* (from the IT domain to the business domain) and the *IT leveraging relationship* (from the business domain to the IT domain)[3]. We therefore frame alignment as a bi-directional relationship (Tallon and Kraemer, 2003), which is consistent with previous RBV research on alignment. For example, Kearns and Lederer (2003) measure alignment, in the context of knowledge sharing, as a bi-directional relationship comprising both the *business domain* to *IT domain* relationship and the *IT domain* to *business domain* relationship.

[3] This distinction was first proposed, in the alignment literature, by Tallon and Kraemer (2003).

This stream of research is particularly suitable for our process-level conceptualization of strategic IT alignment because it highlights RBV's primary strategic logic of leverage – or the principle of "leveraging capabilities to exploit market opportunities" (Sirmon et al., 2007, p. 276) – and "explicitly addresses process-oriented managerial actions that are involved in achieving competitive advantage as well as creating value" (Sirmon et al., 2011, p. 1391).

Process level approach to IT alignment. The reframed conceptualization of strategic IT alignment in this paper utilizes a *value disciplines* perspective on strategic foci to conceptualize alignment at the process-level. Theory and empirical findings then suggest that alignment should be tightest in key processes that execute the firm's strategic foci (Tallon & Pinsonneault, 2011; Tallon, 2008).

Previous studies used Treacy and Wiersema's (1995) value disciplines typology to gain a greater understanding of where alignment matters most, given firm's primary processes in the value chain. As argued by Treacy and Wiersema, firms create value for their customers using one of three unique value disciplines: operational excellence (OE), customer intimacy (CI) and product leadership (PL). Operationally excellent firms create value by offering customers a low-cost product or service while customer intimacy denotes a strategy of doing whatever it takes to meet the needs of customers who favor variety, availability, and service quality ahead of cost. The third strategy, product leadership, signifies firms who create value through groundbreaking innovation.

This value disciplines typology has been the subject of much confirmatory study in the IS literature (Tallon, 2008; Weill & Broadbent, 1998; Weill & Ross, 2004). For example, Tallon (2008) and Tallon and Pinsonneault (2011) used the typology to measure IT alignment across five primary processes in the value chain – i.e., supplier relations, production and operations, product and service enhancement, sales and marketing, and customer relations. As theory and empirical research shows, operationally excellent firms emphasize alignment in supplier

relations and production processes; customer intimate firms emphasize sales and customer relations, while product leaders focus on product and service enhancement (Palmer & Markus, 2000; Tallon & Pinsonneault, 2011; Tallon, 2008).

The Reframed Conceptualization

Our conceptualization of strategic IT alignment is based on realized, rather than intended, strategy. It recognizes that (1) organizational performance depends on actual capabilities that support the successful execution of the firm's strategic foci; and that (2) alignment is a two-way process, where business strategy and IT can act as mutual drivers. The distinction between realized and intended conceptualizations of alignment is important here because a firm's actual or realized strategy often differs from its stated or intended strategy (Conant, Mokwa, & Varadarajan, 1990). Hence, failure to specify whether the construct refers to realized or intended alignment may lead to measurement difficulties and inconsistencies.

We also recognize and distinguish between IT-shortfall and IT underutilization and therefore posit that *misalignment* can occur both due to a lack of IT support for the business or by failure to leverage existing IT resources and capabilities. While the former can be "caused by a lack of IT spending", the latter can be "caused by excessive spending on IT or by failure on the part of executives to understand the business opportunities presented by IT" (Tallon & Kraemer, 2003, p. 7).

Theoretically, distinguishing between IT-shortfall and IT underutilization to conceptualize alignment is consistent with RBV's primary logic of leverage, as discussed in the section Domain of the Construct, and also with research that has shown that excess and deficiency of organizational resources and capabilities need to be distinguished when analyzing the effects of IT alignment (Oh & Pinsonneault, 2007). For example, Bhattacherjee and Hikmet (2007) examine the use of a large computerized physician order entry (CPOE) system in a U.S. hospital and their study illustrates how misalignment can arise due to underutilization of IT

resources. The system was supposed to replace the existing manual ordering process. However, the authors found that "about 25% of physicians at this hospital were using the CPOE system for entering about half of their orders. In other words, 75% of the target population did not use the system, and about 87% of physician orders were not entered or tracked in the system. This high level of non-usage was surprising, given the high level of priority accorded to the CPOE implementation by the hospital administration and the considerable amount of resources devoted to technical and user support" (Bhattacherjee & Hikmet, 2007, p. 730).

In this paper we draw upon RBV to specify IT-shortfall and IT underutilization at the process-level, instead of the firm-level (Tallon & Kraemer, 2003). We also recognize that the alignment construct should be defined "positively, not by the denial of other things" (MacKenzie et al., 2011, p. 299). Hence, our conceptualization of alignment is based on the notions of *IT support* and *IT leveraging* rather than IT-shortfall and IT underutilization. While IT support is defined as the level to which an organization's IT capabilities meet the IT needs of business processes, IT leveraging refers to the extent to which business processes make use of available IT capabilities.

We draw upon theory on construct conceptualization and measurement to reframe the strategic IT alignment construct and apply Petter et al.'s (2007) reasoning to model the construct as formed. In this regard we argue that *IT support* and *IT leveraging* are indicators that predict the IT alignment construct rather than being imperfect reflections of it; dropping *IT support* or *IT leveraging* changes what the construct measures; and changes in one of the indicators do not require a change in the other. Conceptually, the construct could then be modelled as a formed second-order construct that is comprised of two first-order constructs (i.e. IT support and IT leveraging). While there is still debate in the literature about formative versus reflective measurement (Edwards, 2011; Petter, Rai, & Straub, 2012), recent

publications suggest that the first-order constructs could be modeled either formatively or reflectively, depending on the theoretical domain and the construct's object (Polites, Roberts, & Thatcher, 2011). For example, Pavlou and El Sawy (2006) conceptualize *IT leveraging competence* as a formed second-order construct, with the first-order constructs modelled reflectively. On the other hand, Rai et al (2006) conceptualize *IT Infrastructure for SCM* as a formed second-order construct and the first order constructs are modeled formatively.

In order to conceptualize the alignment construct formally – see the section Conceptualization and Operationalization of Abstract Constructs – we specify the construct's object, attribute and rater entity as follows: the object being rated is AN ORGANIZATION; the attribute on which the organization is to be rated is STRATEGIC IT ALIGNMENT AT THE PROCESS-LEVEL; and the rater entity is the organization's MANAGERS.

Grounded in the process-level approach to alignment, we model the object of the construct across the value chain with its primary processes – supplier relations (SR), production and operations (PO), product and service enhancement (PSE), sales and marketing (SM), and customer relations (CR) – as sub-objects. We then draw upon the literature on dynamic capabilities to define the constituents of each sub-object as the capabilities of *sensing*, *seizing* and *managing* (Helfat et al., 2007; 2007, 2009). This approach is in line with previous research that has analyzed business processes through dynamic capabilities. For example, Pavlou and El Sawy (2006, 2010, 2011) conceptualized and measured dynamic capabilities in the context of product development. Here we extend this reasoning to the five primary processes in the value chain.

Therefore, the total number of object constituents is 5 (business processes) x 3 (primary capabilities) = 15 constituents. It is worth noting that if the theory being considered by an alignment study refers to a specific organizational form, type or size then the domain of the construct should provide the theoretical reasoning for modeling the object. For example, if the

theory is about the multi-business form of organization (Chandler, 1962; Grant, 2005), then the object of the construct could be modeled as having two sub-objects: the CORPORATE LEVEL and the STRATEGIC BUSINESS UNIT LEVEL, with the latter defining multiple strategies since it is composed by *n* business units, each of which competes within its own market.

Here we purposefully model the object of the construct across the value chain – consistent with the process-level approach to alignment – and label it generically as AN ORGANIZATION since we do not refer to a specific organizational form, type or size. The attribute of the construct has two constituents: IT SUPPORT and IT LEVERAGING. The rater entity most suitably qualified is the company's high-level managers, which we refer to as C-level executive managers. These high level managers possess the information, knowledge and expertise to evaluate strategy issues (Chen et al., 2010).

The conceptual definition can be written as STRATEGIC IT ALIGNMENT OF AN ORGANIZATION, AT THE PROCESS-LEVEL, IS REALIZED VIA THE LEVEL OF IT SUPPORT AND THE EXTENT THAT IT IS LEVERAGED ACROSS THE VALUE CHAIN, AS RATED BY THE ORGANIZATION'S C-LEVEL EXECUTIVE MANAGERS.

We believe that this definition complies with Kahane's (1982) criteria for good definitions. It is neither too broad nor excludes key dimensions of the alignment construct. First, the definition distinguishes between firm-level and process-level alignment and focuses on a particular level of analysis. Second, it draws on the construct's theoretical domain to recognize the two distinct dimensions of alignment. The language used in the definition is objective and the meaning of terms like "process-level" and "leveraging" is in line with the chosen theoretical domain. Finally, the definition is not viciously circular since it does not refer to synonymous of the term alignment.

As for the operationalization of the construct, the total number of items required for a scale – or index, if the "formative" terminology is used (Coltman, Devinney, Midgley, & Venaik, 2008) – is given by the number of the object constituents × the number of attribute components, i.e. 15x2 = 30 items. The measurement items, which fully specify the theoretical domain of the construct, are then combination of the item parts of the elements in each pair of the Cartesian product A x $B = \{(a, b) |\ a \in\ A\ \wedge$ b $\in B\}$, where:

- A = {SR sensing, SR seizing, SR managing, PO sensing, PO seizing, PO managing, PSE sensing, PSE seizing, PSE managing, SM sensing, SM seizing, SM managing, CR sensing, CR seizing, CR managing}
- B = {IT support, IT leveraging}

Therefore, for the pair $(PO\ sensing, IT\ support)$ the measurement item examines "IT support for sensing activities in production and operations". A typical item has then the form "measurement of $b \in B$ for the object $a \in A$. In order to operationalize the construct the researcher needs to develop fifteen items for the attribute component $IT\ support$ and fifteen for the component $IT\ leveraging$. Hence, if the researcher decides to measure the component attributes using a 5-point likert type scale anchored on not at all and to a great extent, the measurement items may be written as:

IT support

Please indicate the extent to which the current IT needs of the organization's business processes, for each of the following activities, are supported by available IT capabilities: (1: Not at all; 5: To a great extent)

> The activities for sales and marketing (SM) would comprise: *(1) Sensing activities in sales and marketing, (2) Seizing activities in sales and marketing and (3) Managing activities in sales and marketing.* Similarly, the researcher should measure the extent of IT support for sensing, seizing and managing activities in SR, PO, PSE and CR.

IT leveraging

This question investigates whether the organization's business processes make full use of available IT capabilities. *Please indicate the extent to which the following activities leverage the organization's available IT capabilities:* (1: Not at all; 5: To a great extent)

> The activities for customer relations (CR) would comprise: (1) *Sensing activities in customer relations, (2) Seizing activities in customer relations and (3) Managing activities in customer relations.* Similarly, the researcher should measure IT leveraging for sensing, seizing and managing activities in SR, PO, PSE and SM.

Together, the measurement items for supplier relations (SR), production and operations (PO), product and service enhancement (PSE), sales and marketing (SM), and customer relations (CR) can be argued to reflect the construct as defined and fully tap the construct's theoretical domain.

CONCLUDING REMARKS

We began this paper by raising our concerns that the lack of methodological rigor to conceptualize and measure IT alignment is problematic. Typology based contributions towards specific operational measures of IT alignment have been proposed based on explicit plans (Tallon & Kraemer, 2003) and interrelating components (Chen et al., 2010). However, these measures are not without their limitations (Chan & Reich, 2007; Oh & Pinsonneault, 2007) and recurrent criticisms directed towards extant alignment measures account for a limited comprehension of the complex and reciprocal relationships among business activities and IT use (Kumar & Benbasat, 2004).

Our review of the IT alignment literature indicates that extant definitions of the construct are not good according to criteria for construct definitions, and that operationalizations and

measures of IT alignment are often at odds with the theory of construct conceptualization and measurement. Our findings are consistent with recent reviews of the alignment literature, which reveal that alignment research is still largely atheoretic and that greater use of well-established theories, such as the resource-based view of the firm, is needed to go beyond "broad brush" investigations of the construct (Chan & Reich, 2007, p.310-312).

In order to avoid the above limitations, we develop a process-level conceptualization of strategic IT alignment that meets critical criteria for a good construct conceptualization. The domain of the construct is defined through the resource-based theory of the firm and the dynamic capabilities literature. Grounded on this stream of research, we specify the construct formatively through IT support and IT leveraging to explicitly recognize the bi-directional relationship between business strategy and IT use. As practical implication, the use of methods such as the Euclidean distance to operationalize the reframed construct is perfectly proper since the level of IT support for the business and the degree to which the business leverages existing IT capabilities are analyzed independently according to the formative model.

We believe that the paper provides a platform for future theoretical development and addresses practical challenges for alignment measurement by explicitly considering the individual contributions of the business and IT domains to alignment.

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