

The Co-evolution of Business/Information Systems Strategic Alignment: An Exploratory Study

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Abstract

Achieving alignment between its business strategy and its information systems (IS) strategy remains one of the more enduring challenges for organizations. While there is significant research addressing this issue, most studies attempt to reduce the inherent complexity of alignment to allow investigation of direct causal relationships. This tradition has had little impact on improving our understanding of what is a complex process, particularly sustaining alignment over time, and is perhaps a reason why seemingly little progress has been made improving the achievement of alignment in practice. Co-evolutionary theory provides a promising alternative, embracing complexity, and capturing the messy nature of securing alignment. In particular, the feedback loops that are inherent with this perspective can promote either an improvement in alignment or further entrench an isolationist situation. Adopting a grounded theory approach, a causal-loop model of the process of achieving strategic alignment is constructed from empirical data. This model highlights the complex challenge of alignment faced in practice, in particular achieving mutual trust, building relationships, communicating and collaboration. Moreover, it emphasizes the central role of cognition in securing alignment and suggests that absorptive capacity, path dependency and the speed at which learning occurs are key determinants in achieving alignment over time. It advances the view that co-evolution occurs at the social, behavioral, cognitive and intellectual levels. The achievement of alignment is portrayed as more akin to a dancer dancing a dance and a dance being danced. The research also raises the question as to the relevance of the notion of alignment for today's digital age suggesting that it might be an obsolete concept.

Keywords: Strategic Alignment, Co-evolution, IS Strategy, Business Strategy, Feedback Loops, Grounded Theory, Learning

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Introduction

Achieving alignment between business and information systems (IS) strategies, hereafter referred to as alignment, has been a major concern, particularly for chief information officers (CIOs), for many years (Chan, 2002; Luftman & McLean 2004; Luftman et al. 2013). It is widely established that there are a number of aspects, or dimensions, to alignment (Henderson & Venkatraman 1993) with strategic alignment receiving the most attention from researchers (see, for example, Chan & Reich 2007a,b). Strategic alignment refers to the congruence between an organization's business and IS strategies (Preston & Karahanna 2009).

The sustained interest in achieving alignment owes a great deal to research that continues to advance empirical evidence of its positive effects on IS and business performance (Chan & Huff 1993; Sabherwal & Chan 2001; Palmer and Markus 2000). The notion of strategic alignment, as exposed in the literature, builds on three central arguments (Hirschheim & Sabherwal 2001). First, organizational performance depends on structures and capabilities that support the successful realization of strategic decisions; second, alignment is a two-way process, where business and IS strategies can act as mutual drivers; third, strategic IS alignment “is not an event but a *process* of continuous adaptation and change” (Henderson & Venkatraman 1993). While the former arguments are well rehearsed, it is still unclear how to achieve and sustain the process of strategic IS alignment over time.

A feature of most research into alignment is that it attempts to reduce complexity to enable the investigation of simple cause and effect relationships. This can create anomalies between studies (Campbell, Kay & Avison 2005). Consequently, we do not have any near complete models of the alignment process – just partial models of different aspects of alignment. More recent conceptual research that attempts to explicate the complexity of alignment would indicate that this situation is unlikely to improve in the near future (Benbya & McKelvey 2006a; Vessey and Ward 2013). However, this paper will argue, in part, that any move towards embracing complexity rather than attempting to reduce it, is likely to deepen our understanding of the challenges and process of achieving alignment.

Our aim in this paper is to advance a co-evolutionary perspective as a lens for theorizing about the dynamic, complex, and interdependent relationships between business and IS strategies. We believe that co-evolutionary theory can shed insightful light on this process for two reasons. First, while its central concern is to understand organizational *adaptation* and *change* by analyzing the simultaneous or co-evolutionary development of organizations and

their environments it can also be applied intra-organizationally. Second, co-evolutionary theory “will inform any research in organization studies, which spans levels of analyses and involves adaptation over time” (Lewin & Volberda 1999, p. 520). In our quest, we respond to scholars who have been proposing “that the literature on IS alignment is beginning to mature and that future studies of alignment could benefit from...using established theories from IS or other disciplines” (Sabherwal & Chan 2001, p. 26).

This research didn’t start out as a study drawing on co-evolutionary theory. We set out to explore the achievement of alignment between business and IS strategies and to capture descriptively what occurs in practice in organizations as they seek to attain this objective. Acknowledging both the processual nature of alignment and the futility of viewing alignment as a snapshot, we sought from our data to map out what participants in the study were telling us regarding their experiences of achieving alignment over time. Although alignment has been studied by scholars for many decades, that it is still a significant concern for practitioners led us to “park” the extant research (i.e. perhaps prescriptions emanating from research are contributing to the challenge of achieving alignment?) and collect data without using any preconceived frameworks (i.e. when looking through sun glasses, everything appears dark). Following a grounded theory methodology, we minimized our intervention as researchers in the early phase of data collection, seeking instead to give informants an opportunity to voice their stories and share their experiences. However, as we begun to analyze the data, identify variables and concepts and posit relationships, we felt that co-evolutionary theory would be a potentially useful lens to frame the complexities of the alignment process that we were observing from our data.

Rather than structure the paper following our research process, we have chosen to present our research following a more conventional structure. To this end, we first briefly review the strategic alignment literature to carve out our intellectual position. We then introduce co-evolutionary theory, presenting its central thesis and suggest how it can help progress our understanding of the alignment process. Having explained our research design, we then present our co-evolutionary model of alignment and describe it using our empirical data. The paper concludes by discussing our model in the light of the extant research to surface our contribution. We draw out the implications of our findings and point to potentially fruitful avenues of further research.

Strategic alignment

Strategic alignment is based on the premise that the inability to realize value from IS investment is, in part, due to the lack of alignment between the business and IS strategies of the organization (Henderson & Venkatraman, 1993). Since the late 1970s, a substantial body of work has evolved exploring both theory and practice in this domain. While this literature has been extensively reviewed elsewhere (Chan and Reich 2007), to position our research we briefly trace the historical developments of alignment thinking, following the structure outlined in Figure 1.


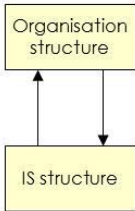
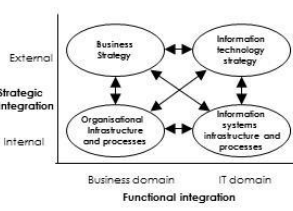
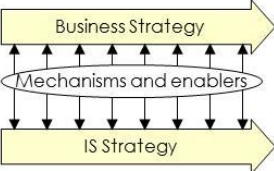
	Business Strategy - IS Alignment	Business - IS Structural Alignment	Strategic IS Alignment process	Alignment Mechanisms
Focus				
Description	Align IS investment with business strategy. Tools and techniques such as value chain analysis, critical success factor analysis, support the process. Identification of success factors/patterns.	Align IS structure with organization structure	Dynamic alignment between business strategic context and IT strategic context. Assesses range of strategic choices facing managers and how they interrelate. Process of continuous adaptation and change.	Identification of the key mechanisms and enablers of alignment in a dynamic context. Challenges assumption that IS and business should be kept separate. Explores conditions leading to sustainable competitive advantage.
Proposition	Considers alignment as a strategic, top-down planning event. Early research focused on coordination of business and IS plans rather than strategies.	Recognizes that strategy alone will not deliver alignment; Stresses the importance of structural alignment.	Stresses the importance of strategic and structural alignment; Acknowledges that alignment is not an event but a process.	Critiques that the process view does not explain how variables interact; Introduces mechanisms and enablers of alignment; Some attempt to show how to achieve sustained alignment over time.
References	King, 1978, Wiseman, 1985; Earl, 1989; Lederer and Mendelow, 1989; Teo and Ang, 1999; Chan et al., 1997; Bergeron et al., 2004	Ein-Dor and Segev, 1982; Tavakolian, 1989; Jordan and Tricker, 1995	Henderson and Venkatraman, 1989, 1993; Broadbent, 1990; Broadbent and Weill, 1993; Teo and King, 1997; Avison et al., 2004	Earl, 1993; Ciborra, 1991, 1994; Keen, 1993; Mata et al., 1995; Hirschheim and Sabherwal, 2001; Ross and Weill, 2002; Benbya and McKelvey, 2006a; Vessey and Ward, 2013

Figure 1 Evolution of strategic IS alignment thinking.

Ever since the application of IS in organizations moved beyond automation towards seeking competitive advantage, there has been a considerable interest on developing more strategic oriented approaches to determine IS investments. Early approaches devised top-down strategic planning models based on the assumption that an IS strategy can be planned and is often closely associated with the business strategy. The driver behind the process of IS strategy formulation under this view is to evaluate the impact of IS on business strategic

options, while also aligning IS and business strategies (King, 1978; Earl, 1989). Tools and techniques, such as value chain analysis, critical success factor analysis and strategic options analysis were developed to support this twin objective (c.f. Rockart 1979; Porter & Miller 1985; Wiseman 1985).

Yet, researchers at that time also recognized that the alignment of business and IS strategies would also require structural alignment between IS and the organization (Ein-Dor & Segev 1982). Structural alignment stresses the importance of structural fit between IS and the business, specifically in the areas of IS decision-making rights, reporting relationships, provision of IS services and infrastructure, and the deployment of IS personnel.

Acknowledging that alignment is not an event but a dynamic *process* in which business and IS strategies evolve over time, Henderson and Venkatraman (1989, 1993) proposed a model that represents the dynamic alignment between the business and IS strategic contexts, stressing the necessity for both strategic *and* structural alignment. Their conceptual model is based on the concepts of strategic integration and functional integration as a way of assessing the range and interrelationships of the strategic choices that managers face. They argue that alignment should at least involve four domains of strategic choice (i.e. business strategy, organizational infrastructure and processes, IS strategy, and IS infrastructure and processes) and that effective management requires a balance among the choices made across all four domains.

However, Henderson and Venkatraman's widely adopted model is still premised on the assumption that business and IS strategies are separate and distinct (Bharadwaj et al. 2013; Sauer & Burn, 1997). Critiques of the concept of strategic alignment see this as a key reason for mis-alignment and the need for approaches to get business and IS strategies aligned in the first instance. Yetton (1997) highlights the conundrum of alignment in that it is as much a problem to be managed as it is a solution.

But is this existence of separate strategies that has seen attention turned to the mechanisms and enablers of alignment in a context that is increasingly viewed as dynamic and complex. From a study of 21 organizations, Earl (1993) concluded that his notion of the *organization approach* offered the best prospect for achieving alignment where IS decisions are made through continuous integration between the IS function and the rest of the organization. Key enablers and inhibitors of strategic alignment were identified by Luftman and Brier (1999) and include: senior executive support for IS, IS involved in strategy development, IS

understands the business, business-IS partnership, well prioritized IS projects, and IS demonstrates leadership. The concept of the *management difference* has been suggested as explaining why some organizations are better at aligning IS to business objectives than others (Keen 1993). Scholars have also highlighted the importance of “informal networks of relationships” for achieving strategic IS alignment (Chan 2002) and have suggested that “an effective IT governance structure is the single most important predictor of getting value from IT” (Weill & Woodham, 2002), the prime objective behind the need for alignment.

Researchers examining the basis of sustainable competitive advantage from IS have also shed insight on how organizations might achieve alignment over time. Examples of factors that are seen to help sustain alignment include: developing superior IT management skills (Mata *et al.*, 1995; Dehning & Stratopoulos 2003); building IS competencies, which cross functional boundaries (Peppard *et al.* 2000); and business management’s leadership role in key IT decisions (Ross & Weill 2002).

A criticism that can be leveled at much of the extant research is that, while acknowledging the challenges of achieving alignment, most have attempted to reduce this inherent complexity to allow investigation of direct causal relationships. Concentrating on one aspect of alignment at the expense of the other dimensions is one example of reducing complexity. Complexity is further reduced by adopting the assumption that strategies that are developed in a formal process will be implemented as intended. If this was the case, achieving alignment then becomes simply a matter of improving IS planning methodologies (King 1988; Lederer & Sethi 1988) and ensuring that business and IS plans are formally integrated (Teo & King 1997). However, plans and strategies are rarely implemented as intended (Lewin & Volberda 1999; Mintzberg 1994). This is for many reasons – changes in the environment and, in particular, how lower level managers and personnel are motivated and measured (Castellano *et al.* 2004; Kerr 1995, 2003) or complexity as a result of legacy investments. Ciborra (1991; 1994), for instance, concluded from a study of a number of organizations that their achievement of competitive advantage from the deployment of IS was due more to serendipity than formal planning. He observed that IS alignment rather resembled a process of *bricolage*, improvisation and tinkering than the execution of a preconceived strategy. Given a dynamic environment, insisting that IS plans are based on business plans, and then expecting them to be implemented explicitly, is more likely to result in mis-alignment rather than achieving the desired result.

There has been some recent research that has drawn on co-evolutionary theory. Benbya and

McKelvey (2006a) address the organizational issues of alignment, specifically organizational structure. Their study examines the emergent nature of IS alignment by focusing on “co-evolution-based self-organized emergent behavior and structure” (p. 284). Their perspective is that alignment takes place via adjustments at individual, operational and strategic levels in an organization. Conceiving organizations and IS as complex adaptive systems that co-evolve over time, Vessey and Ward (2013) have proposed a conceptual model of sustainable IS alignment. Their theory links bottom-up, emergent processes that foster adaptively with top-down, formal organizational processes. All these studies are data free. Indeed, Vessey and Ward (2013) stress that theirs is a theory for explaining but “that making testable predictions is not of primary concern” (Gregor, 2006) undermining its utility.

In conclusion, the extant research suggests that the alignment concept is theoretically and conceptually consistent, but the difficulties associated with its practical application in terms of achieving and sustaining alignment over time have been greatly underestimated (Hirschheim & Sabherwal 2001) and this has been reflected over the last 40 years in surveys of practitioners (c.f. Luftman et al., 2013). Despite the recognition that strategic IS alignment is a process and not an event, its conception is still overly deterministic and little insight is available on how to *sustain* the dynamic and continuous process of adaptation and change between business and IS strategies. The empirical study by Sabherwal et al. (2001), using the *punctuated equilibrium* model (c.f. Gersick 1991) to examine the dynamics of alignment, is an example of a study that seeks to embrace complexity. Our research strives to further develop this area and we suggest that co-evolution theory can further advance our understanding of the business-IS strategy relationship. In particular, we sought to derive a model from empirical data rather than present conceptual argumentation.

Co-evolutionary theory

The term ‘co-evolution’ was coined in the 1960s by the American population biologist Paul Ralph Ehrlich and the botanist Peter Hamilton Raven to refer to evolutionary changes that occur in genetically unrelated species as they interact with each other in their environment (Futuyma & Slatkin 1983). The notion of the simultaneous or co-evolution of organisms and their environment has been applied to reason about the organization-environment relationship with the aim of understanding organizational adaptation, recognizing that the evolution of organizations cannot be understood independently from the simultaneous evolution of their

environment (McKelvey 1997). Seminal work includes the application of co-evolutionary theory to the analysis of the competitive advantage of nations (Porter 1990), strategic management (Barnett & Hansen 1996), strategic alliances (Koza & Lewin 1998), and new organizational forms (Lewin & Volberda 1999). Although co-evolutionary theory receives increasing attention in the social sciences and organization theory, it has seen limited application to the study of IS.

In contrast to evolutionary theories, which view organizations, populations or other entities in isolation, the emerging co-evolutionary perspective emphasizes the coupled evolution of multiple populations or forms (Amburgey & Singh 2002). Co-evolutionary thinking appreciates the embeddedness of organizations in a complex socio-cultural and historical context, where forces of change and interactions conflux and reverberate. It also allows a dynamic view of the processes and forces acting upon the organization and its environment. This paper follows Lewin and Volberda (1999) definition of co-evolution as “the joint outcome of managerial intentionality, environment, and institutional effects” (p. 526).

Co-evolutionary theory argues that firms are complex systems (Kim & Kaplan 2006) that exhibit a number of characteristics:

- *dynamic* – they change over time with various sections changing at different rates.
- *tightly coupled* – actors interact with each other and with the environment; everything is connected.
- *governed by feedback* – because of tight coupling, actions feedback on themselves. Each decision has an impact affecting future decisions.
- *nonlinear* – effect is rarely proportional to cause. A small change in one location can cause a disproportionate change in another location.
- *history-dependent* – history exerts a strong influence on future trajectories i.e., path dependencies.
- *self-organizing* – internal structure often dictates the performance of the system. This could be either to nullify an action, or amplify the effect over time.
- *adaptive* – decision rules and actions of actors change over time often as result of experiential learning. However, due to complex nature of the system the learning may not be beneficial to overall system performance, enhancing one small section to the cost of other sections and overall performance.

- *counterintuitive* – cause and effect are often separated by time and space. They are difficult to correlate. In many instances decisions are made to act on symptoms, not causes. The consequence can be that actors just push harder and achieve nothing except expenditure of time, effort and resources.
- *policy resistant* – in many situations “obvious” solutions, aimed at symptoms, often make the situation worse.
- *trade-offs* – time delays between cause and effect mean that there is often short term, then long term, results. Often solutions, aimed at symptoms rather than hard to identify causes, cause an initial improvement followed by a long term deterioration in performance (Stermann 2000, p. 22).

Co-evolutionary theory emphasizes the coupled evolution of multiple populations or forms whilst conforming to the characteristics of complex systems. When applied to organizational studies it postulates that actors (i.e. individual people or groups of people) interrelate with each other and their surroundings. These actors have an unlimited capability to adapt their behaviour, subject to prior experience. However the behaviour of actors is influenced by the actions of other actors and the system itself. As actors are also capable of anticipating the results of their actions they are capable of changing their actions thus evolving and learning. The resulting “system” is self-organizing as new patterns become the result of interactions between actors (Benbya & McKelvey 2006b).

Fundamentally, the environment in which actors operate is a result of their prior actions. These prior actions can often constrain future actions as they become (informal) rules or routines to be followed. If actor A anticipates the result of his or her actions then makes a different decision, actor A is effectively ‘breaking the rules’. It is at this point that evolution occurs. The new action will then force other actors to re-evaluate their future actions. In response actor B may also choose to make a different decision based on the action of actor A. It is at this point that co-evolution occurs. If enough actors within the system elect to change their actions in response to others actions the result can be the development of new knowledge, capabilities and innovation.

However, there is no guarantee that co-evolution will occur. Rather than changing his, or her, own response to the action of actor A, actor B may take action that encourages actor A to, in future, conform to the informal rules already in existence. This is the normal situation in most organizations as it encourages inertia. It is “the way we do things ‘round here” and cannot be

underestimated. Actor A could represent a business manager or unit, and actor B an IS manager or unit (or vice versa – it makes no difference) suggesting why many organizations are unable to achieve alignment.

Under a co-evolutionary view, the fundamental characteristics of environments are uncertainty, complexity, munificence, graininess, fitness and niches (McKelvey 1997), which shape a particular view of the relationship between an organization and its environment. Key characteristics of this relationship are summarized in Table 1. Organizations, or business units, do not lead isolated lives but instead are linked inextricably with others. The success of one organization may therefore be as much a function of what other organizations do as what the organization itself does. Moreover, a cluster of organizations inhabit a landscape (just as a species does) and landscapes are coupled with other landscapes. The actions of a firm therefore not only impinge on its own landscape but on other landscapes too (Kauffman 1995).

An organization's capacity to co-evolve successfully with its environment depends on a large number of factors, key among those are: its fitness function, absorptive capacity, and value creation mode. The notion of the fitness function seeks to capture the idea of how well the organization fits the landscape, in terms of its capability for coping with disorder and uncertainty (Fombrun 1988). Absorptive capacity, which concerns a firm's ability to assimilate new knowledge, including the speed at which it can learn, has a mediating effect on the organization's adaptability (Cohen & Levinthal 1990). Value creation can be pursued through strategies of exploration and exploitation, an idea originally proposed by March's (1991) organizational learning model that links firm adaptation to changes in its population. Exploration concerns the strategy of prospecting for new landscapes to discover new opportunities for value creation. This involves innovation, R&D, venturing, risk-taking, developing new capabilities and investing in the firm's absorptive capacity (Koza & Lewin 1998). Exploitation aims at increasing the productivity of existing capabilities and employed capital and assets. Environmental discontinuities such as new entrants or disruptive technology can promote new conditions for competition and destroy existing competencies (Tushman & Anderson 1986).

Co-evolutionary theory approaches its subject of study by identifying its 1) antecedent conditions; 2) co-evolving activities, actions and processes; and 3) their outcome (Koza & Lewin 1998). For instance, research using co-evolutionary theory has explained the emergence of new organization forms as an outcome of the co-evolution of the competitive

environment, firm intentionality, and the institutional environment of the firm (Lewin & Volberda 1999). For example, Kieser (1989) shows how medieval guilds were replaced by mercantilist factories as markets and institutions co-evolved.

Characteristic	Description	Example of Application
Multi-level effects	Co-evolutionary effects take place at multiple levels within firms (micro-co-evolution) and between firms and their niche (macro-co-evolution).	Organizational novelty (Crowston, 1996); Networks (Ruef, 1996); Organization design (Bruderer and Singh, 1996)
Multi-directional causalities	Co-evolutionary effects result from multi-directional causalities within a complex system of relationships where changes in variables are caused by changes in others.	Competition (Baum, 1999); Micro- and macro-co-evolutionary interdependencies (McKelvey, 1997)
Non-linearity	Co-evolutionary effects are not tractable through a simple cause-effect logic of linear relations between independent and dependent variables.	Casti, 1994
Positive feedback	Actions and interactions between firms and their environments are recursive and result in interdependencies and circular causality.	New organizational forms (Lewin and Volberda, 1999)
Path and history dependencies	Adaptation is path- and history-dependent. Restricting and enabling constraints of organization path dependence.	Social structure (Stinchcombe, 1965); Markets and institutions (Kieser, 1989); Institutional models (Calori et al., 1997)
Smooth versus rugged fitness landscapes	Every time an organization's fitness changes, the fitness of its landscape changes. An increase in one firm's fitness results in a decrease of rival firms' fitness.	Levinthal (1997)

Table 1 Properties of co-evolutionary organization-environment relationships (source: Peppard & Breu 2003).

It has been suggested that alignment can co-evolve at three levels: strategic, operational and individual (Benbya & McKelvey 2006a). Business strategies change (Lewin & Volberda 1999; Mintzberg 1994) and IS strategies must adapt but they must also change to reflect bottom-up emergent strategies that can occur. This requires bottom-up, often emergent approaches, to strategy alignment that rely on collaboration and broad participation from many actors. Achieving this has proved a challenge in practice.

Alignment is a complex system. Any complex system consists of combinations of positive and negative feedback loops. These are a series of cause and effect dyads that, when linked together, form loops with action eventually returning to the originating variable. A negative feedback loop is goal seeking. That is, any action taken by an actor will be nullified by the feedback throughout the loop. The performance of these loops cannot be changed in the long term. Performance tends to oscillate within a relatively narrow band as feedback passes around the loop (Morecroft 2007).

Positive feedback loops are ‘deviation amplifying’ (Benbya & McKelvey 2006a; Morecroft 2007; Sterman 2000). With these loops, an action taken by an actor will be amplified due to the feedback within the loop. A simple example is compound interest in a bank account. Interest is paid and adds to the principal. The next payment of interest will therefore be greater leading to an even greater increase in the principal. That is, growth within a positive feedback loop tends to be exponential. However, positive feedback loops can also promote decay, depending on the direction of the original action. This creates the classic virtuous or vicious cycles. We have observed that the proponents of co-evolution theory generally only consider virtuous cycles. The opposite possibility is generally ignored where, in our case and given the existence of a dominant positive feedback loop, we posit that the extent of alignment could actually be getting worse over time. This deviation is amplified over time entrenching the division between business and IS. This situation is also a form of co-evolution. Both the business and IS groups have reacted to each other's actions to reach this position.

A co-evolutionary view of the dynamic process of mutual adaptation and change of business and IS strategies provides us with a lens that transcends deterministic representations of strategic IS alignment. A co-evolutionary stance allows us to view this phenomenon as the fuzzy, indeterminate, and complex process that more accurately reflects the authentic experience of organizational actors who seek to achieve and sustain alignment in practice. Strategizing in practice is fuzzy because contemporary environments are hyper-dynamic (e.g., the “red queen effect,” cf. Barnett and Hansen 1996; Van Valen 1973), the distinction between external and internal boundaries makes increasingly less sense (e.g., Internet effects, electronic supply chain integration, virtual organization, networks, c.f. Sampler 1998), and IS strategizing and implementation is far from being linear and predictable (e.g., tinkering, improvisation, c.f. Earl 1993; Ciborra 1994).

Methodology

This research used the Glaserian form of grounded theory development (Glaser, 1978), informed by an interpretive epistemology and constructionist ontology, to investigate the process of business/IS alignment. The objective was to develop, rather than test, a theory that could explain practitioners’ experiences in achieving alignment.

Initial data collection was via three unstructured focus groups (Morgan 1998; Stewart &

Shamdasani 1990). Two of the focus groups consisted of six senior IS managers each whilst the third group was made up of three senior business managers. The use of unstructured focus groups partly resolved the dilemma created by Glaser's recommendation that a literature review should not be conducted prior to data collection and analysis (Glaser 1992; Urquhart & Fernandez 2006). As researchers, consultants and practitioners, we were well aware of the literature in the broad area of alignment and we sought to minimize our own biases and assumptions through the use of workshops as a data collection device.

In the conduct of the workshops, we sought to transfer power from us as facilitators to the participants (Blackburn & Stokes 2000); we prompted discussions but didn't drive them. Participants were given instructions on how to self-manage the focus groups prior to commencing (Morgan, 1997). Each group was given two questions to discuss: What do you understand by the term IS/Business alignment? What, in your experience, are the three most important enablers and inhibitors to alignment? Subjects were then able to discuss factors and issues regarding alignment that were important to them rather than being directed to discuss issues identified by the researcher from the literature. Indeed, the initial invitation to participate in the research was framed as a research project to study the achievement of alignment, without being specific as to what we (as researchers) understood by the notion, and that we were looking to draw on their (participants) experiences in achieving alignment. The focus group transcripts were transcribed and analyzed (these lasted between 90 and 120 minutes). From this analysis, a data collection instrument was developed (Fontana & Frey 2000). In-depth semi-structured interviews were then undertaken with nine managers; some of these had participated in the focus groups. These managers were interviewed individually.

Sampling of subjects for both the focus groups and individual interviews was purposive (Glaser 1998; Morgan 1997). Subjects were recruited from a number of industries and organizations of various sizes from small to medium manufacturing firms, to very large Australian based financial institutions and fast moving goods manufacturers, to the Australian branches of large multi-national organizations (see Table 2 for a list of participants).

Participants were also selected to represent various levels of management, from a chief executive officer to line managers. Sampling continued until saturation occurred – when no new conceptualizations emerged from the interview data, no new properties of categories emerged and no new relationships between categories emerged (Dey 1999; Urquhart 2001).

Job title	Reports to:	Mgt levels from CEO	Industry	Interview	Focus Group
General manager	Board	0	Consumer Goods		Y
General manager	Board	0	Financial/IT	Y	Y
Commercial Manager	Senior General Manager	2	Consumer electronics	Y	
Contracts Business Manager	GM Contracts & Transition		IT&T		Y
Managing Director	Self	0	IT Services, Business Consulting	Y	Y
CIO	CEO	1	FMCG	Y	Y
Unix Team Lead	Systems Support Manager	4	Insurance/Finance/Investment		Y
IT Manager	Executive Manager	1	Legal	Y	Y
IT Manager	General Manager	1	State Government		Y
Project Manager	Manager Business Solutions	4	State Government	Y	Y
Business Systems Manager	Enterprise Systems Director	5	Healthcare	Y	Y
IT Manager	CFO	2	Consumer electronics	Y	
Technical Manager		4	IT Consulting	Y	Y
Functional Analyst		5	IT Consulting		Y
Senior Project Manager		4	IT Consulting	Y	Y
Yield Systems Manager	Director of Operations		Airline		Y
Development Project Leader	Head of Development	5	Financial		Y
Senior Business Analyst	CIO	4	Financial Consulting		Y
Head of Project Services, IT Strategy	Head of IT Strategy	4	Finance	Y	
Head of Architecture	CIO	4	Finance	Y	

Table 2 Participant details.

All interviews were recorded, transcribed and then analyzed from an interpretive perspective using the interactive coding family (i.e. open coding, theoretical coding, sorting and memoing). The second author did an initial coding which was then validated by the first

author. Interactive coding does not assume linear causality but rather “... *mutual effects, reciprocity, mutual trajectory, mutual dependency, interdependence, interaction of effects, covariance. This code is an effort to capture the interacting pattern of two or more variables, when the analyst cannot say which comes first. Nor does it matter, probably*” (Glaser, 1978, p. 76). The analyzes, supported with the aid of Nvivo, a computer aided qualitative data analysis software (Richards 1999), was undertaken on three separate occasions and subjected to both open and axial coding (Strauss & Corbin 1990). Later interviews were less rigorously analyzed, being mainly subjected to open and theoretical coding to fill in gaps in the emerging theory to ensure saturation (Glaser 1978).

It was noted at the time that the substantive theory that emerged from the data was, in fact, an example of the more general co-evolutionary theory. It is presented here as such. A feature of many grounded theory reports is that, due to the restriction on *a priori* reading and the insistence on inductive theory development from primary data, the literature is often not introduced until the theory has been at least partially developed. It is then often introduced during the discussion where it is able to “include, transcend, synthesize and organize” the extant literature (Glaser 1996, p. xiv). This paper does not follow this tradition in presenting the research and has included a section presenting both a review of the alignment and co-evolutionary theory literatures.

A Co-evolutionary Model of Business/IS Strategic Alignment

The core concern of the IS managers participating in this study was the difference between espoused business strategies and those they could see being implemented by their managerial peers in the business. This, of itself, probably explains the central challenge of achieving alignment. Some of the managers in this study were able to resolve this situation by forming relationships with their business colleagues, engaging in a continuous interaction and dialogue with them. Others were not. The discourse that follows shows why some IS managers can form productive relationships that leads to co-learning and collaboration while others struggle in this quest. The data suggests it rarely has anything to do with individual desires. From the model in Figure 2, derived from our data, we demonstrate that feedback within various loops determines what is generally possible within a given organization. The data also revealed that where IS managers are able to form relationships and have productive conversations they tended to support the actions and priorities of their business manager

peers, not any explicit strategy.

Participants indicated that collaboration between IS and business managers is the most important aspect of alignment which can be loosely defined as business and IT personnel working together to achieve a common goal. Consequently, the model presented in Figure 2 centers on collaboration and does not include a specific variable for alignment. Moreover, the model will demonstrate why encouraging dialogue and collaboration between IS and business units can be so problematic for many organizations.

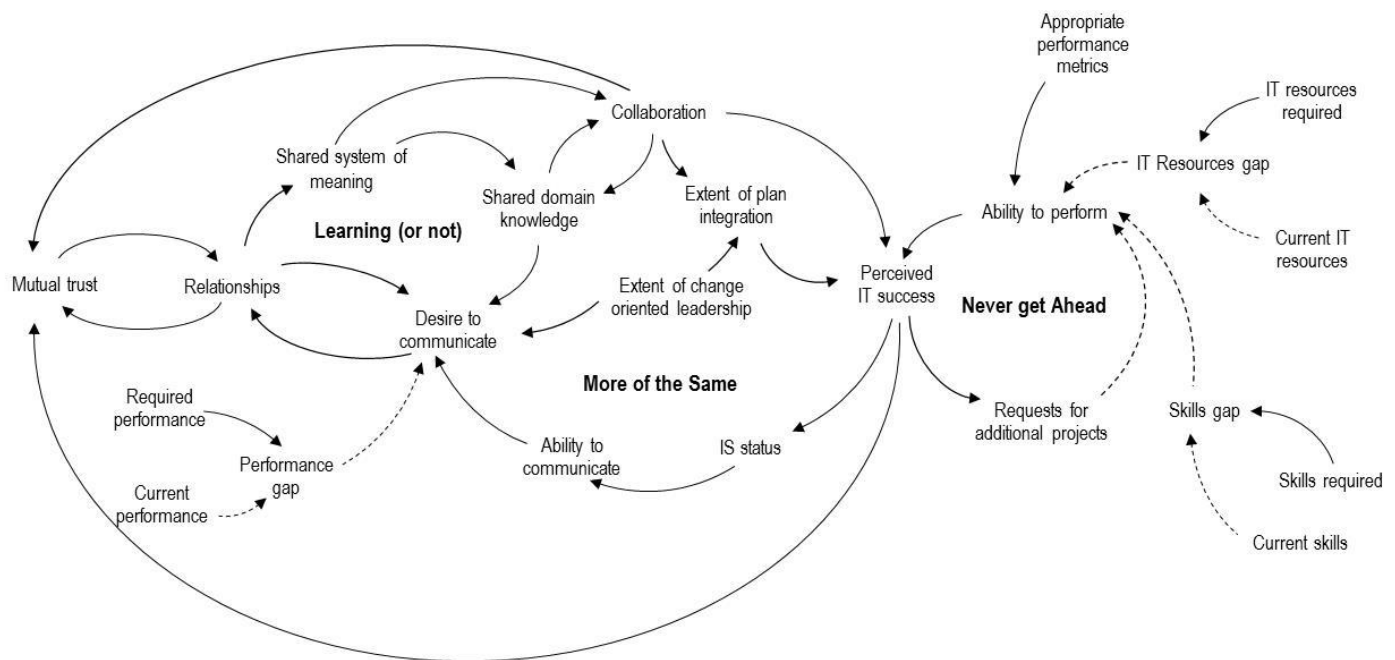


FIGURE 2 A co-evolutionary model of IS/Business alignment.

Each variable in the model represents a level – the item described by the variable name could be measured if needed (variable are defined in Table 3). Each variable is connected to at least one other variable via an arrow. The direction of the arrow indicates the causal influence is either positive or negative. A positive connection, denoted by a continuous line, indicates that any change in the causal variable will instigate a change in the same direction in the target variable beyond what it would otherwise have been (Stermann 2000). For example, reading from the right hand side of the model, any increase in *IT Resources required*¹ will cause an increase in the *IT Resources gap* above what it would otherwise have been. The opposite also applies: any decrease in *IT Resources required* will lead to a decrease in the *IT resources gap*

¹ For ease of exposition, variables in the model are *italicized*.

below what it would otherwise have been. A negative connection indicates that the reaction of the target variable is in the opposite direction to the movement in the causal variable. For example, an increase in *Current IT resources* will lead to a decrease in *IT Resources gap* below what it would otherwise have been.

In the model, *IT Resources gap* and *Skills gap* are included because the data suggests that both impact *Ability to perform*. If either the *IT Resources gap* or *Skills gap* increases, then the *Ability to perform* will decrease below what it would have been before these gap existed. However, the data also indicated that *Appropriate performance metrics* also impact *Ability to perform*. This is because a number of managers suggested that the rhetoric within their organizations was that IS should seek out opportunities for innovation while the reality was that, in some organizations, IT was measured purely on its cost to the organization. This is a classic case of rewarding for B while hoping for A (Kerr 1995). Individuals and groups will always perform to the performance metrics being applied (i.e. what gets measured gets managed), not what management would like to achieve (Kerr 2003). The connection in Figure 1 illustrates that, provided *Appropriate performance metrics* are being applied, then the *Ability to perform* will increase above what it would otherwise have been. Conversely, if the performance metrics are inappropriate then the ability of the IT group to perform to the desired standard will decrease.

<i>IT resources required</i>	Resources needed to execute current portfolio (projects and services)
<i>Current resources</i>	Resources available; people, money, skills
<i>IT resources gap</i>	Difference between required and available resources
<i>Appropriate performance metrics</i>	What is measured/assessed (aspects of performance that is assessed)
<i>Ability to perform</i>	Ability to undertake projects/deliver services
<i>Perceived IT success</i>	Perception held by business executives in relation to performance of IT
<i>Request for additional projects</i>	Business demands for new projects to be delivered
<i>IT status</i>	Perceived role of IT within organization, perception of IT and history of relationship between business and IT
<i>Ability to communicate</i>	Capacity and aptitude to communicate
<i>Desire to communicate</i>	Aspiration to communicate
<i>Relationship</i>	Common bond
<i>Mutual trust</i>	Trust that is reciprocated
<i>Shared system of meaning</i>	Ability to understand each other
<i>Shared domain knowledge</i>	Common and revealed understanding
<i>Collaboration</i>	Working together for a common outcome
<i>Extent of plan integration</i>	Degree to which business and IS plans are aligned
<i>Required performance</i>	Expected performance from IT
<i>Current performance</i>	Actual IT performance
<i>Performance gap</i>	Gap between expected and actual performance

Table 3 Definitions of variables.

Tracing around this loop, if the *Ability to perform* increases it will contribute to *Perceived IT success*. However, the experience of most of the IS managers suggested that a result of an improvement in their (i.e. project) success was that they then received *Requests for additional projects*, but usually without being provided with additional resources. This then adversely impacted their *Ability to perform*. This is a negative feedback loop. Thus, there exists an apparent paradox: an initial improvement in *Ability to perform* will eventually result in a reduced *Ability to perform*. Similarly, when considered only as a part of this loop, *Perceived IT success* will also tend to oscillate within a narrow band.

This latter construct was developed by the group of IS managers in the first focus group. Although acknowledging it as an over simplification, they indicated that it captured their experience in not being able to sustain improvements in project performance. It is included in the model because these IS managers believe that *Perceived IT success* eventually impacts their credibility, or *Mutual trust*, and consequently communication and their ability form relationships with business managers. This belief is consistent with earlier research (Bashein & Markus 1997). However, unlike the managers in the study of Bashien & Markus (1997), our managers understood that improving their technical abilities was not an effective method of improving *Mutual trust* as a precursor to instigating communication with business peers.

This negative feedback loop has been labeled “Never Get Ahead” in Figure 1 as it captures the essence of the experience of the IS managers interviewed. The loops “*More of the Same*” and “*Learning (or not)*” are positive feedback loops that exhibit deviance amplification (Lewin & Volberda 1999). If an increase in *Perceived IT success* is achieved then *IT Status* will also improve beyond what it would otherwise have been. The latter variable is expressed at a high level of abstraction and from our data incorporates:

- The perceived role of IT within the organization, whether this is as a potential source for competitive differentiation or a low cost reliable service. This role affects the governance, authority and autonomy of the IS group. It also impacts organization structures and the physical location of IS personnel – whether they are located away from, or within, the business unit(s) they support.
- The perception of IT, whether it is considered helpful or dysfunctional. *IS status* also includes the attitude of staff towards the IS group.
- The history of the relationship between the IS organization and the business.

Some participants suggested the level of *IS Status* was partly due to the relative youth of the IS discipline and a corresponding lack of understanding by business managers of their role in the process generating business value. A CIO of a large fast moving consumer goods manufacturer commented:

... technology is still seen as being separate. It's still the mystical thing. It's still a little bit 'black boxy.' It's still 'that's the IT guys sitting over there, and we don't want to talk to them and they don't want to talk to us. And they're propeller heads and we don't understand what they do but, oh shit, we better humour them a bit.' There's a bit of that still, and it's not just about the strategy bit. It's about the whole engagement.

In this study *IS Status* was identified as the variable having the most effect on an IS manager's ability to make choices and take action. Within the first minute of the first focus group an IS manager remarked:

... things are already in place with history. Things that happened in the past and it takes a very professional view to get past mistakes and bad experiences and still work together in the future.

Where *IS Status* is low, the actions of IS managers are usually restricted to meeting an

expectation of a low cost and reliable IT infrastructure. According to one interviewee, the attitude of IS managers working in this environment is often one of *"I do what I'm told."* Consequently, in such contexts, communication with business managers is not encouraged. IS projects are often "given" to the IS group without prior discussion. In such situations, the IS group tends to be physically isolated from the rest of the business which further impedes communication. This has a knock-on effect on the development of relationships and trust between IS and business managers and units. The data suggested this aspect to be particularly important in achieving alignment.

Where *IS Status* is high, the data indicated that it is likely that the perceived role of IS will be to support the achievement of strategy. Because of this, business managers are more inclined to reciprocate communication with IS managers. The focus of an IS group in this environment *"is adding business value,"* whilst its attitude is *"keep our customers happy."* IS managers in the study also indicated that where *IS Status* is high they tend to have more autonomy and authority. Moreover, the CIO is also more likely to report to the CEO rather than another executive officer.

The data suggests that as *IS Status* improves then both business and IS managers will have a greater *Ability to communicate* as well as a *Desire to communicate*, as the environment in which they work makes communication possible. The opposite also applies. Where *IS Status* is low, managers have less ability or desire to communicate. Low *IS Status*, a poor history of IS project delivery, fractured relationships and a perception of IS being a cost of doing business, can mean that there is little advantage to a business manager in interacting to any great extent with an IS manager. Any approach by an IS manager to expand the scope of dialogue is likely to be rejected unless there is mutual benefit (Brown 1993).

When discussing communication, interviewees and focus group participants emphasized communication that influenced the decisions of others, not merely casual conversations. Their concept of communication was therefore similar to the 'mutual influence' of Nelson & Coopride (1996). From their experience, the managers in the study universally believed that communication together with the development of positive working relationships and trust is essential in attaining alignment. An ex-CIO emphasized the role of trust and relationships:

That's what the relationship is about. It's building trust to a point where when you hit a road block in the communication you've got something to come back from, to rebuild from. ...relationships kept the channel of communication

open for when there was a problem. So it's not that something goes down railroad tracks and never comes off the path, things always come off the path. It's about how quickly and how accurately you get feedback...

He later commented that a strong trusting relationship can help repair a broken process but establishing a new process or governance mechanism will never fix a broken relationship.

Our participants indicated that *Communication* is essential in the development of *Relationships* between people, in this instance between business and IS managers.

Confirming what the research literature reports (e.g. Lewicki & Bunker 1996), our participants indicated that there is a recursive relationship between these two variables.

Communication is essential to commence a relationship, but as a relationship develops it both requires and encourages further communication (Lewicki & Bunker 1996). However, we find from the data that meaningful communication can be difficult instigate where *IS status* is low, as it is unlikely that relationships and trust will develop between IS and business managers.

A confounding influence is that relationships and trust are most likely to develop between people who have something in common but this is often not the case when considering IS and business managers. One major area of difference can be their separate language and systems of meaning. A CIO elaborated:

Maybe one of the issues is that people who are in those senior roles within a functional area are there, to a large extent, from their success in their functional area. And, for whatever reason, that sort of blindsides them from being able to take someone else's perspective. So, an HR director might not be able to see why their input is crucially important to an information systems plan and vice versa.

This same CIO then gave an example. He was at one time the CIO of a publishing firm and was attempting to work with book editors. In this role he described their work using the term “process” which he thought self-explanatory. However, the editors related a process to manufacturing, not the work they were doing which they considered to be creative. They were fearful he was attempting to downgrade their role to that of a production line worker.

When probed, a senior IS manager nominated a shared system of meaning as a most important enabler of alignment, commenting:

The ability of IT staff to understand business issues and communicate new things in the language of the business. So, not just talking in bits and bytes,

but talking in terms of strategic direction and enabling that stuff to happen

Our data suggested that as *Desire* and *Ability to communicate*, *Relationships* and *Mutual trust* begin to improve so does a *Shared system of meaning*. Members of both the IS and business units begin to understand each other's language, improving interactions and communication. This, then, reduces the perceived differences between the two groups, encouraging further communication.

The data indicates that improvements in a *Shared system of meaning* can also lead to increases in *Shared domain knowledge* which, according to earlier research, is the variable that has the most impact on performance (Nelson & Coopride 1996) and in achieving alignment in the long term (Reich & Benbasat 2000; Preston and Karahanna, 2009). Moreover, the data further signaled that this can lead to improved collaboration between IS and business units.

The relationship between communication, trust, shared system of meaning, shared domain knowledge and performance is well understood in the management literature (Nahapiet & Ghoshal 1998). This, then, creates a separate positive feedback loop, what we have labeled "Learning (or not)" in the model. An increase in meaningful communication fosters relationships and trust between IS and business managers. As this occurs, they build a shared system of meaning and shared domain knowledge. Thus, the understanding, knowledge and abilities of both groups co-evolve. Furthermore, the data suggests that as shared domain knowledge improves it encourages further communication, creating a positive feedback loop. But, as with all positive feedback loops, the amplification can also be negative. If *IS Status* discourages communication then the value of all the variables in this loop will also decay over time.

Shared domain knowledge is also part of a larger feedback loop, "More of the same", that includes all the variables so far discussed as well as *Collaboration* and *Perceived IT success*. With respect to alignment, the objective of the IS managers interviewed in developing relationships and shared domain knowledge was to understand the goals of their business peers as these were often different to the priorities and strategies contained in formal plans. An IS manager in a multi-national consumer goods manufacturer commented:

How do you know if what you're doing is in the right direction if you don't have these relationships? You develop the networks, you develop an understanding of what the business wants, or the strategy that is required. If

you didn't have the relationship you couldn't be in alignment, because what would you be in alignment with? You wouldn't know anything.

Understanding of business managers' priorities allowed IS managers to collaborate better with their business peers and assist them in achieving these. An observation we made during our analysis (which we didn't investigate further), was that IS managers tended to form relationship with peer level managers, not with managers at a higher hierarchical level. Their primary concern was to support their peer's goals, not those of the organization as a whole which they reported as often being difficult to understand and implement at an operational level.

The majority of the participants in the research indicated that it is the relationships and extent of collaboration that facilitates closer alignment, not an analyzing a strategy document. One CIO noted:

... the work I did on the IT strategic plan a couple of years ago, it was more the relationship building which aligned IT with business areas, and more the communication than the plan itself. It was the act of working with the people which aligned it. I mean the plan, it really was irrelevant what it said. If the fact it brought us together and got us talking, and meaning that we made eye contact in the lift, rather than looking at the numbers or whatever. That was what helped the most, I think.

When probed, she noted that the plan only documents intent and while it provides some overall direction, she did not regard it as central for achieving alignment. For this, she espoused the critical importance of relationships and collaboration at an executive level:

I mean the main thing I think it comes down to is the legitimacy we have within the organization. And that's largely based on the personal relationships between the executives and our management. So that when that breaks down, we've got real problems. And it's broken down before a few years ago, but it's quite good at the moment. And I see that as the main groundwork for aligning. If that's not there then it's really difficult to build on anything.

Where collaboration occurred, the emphasis of IS managers was on providing business value and keeping their (usually internal) customer happy. This impacts *Perceived IT success*. Both IS and business units and managers were thus coevolving in their understanding and

construction of shared meaning. Where a virtuous cycle is evident, managers learn about each other's problems, challenges, constraints and also what they were attempting to achieve. This further encouraged *Collaboration* and improved *Perceived IS success* and, eventually, *IS Status*. Given this situation, participants acknowledged that it is more likely that they will be invited to contribute to strategy discussions. Likewise, it is more likely that senior business managers will be involved in the development of IS strategic plans, leading to a higher level of alignment.

From our analysis, there appears to be a positive correlation between *Collaboration* and *IS Status*, particularly in relation to the attitude of business managers towards the role of IS within the organization and also in the governance, authority and autonomy of the IS function. We observed that where collaboration occurs between IS and business units and managers, the CIO is more likely to report to the CEO. We also detected that it was often the case that in this situation the IS group had some discretionary funds available to experiment with or run pilots, improve services or meet other emerging needs.

In every instance where collaboration between IS and business units and managers was not evident, the CIOs of the organizations represented in our study reported to either the CFO or another executive officer. In each of these organizations, IT was treated as a cost centre with an ongoing focus to reduce spending on IT. CIOs in these organizations reported that they responded to this expectation, providing a reliable, low cost service making few, if any, suggestions as to how IT could be harnessed strategically. Often, this was not necessarily because they didn't want to – in most instances it was because the environment meant they were unable to make suggestions. Any recommendations inevitably involved spending, which was not supported by the CFO to whom they reported. Although anecdotal, we detected a high degree of frustration in the IS managers and CIOs operating under these conditions.

We also observed a tendency in these organizations to outsource business process improvement initiatives. An example was a large multi-national electronic consumer goods manufacturer. The rhetoric of senior management was that IS provided competitive advantage to the firm. The reality according to a senior business executive within the firm was that IS was measured solely on cost. The IS group reported to the CFO; its primary function was to maintain the internal network at the lowest possible cost. When this organization decided to implement an ERP system the internal IS group was not consulted, nor was it a part of the implementation. Business managers became the project leaders and consultants were used for the rollout. However, the internal IS group was then expected to maintain the new hardware

and application. In the words of the CIO, “*the IS group has no influence, no authority and no autonomy.*”

We also noticed that where collaboration between business and IS groups was low the IS group had relatively few discretionary funds available. In most instances, funds were tied to individual projects with IS managers resorting to creative accounting practices to free up some of those funds available for other activities. Where collaboration did not exist, business and IS plans were created in isolation and usually did not refer to each other. In either situation, high or low levels of collaboration, there was a strong connection to *Perceived IS success* and then to *IS Status*. This connection completes the loop.

The IS group within his organization had very low status. It was measured on cost and reacted accordingly. One effect of considering an IS group as being a cost centre is that there was then little need to communicate and collaborate. A consequence was that the IS group is then labeled unhelpful and uncommunicative by the rest of the business. The CIO of this firm then launched an initiative to change this situation by issuing monthly reports that he believed would be of value to business unit managers. It was a first attempt at communication. These reports were rejected on the basis of their being created by the IS department and therefore, from their perspective, unreliable and using suspect data. Our subject said that no attempt was made by business managers to verify the validity of the data and reports. By automatically rejecting the reports the business managers avoided questioning their own beliefs and attitudes while at the same time maintaining the status quo. Communication, trust and collaboration between business and IS in this organization remained virtually non-existent. From the interviews, it seems that it is always the IS group that is perceived as uncommunicative even though business personnel may be reluctant to commence communication.

The data demonstrated that the effect of positive feedback loops reinforce the presence or absence of collaboration between IS and business managers and groups within an organization. However, it is possible than an instigating event, or trigger, can change the behaviour of a positive feedback loop (Benbya & McKelvey 2006a). For example, once IS manager told the story of being approached by a new partner in the medium sized law firm where he worked. This partner had previous positive experiences with IS and suggested evaluating a new technology. The IS manager responded positively and the resultant project was deemed a success and further requests were made. In the words of the IS manager “*communication happened.*” This scenario then spread to other partners and sections of the

business resulting in a generally higher degree of collaboration between IS and the business. When related to our model, the partner wanted an improvement in overall performance leading to an increase in the *Performance gap*. The partner's *Desire to communicate* then increased as a first move to improve performance. The data indicates this is a typical starting point.

Positive feedback loops can form either virtuous or vicious cycles and while a trigger event can tip a vicious cycle into a virtuous cycle, the opposite is also quite possible. An IS manager at a large Australian financial institution reflected on the situation at his organization:

a lot of that is based on our history, back when a number of events occurred in the early 90's [this organization had a major IT project failure during this period which, together with a number of unrelated poor business decisions, almost led to its bankruptcy]. Confidence in IT was lost and so a lot of autonomy was removed from the IT organization and so the account [function] basically came in to drive IT and took a lot of the business management out of it. A lot of that appropriate risk taking out of it, out of the IT organization. So that's why at the moment it's like 'Here's a project. Fill that order and deliver something'.

Changing this situation was proving difficult, but an assessment of the progress at the time of interview was:

Improving! Some of the business units have created their own IT areas which are not part of IT because they were not happy with the service being provided to them. ...others are quite dependent on IT [group] and the relationships are improving, I think, over the last 12 months... We have put on 4 business unit CIO's who are there to work directly with the business unit heads to improve relationships and the services. So, I would have to say that it is improving from a pretty poor base in the first place.

Changing the behavior of a positive feedback loop can be challenging. Since the completion of this study a newly hired CFO has reversed these actions, re-establishing the IS function as a cost centre. One of the IS managers interviewed for this study no longer works for the organization.

Discussion

We set out with this study to explore the achievement of alignment between business and IS strategies and to capture descriptively what occurs in organizations as they seek this objective. Acknowledging both the processual nature of alignment and the futility of viewing alignment as a snapshot, from our data we sought to map out what participants in the study were telling us regarding their experiences of achieving alignment over time. As we have noted, the bulk of the extant research reduces the inherent complexity of alignment to allow investigation of direct causal relationships. With this reductionist approach it is difficult to gain a full understanding of the whole; that is, we have difficulty reassembling the individual pieces of research that have resulted from five decades of study. For example, Luftman and Kempaiah (2007) have identified six components of what they refer to as “alignment maturity” (i.e. communications, value, governance, partnership, scope and architecture, and skills). Each component can be sourced in the literature, is measured independently, with no indication as to how they are related or interact with each other. In our study we sought to embrace this complexity and empirically capture the messy nature of alignment in practice. While our model reflects the findings of Luftman (1999, 2001), Chan (2002), Reich and Benbasat (2000), Nelson and Coopride (1996), Johnson and Lederer (2005), Tallon (2007), Tan and Gallupe (2006), Bergeron, Raymond and Rivard (2004) and others, we looked to identify causal, non-linear and multi-directional relationships and interactions with associated feedback loops. As exemplified in Table 4, the model we developed in Figure 2 exhibits the properties of co-evolution identified by Lewin and Volberda (1999).

STRATEGIC ALIGNMENT: BUSINESS STRATEGY-IS STRATEGY CO-EVOLUTION

Characteristic of Co-evolution	Example of application from model
<i>Multi-level effects</i>	IS managers align their actions to those of their peer business managers. This can result in many outcomes. For example, where collaboration exists it is likely that intended business and IS strategies are aligned via the collaboration and actions of the CIO and other executives. However, due to the performance measurement criteria placed on business managers, and other issues, a catch-22 situation can exist where implemented strategies may not reflect intended strategies.
<i>Multi-directional causalities</i>	The development of relationships between IS and business managers is dependent on their ability to communicate. However, as the relationship develops it encourages further communication. Similarly, a developing relationship can engender trust that then further improves the relationship.
<i>Non-linearity</i>	The research presented here indicates that instead of variables being connected in a simple cause-effect logic of linear relationships they are, in fact, part of feedback loops. Examples are the loops "Learning (or not)", "More of the Same", and "Never get ahead" included in the model.
<i>Positive feedback</i>	Also known as self-reinforcing feedback – positive feedback strengthens the existing situation. If <i>IS Status</i> is low, there is little incentive to communicate. Therefore relationships between IS and business managers tend not to develop, inhibiting a shared system of meaning, shared domain knowledge and collaboration. This then adversely impacts IS performance, supporting the organization's poor view of the IS function, and strengthens a low <i>IS Status</i> . Conversely, high <i>IS Status</i> encourages communication which will, after intermediary impacts through the feedback loop, improve <i>IS Status</i> even further. A feature of positive feedback loops is that they tend to exhibit exponential, or non-linear, growth (or decay).
<i>Path dependency</i>	The effects of positive feedback loops ensures that the status quo tends to be strengthened over time. Where <i>IS Status</i> has historically been low it will be difficult for an IS manager to successfully instigate meaningful communication in an attempt to develop a relationship, build shared domain knowledge and achieve collaboration.

TABLE 4 Co-evolution and strategic alignment.

A feature of positive feedback loops is that the value of variables within them tends to exhibit exponential growth (Stermann 2000). This means any initial changes in the behavior of the system may be almost imperceptible, especially where the instigating event is insignificant but the impact can be far reaching. There are two ramifications of this. Firstly, seemingly insignificant events, perhaps early in an organization's life, can pre-determine the role of IS within that organization. For example, Gramignoli, Ravarini and Tagliavini (1999) have reported that the principals of small to medium enterprises (SMEs) normally recruit IT managers according to their technical expertise, not their ability to provide commercial and strategic input. Additionally, they also found that senior business managers within SMEs tend not to have an understanding of the strategic use of IT. This is a trigger event, suggesting that the principals may see no reason to communicate and collaborate with his IT manager on strategic issues. From this scenario it is likely that poor IS/business relationships, weak

collaboration, and little, if any, IS innovation are the norm in these organizations and, due to the effect of the positive feedback loop, this situation is sustained over time. This proposition is partly supported by earlier research (Thong & Yap 1995).

Secondly, any attempt by an individual to change such a situation is more than likely to be rejected. The large Australian financial services organization in our study was an example of this. However, if the recipient is amenable to a change in the situation the effect is likely to be unnoticed by others within the organization. It is only over a considerable time, with more people becoming enrolled in the adoption of behavioral and other change, that an overall change can be seen. The law firm in our study is an example of this scenario. Improving collaboration from the bottom up is possible, but it is likely to experience many rejections and take considerable time to percolate to the senior ranks of the organization. This then raises the fundamental question of how to break a vicious cycle of misalignment.

Our model can help explain the anomalies observed by Sabherwal et al. (2003) in their study. There is no guarantee that the underlying beliefs, attitudes and perception of IS contained within *IS Status* will change during a crisis; people may just work harder, rather than differently. At the end of the crisis either the system described in Figure 2 has been tipped from one cycle to another, or the status quo will re-assert itself. The executive in our study from an Australian retail bank described a crisis that did result in a dramatic change in *IS Status* and the knock on effects on the overall behavior of the system. The system is now reinforcing the new context.

The “tightly coupled” nature of the model means that a change in the value of any one variable can have an impact on other variables. A new CEO, for example, who may not hold the same views as his predecessor of IT and its potential could have a negative effect on the extent of alignment. Reducing resources for IT, perhaps due to a cross-the-board budget cuts, can potentially reduce “success” and this can have an impact on *IS status*.

When considering the loop “More of the Same,” it is clear that an improvement in any variable will cause improvements in all other variables beyond what they would otherwise have been. Similarly, any erosion of the value of any variable will lead to erosion in the value of all other variables. The deviance amplification nature of positive feedback loops means that a situation where collaboration is apparent or not will be strengthened over time. Changing the situation then becomes problematic.

As our model illustrates, *Perceived IT success* stems from *Collaboration*. It is also impacted

by other variables. However, increased *Collaboration* could result in more resources being made available, increasing *Ability to perform* which impacts *Perceived IT success*.

The loops in the model operate at all levels of an organization: executive, senior management and operational. It is quite possible, although unlikely, that the major positive feedback loops in Figure 2 could exhibit virtuous tendencies at an executive level, but vicious tendencies at an operational level. A more likely scenario is a generally virtuous cycle operating at all levels of the organization. Although communication, trust and collaboration may be evident, overall alignment may not be. At an executive level, strategies and plans may be aligned. However, many operational level business managers may not implement business strategies as intended due to the performance metrics applied to them and other factors (Kerr 2003). Operational level IS managers then support the goals and actions of their business peers and not the overall business and IS strategies. This “catch-22” phenomenon has been observed by other researchers (Nordstrom & Soderstrom 2003).

There are a number of variables that are not contained within loops. These include variables related to required performance, resources and skills. The former can be either required business or IT performance – it doesn't matter which. It can represent an organizational crisis of some kind that requires a dramatic improvement in performance. However, during normal times of operation the performance gap remains constant, or nearly so, and therefore has little effect on the feedback loops.

The influence of path dependency

The data from this study indicates that both business and IS managers within an organization must first have the ability and desire to communicate, trust each other, develop a shared system of meaning and then to collaborate. The opposite is just as possible; they may make an unconscious decision not to collaborate. In either case the deviance amplification behavior of the positive feedback loops within the alignment system reinforce the situation. This, then, impacts the extent of alignment as it has been conclusively demonstrated in the literature (Chan 2002; Nelson & Coopride 1996; Preston & Karahanna 2009; Reich & Benbasat 2000). It also explains the seemingly intractable nature of alignment and why it has remained a major issue for so long.

Where such a vicious cycle exists, managers must be open to approaches by their peers to break the cycle. The danger is that they react unconsciously the way they always have due to

the influence of *IS Status*. Most people do this as it is efficient, reacting automatically according to the unwritten rules of the environment, without questioning consequences or underlying beliefs and assumptions (Tversky and Kahneman 1974; Argyris 2003; Senge 1990). Although Benbya & McKelvey (2006a) did not consider path dependence and history in their co-evolutional model, our data suggests that it is vital when considering alignment. Past actions and outcomes bound future actions by constraining intentions. Every IS manager within this study who worked in a situation where *IS Status* was low lamented that most attempts to commence meaningful communication with business peers were usually rejected. Others gave examples of approaches by business managers being rejected by IS peers. Both parties are equally, and unknowingly, guilty.

Because of path dependence and history limiting future actions, we postulate that it is normal that most instigation events, or triggers, will need to be large rather than insignificant. It normally takes a crisis of some kind before organizations will change existing processes and work practices and behaviors (although this is not always guaranteed). This is the basis of the punctuated equilibrium model of alignment (Sabherwal, Hirschheim & Goles 2003). A senior IS manager within a large Australian financial institution provided us with an example. An organization he previously worked for was a newly formed retail bank and under Australian law it was protected from takeover bids for a period of 10 years after incorporation. That period had nearly expired and the bank needed to triple its share price within a short period to maintain its independence. The CEO effectively 'locked' 300 senior managers from all functional units within a room for three months. They were told to come up with suggestions how the bank could increase its share price. Some 3,000 recommendations were made. These were then grouped together to form projects that were then prioritized with many of these accepted by the bank's leadership team and implemented. During this period of time both business and IS managers were forced by circumstances to work together, and while there were struggles and frustrations in the early weeks, the necessity to communicate led to a mutual understanding, shared domain knowledge, shared vision and a resolution of common problems. The bank managed to lift its share price to the required level within the required time.

A result of this experience was that both IS and business managers continued to collaborate as they had changed their beliefs and attitudes towards each other. When new business projects were being considered IS managers were immediately invited to participate and actively questioned on how IS could contribute to project success. A side effect was that IS

projects associated with these business projects were adequately resourced and headed by a business sponsor.

During both focus groups and interviews trust and its importance was frequently mentioned. When we studied the transcripts we noticed that the concentration was on the development of relationships and trust between individuals. This is reflected in the business and IS literature that considers, for example, relationships and trust between CEOs and CIOs (see, for example, Feeny, Edwards & Simpson 1992). However there is a difference between trust between two people and trust between groups of people, that is rarely explored in the literature (Zaheer, McEvity & Perrone 1998), particularly the IS literature. Although Zaheer et al (1998) investigated trust between organizations within a supply chain their work is equally applicable to units within a single organization. Significantly they found that there is a direct relationship between inter-organizational trust (or intergroup trust in our context) and performance. They hypothesize that this is due to cooperation between units in exploring new information and coordination technologies as well as cooperation in product and process innovation. Conversely, they found that low levels of intergroup trust were associated with conflict and dysfunctional processes. Zaheer et al. (1998) also found that where intergroup trust is high it will withstand the exit of a significant actor as any new actor will be inculcated with a trusting attitude on joining the group. High levels of intergroup trust are often able to withstand setbacks such as a less than optimum project outcome.

The above is important for alignment. If intergroup trust exists then it is more likely that business and IS groups will collaborate to discover new ways in which existing technology can be used. They will tend to solve mutual problems rather than remain remote from each other. At the same time the trust will mitigate the effects of an occasional poor project performance. If a CIO who is working in this situation decides to leave for some reason it is likely that his or her replacement will more quickly develop a relationship with the other executive officers.

Significantly, Zaheer et al (1998) discovered that trust between individuals had little direct impact on performance. It appears that individual trust is important during the development of group trust but does not have a direct impact on performance. But, personal trust is positively connected to "... attitudes, perceptions, and other cognitive constructs" (Dirks & Ferrin 2001, p. 455). That is, the situation where *IS Status* is low is unlikely to change until personal relationships and trust is developed between individuals in both groups. Earlier research indicates that most IS managers believe that their credibility and trustworthiness are

a result of their technical ability (Bashein & Markus 1997). In particular, operational level IS managers within this study also indicated they spent most of their time attempting to increase their project performance to increase credibility even though admitting that they understood that developing relationships with business peers was more effective.

We suggest that the level of trust and relationships developed between CEO and CIO may be necessary for the development of a shared vision and integrated organizational and IS strategies (Reich & Benbasat 2000; Johnson & Lederer 2005), but that trust and relationships between IS and business groups may be necessary for the implementation of the vision and strategies. Zaheer et al's (1998) work would indicate that trust developed between a CEO and CIO is a necessary but not sufficient condition for business and IS units to collaborate.

A re-interpretation and extension of multi-level effects

Multi-level effects are a cornerstone of co-evolutionary theory. The extant research that has drawn on co-evolutionary theory has interpreted and presented 'levels' as concerned with organizational levels (Vessey & Ward 2013; Allen & Varga 2006; Benbya and McKelvey 2006a) or 'layers' (Schlosser et al. 2012). While the intersection of staffs from different organizational levels was evident from our study, a deeper analysis of our model suggests that levels can also be interpreted as cognitive, social, behavioral, intellectual and structural. In Figure 3 we designate each of the variables in our model to one of these categories.

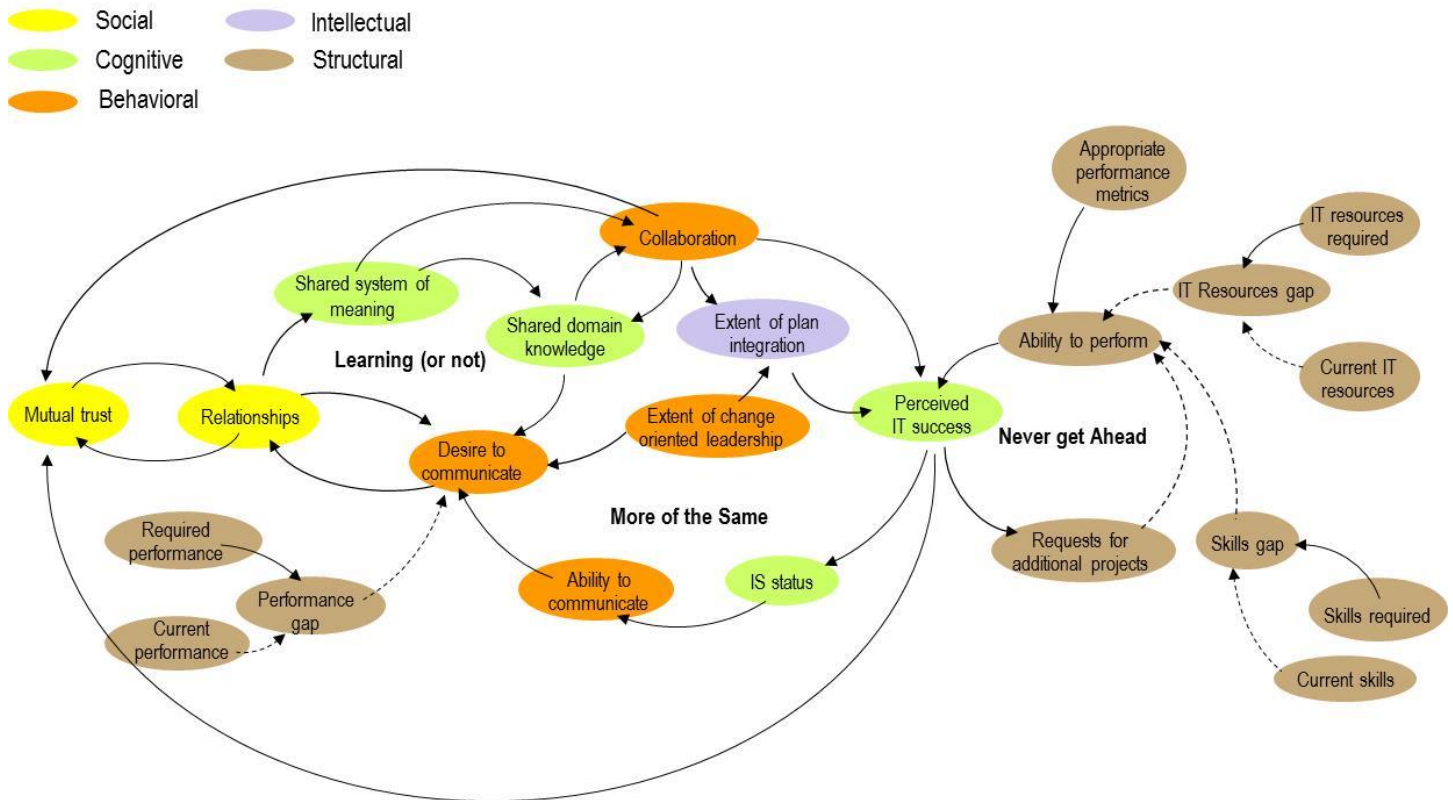


Figure 3 The multi-level effects of alignment co-evolution.

Cognition refers to the set of mental abilities and processes related to knowledge: attention, memory, judgment and evaluation, reasoning, problem solving and production of language. *Social* is concerned with the interaction of people with other people and to their collective co-existence, irrespective of whether they are aware of it or not, and irrespective of whether the interaction is voluntary or involuntary. *Behavior* can be regarded as any action of people that changes their relationship with others. Behaviors can be either innate or learned and their response to various stimuli or inputs, whether conscious or subconscious, voluntary or involuntary. *Intellectual* are plans, documents and intensions. *Structural* captures activities such as task allocation, coordination, and accountabilities that are directed towards the achievement of organizational aims. It also includes metrics.

Figure 3 illustrates the interplay between these levels. It shows, for example, how structural choices influences behavior; how the cognitive variables also influence behavioral ones; and how social aspects influence the cognitive. The implication for the achievement of alignment is that you cannot isolate one aspect, for example the structural and design and implement an IT governance structure, without also addressing the other domains. This demonstrates the complex process of achieving alignment over time. It also questions the utility of research which attempts to reduce the inherent complexity of alignment by isolating a single aspect

such as studying the social dimensions of alignment without also engaging with, for example, the cognitive, behavioral and structural levels. These are interdependent and coevolution is the joint outcome of managerial intentionality, institutional effects and the environment.

Learning (or not) as a determinant of the extent and speed of strategic alignment

One of the managers that we interviewed defined alignment as “*business and IT working together to achieve a common goal.*” This might be a business manager seeking to execute a particular strategy or meet a particular goal. It could also be an IS manager seeking to bring a new technology to the attention of a business colleague. “Working together,” or *Collaboration* as we have defined it in our model, will only occur if there is communication between both parties, mutual trust, shared domain knowledge as well as the ability to understand and represent the knowledge of the other party. For this to occur, we must look beyond mere relationships. For example, we can have a good relationship with colleagues from the physics discipline, but would struggle to understand the Higgs Boson theory.

The model helps elucidate and expand on the prescriptions that are found in the literature regarding relationships. Luftman et al. (1999), for example, has reported that an enabler of alignment as “business-IT partnership” (with IT/business lacking a close relationship as an inhibitor) but provides little detail. It also helps us go beyond the “informal networks of relationships” as described by Chan (2002). The purpose of establishing *Relationships* is for access to knowledge and knowledge is concerned with cognition.

Our data points to the fact that achieving alignment has a strong cognitive dimension. In line with the finding of Tan and Gallupe (2006) our data indicates that there is a strong connection between the extent of business IS-alignment and the shared cognition between business and IS executives. More specifically, our analysis indicates that alignment is related to learning. We would postulate that absorptive capacity has a strong influence on alignment. The ability of both business and IS executives to understand each other and represent each other’s knowledge are key attributes for learning occurring. The amount of learning will be a function of the extent of prior knowledge and the quality of any interaction that takes place. Indeed, the origins of the need for alignment can be seen in the dispersion of knowledge across an organization and the requirement to somehow coordinate and integrate this knowledge. Contemporary organizational blueprints have segregated business knowledge and

IT knowledge, corralling each to separate functional units. Figure 4 maps the primary domain of knowledge against organizational level and the levels of co-evolution. It starkly illustrates the complexity of achieving alignment. Perhaps the most fundamental challenge is getting both business and IT executives to acknowledge the need for knowledge integration and coordination.

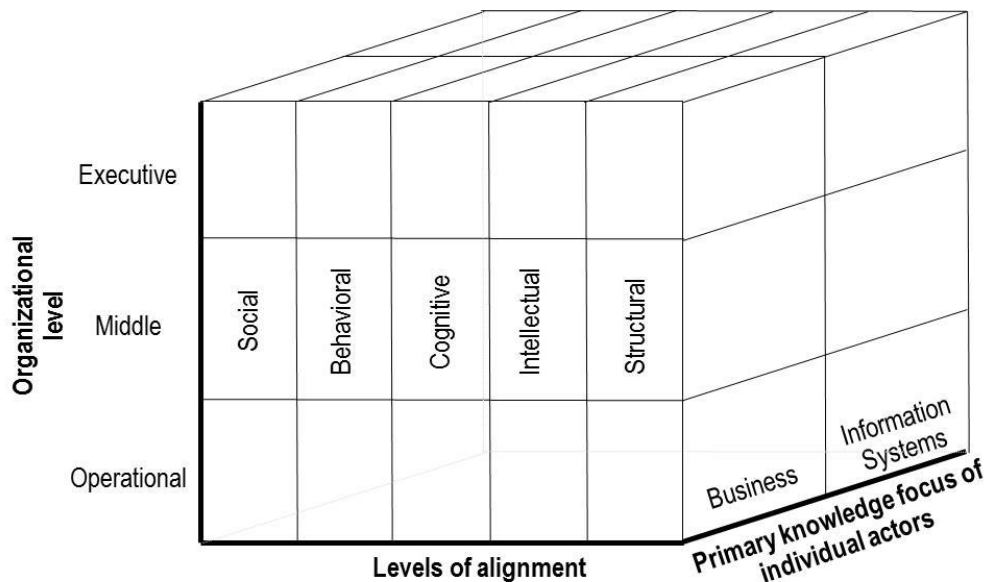


Figure 4 A co-evolutionary perspective of achieving alignment.

While knowledge is “owned” by the individual, the integration of this knowledge² takes place at a collective level: groups and other collective forums, some of which are formal others informal (Okhuysen and Eisenhardt, 2002). Although specialist knowledge is required to accomplish many tasks in an organization, there are also situations in which individuals with specialized knowledge must integrate their knowledge in a group or other collective. For example, prescriptions around the IS strategy process demand the involvement of executive management if it is to be effective (Broadbent & Weill, 1993; Jarvenpaa and Ives, 1991; Kearns & Lederer, 2003; Reich & Benbasat, 2000; Ward & Peppard, 2002). Why? Because there is incomplete knowledge in the IT function, in particular with the CIO, to successfully develop this strategy in isolation.

Language, dialogue and conversations are the key mechanism for coordinating and integrating knowledge and achieving this learning. This resonates with the findings of Reich

² It is not the intention to enter into the debate between “knowledge” and “knowing.” For an elaboration on this point see Orlikowski (2002) and Blackler (1995).

and Benbasat (2000) that a direct predictor of alignment was a “*high level of communication between IT and business executives.*” In other words, in the organizations they studied, evidence of conversations between business and IT executives signalled closer alignment. Chan’s (2002) research pointed to the role that informal organization structures plays in alignment and we suggest that this might be a proxy for conversations taking place outside of formal organisational structures. We postulate that these conversations support understanding, and knowledge sharing and ultimately learning and the creation of new knowledge. For example, knowledge of business priorities or new technologies. Of course, conversations do not take place in a vacuum and both parties must have a *Desire to communicate*, recognizing its importance

IS executives interviewed reported that they strive to learn about the goals and priorities of business colleagues as they seek to determine and assess the organization’s portfolio of IT investments. However, they also pointed to the challenges they have in getting the kind of interaction necessary to reveal these. Success requires the ability to represent each other’s knowledge, create shared meaning and mutual understanding. What Ciborra (1994) referred to a bricolage, could actually be a processes of learning where something is tried out, assessed, and refined. Chan’s (2002) view that alignment should be seen as a journey and “one that is not always predictable, rational or tightly planned” (p. 98) has strong resonance with learning. We would postulate that the speed of co-learning will determine the extent of alignment.

However, conversations cannot be mandated. Both parties must see the mutual benefits of doing so. To bring both parties together to facilitate these conversations, organizations typically implement IT governance structures, processes and mechanisms. However, just because executives come together in a steering committee, for example, doesn’t necessarily mean that the “right” conversations will take place or any worthwhile collaboration. Indeed, research reports that in many instances IT governance structures are not having the desired result.

In our study IS executives pointed to many examples where business executives did not see the need for communication. We would postulate that this can be due to weak IT Savvy (Ross and Weill, 2006) or digital illiteracy (Peppard et al. 2011), particularly at the upper echelon, and the understanding that senior business leaders have of IT capability, the opportunities and their responsibilities. The implication is that the shared vision between the CIO and top

management team that Preston and Karahanna, (2009) identified as being “critical to creating, and maintaining through co-evolution, IS strategic alignment in the organization” is likely to be absent. Bassellier et al (2003) have demonstrated that IT knowledge and IT experience together explain managers’ intention to champion IT.

Digital Strategy

Through this lens of co-evolutionary theory it might be expected that the data would reveal the details of business and IS strategies and how elements of each interacted and co-evolved, and that both would have prominence in any model derived from our data. This was not the case, and neither business strategy nor IS strategy appears in our model. Indeed, participants in the study rarely spoke about formal strategy, either business or IS. This view might be signaled in the concern that IS managers in our study *expressed* in regard to the difference between espoused business strategies and what they could see being implemented. This reflected their belief that a strategy captured in any formal strategy document (if such a document even existed) generally does not reflect the reality of what executives are looking to achieve. Some interviewees referred to occasions where they struggled to understand the espoused strategy.

In fact, it may be wrong to focus on business and IS strategies *per se* when seeking alignment. IS managers were at pains to point out to us the gap between espoused strategies and those executed. The notion of IS and business strategy alignment suggests that these are two separate entities—the business strategy and IS strategy. Moreover, as you have to align to something, it is conditioned on one being subordinate to the other with the IS strategy portrayed as being subservient to the business strategy. Articles published in the IS literature are often titled ‘aligning IS strategies with ...’ never ‘aligning business strategies with...’ Yet, more than ever, IS through digitization needs to be integrated into the very fabric of the organization, and this includes being part of the broader strategic discourse. In far too many organizations, IS is an afterthought. For example, once managers, particular senior managers, get a project or idea to a certain point, for instance a potential merger, they often think “Maybe we should consider about getting ITs input.” At this point, it is usually too late as key choices have already been made and the CIO and the IT organization is playing catch-up.

Today, the concept of “digital strategy” is emerging to supplant what was previously “the IS

strategy.” This strategy is more than just the portfolio of IT investments but represents a fusion of business and IS strategies (Bharadwaj et al. 2013). Digital is becoming the unifying concept, bringing together what were previously separate functional strategies from right across an organization. Digital is now pervasive and it is unlikely that “the marketing strategy” or “the distribution strategy” will not have a digital element.

The notion of alignment itself might be the problem in achieving alignment; it gives the sense that you have to achieve alignment. In today’s increasingly digital world, perhaps the quest for alignment is obsolete? While, Chan (2002) portrays alignment as a journey, assuming towards some end goal; we would suggest that a more appropriate way to capture alignment is as a dance. In his poem *Among School Children*, Nobel prize-winner for literature, W.B. Yeats (1865-1939) wrote the line “How do we know the dancer from the dance?” a line we suggest has strong resonance with the challenge of achieving alignment. The *dancer-dance* also provides a metaphor to better understand the dichotomy between business and IS strategies that is alluded to in the extant research. Yeats was postulating that a dance is nothing without a dancer, and similarly a dancer is insignificant without a dance to dance. How can we assess a dancer without seeing him/her actually dance? Similarly, how can we judge a dance without actually seeing it being performed? More profoundly, how do we then draw a distinction between the one who dances and what he/she is dancing? One cannot exist without the other. Between business and IS strategy a similar interdependency is present. In today’s information and technology driven environment, an organization is unlikely to exist without IS; IS themselves cannot exist outside of their organizational context.

Another interpretation relates to the preservation of dance. Literary or musical art can be transcribed to paper using a widely understood encoding system (e.g. the alphabet or musical symbols) and passed on to future generations. Documenting and preserving dance is not so easy. The oldest method of dance preservation is, as with most art forms, oral tradition. Masters of the craft teach their students who carry it into the future. Most surviving pre-19th century dance exists today only because of this practice. More recently, some dance companies have attempted to preserve early twentieth century theatrical dance by learning and performing the works of the previous generation. Today, librarians, scientists, and dancers, are working to develop new ways to more fully document this fundamentally ephemeral art form. Digital strategy can be created and preserved through conversation.

Alignment as a dynamic capability

As organizations and business becomes increasingly digital and dependent on their IS, the ability to achieve alignment becomes a dynamic capability (Teece, Pisano & Shuen 1997). The co-evolutionary perspective that we have presented in this article may also help in building such a dynamic capability. According to Teece et al. (1997, p. 515) “[w]inners in the global marketplace have been firms that can demonstrate timely responsiveness and rapid and flexible product innovation, coupled with the management capability to effectively coordinate and redeploy internal and external competences. ...companies can accumulate a large stock of valuable technology assets and still not have many useful capabilities.” When applied to IS in organizations, this statement infers a number of resources and capabilities: the IT resource itself; relationships; the capability of IS staff; the capability of the CIO to manage both the IT resource and IS staff; and, most importantly, the capability of senior management (both IS and business) to manage the entire IS resource to derive competitive advantage through innovation. Each of these then becomes a resource available to the organization.

The development of these resources, or capabilities, in a highly dynamic environment is vital. Indeed, according to Eisenhardt and Martin (2000, p. 1113): “[i]n high-velocity markets, the threat to competitive advantage comes not only from outside the firm, but also more insidiously from inside the firm through the potential collapse of dynamic capabilities.” This is reflected by research within the system dynamics field that has found that the performance of most systems is due to the interaction of endogenous, not exogenous, variables (Sterman 2000). As the environment changes so new capabilities must evolve on a continuous and ongoing basis. Our model points towards what is required in building this capability.

Future research directions

We have suggested that researchers studying alignment need to embrace complexity and use approaches that accommodate this. By investigating alignment using a lens that incorporates a co-evolutionary perspective we have developed a model on which other quantitative research could be placed. This, then, may allow an understanding of both the pieces and the whole. Note, however, that our model is not complete. It is an initial understanding of the alignment process. For example, our data would indicate that where *IS Status* is high then *Current IT resources* are more likely to be adequate for any given project. This particular feedback link

may then provide the means to improve *Perceived IT success* in the long term, overcoming the effects of the balancing feedback loop “Never Get Ahead.” In causal-loop terminology it is possible the positive feedback loop “More of the Same” will gain dominance over the negative feedback loop “Never get Ahead.” This needs further investigation. It is also inevitable that researchers will find other causal links affecting alignment that could be incorporated into the model.

As this study was concerned with strategic alignment it didn’t explicitly look at the successful delivery of IT projects or provision of IT services. If we had, we suspect that there would have been another loop related to the delivery of projects and services – the outcome of these are likely to impact *Perceived IT success* – and these would need to be incorporated into a more comprehensive model.

One particularly pertinent question that this research raises is how to break a cycle of mis-alignment. What aspects of the model should be tackled first? What is the most effective action(s) that a group of managers can take to change a situation that they deem contributing to a mis-alignment? There is also the thorny issue surrounding the ambiguity between espoused and the strategies that are being implemented. What can IS managers do in such situations?

We believe that any future alignment research should acknowledge recursive relationships between factors if they are suspected even if they are not directly investigated. This immediately identifies future research rather than claiming that any causality is uni-directional which may inhibit our understanding. As an aside we also contend that a similar approach to that used here, embracing complexity and assuming a co-evolutionary or systems view, could be effectively employed in research into IT innovation, governance, project management and other IS areas.

Conclusion

With the research reported in this article, we set out to explore the achievement of alignment between business and IS strategies and to capture descriptively what occurs *in practice* in organizations as they seek to attain this objective. Acknowledging both the processual nature of alignment and the futility of viewing alignment as a snapshot, from our data we sought to map out what participants in the study were telling us regarding their experiences of achieving alignment over time. Given that achieving alignment has remained an enduring problem, we decided against drawing on prior research in the early phase of our research and

employed a grounded theory approach.

The empirical data that we collected was framed using co-evolutionary theory as a lens and this enabled us to identify feedback loops of variables that affect the achievement of alignment. The result was a model that reflects the complex and dynamic nature of the process. While previous IS research papers utilizing co-evolutionary theory are conceptual, we have built our model from empirical data. Using this theory we have demonstrated how relationships between business and IS managers can develop over time, showing that the interaction of a number of variables will impact the ability of these managers to develop such relationships. From this data, it is demonstrated that although positive feedback loops are an essential ingredient of co-evolution and alignment, their action can also prevent the development of relationships, shared domain knowledge and collaboration between and IS managers and therefore alignment. Whether a virtuous or vicious cycle is in operation is often dependent on history.

This model highlights the complex challenge of alignment faced in practice, in particular achieving mutual trust, building relationships, communicating and collaboration. Moreover, it emphasizes the central role of cognition in securing alignment and suggests that absorptive capacity, path dependency and the speed at which learning occurs are key determinants in achieving alignment over time. It advances the view that co-evolution occurs at the social, behavioral, cognitive and intellectual levels. The achievement of alignment is portrayed as more akin to a dancer dancing a dance and a dance being danced. While achieving strategic alignment is often seen as an intentional process of design our research indicates that it is one of continuous learning. In other words, the purpose of establishing connections, building trust and relationships and collaboration is to facilitate this learning.

The model shows how relationships work through a number of other variables to impact learning and collaboration. It is now clear that both IS and business managers must develop a shared system of meaning, shared domain knowledge and work together to resolve common problems and issues. Doing so impacts the perception held by the organization of IS performance and eventually impacts the status of IS within the organization. As *IS status* improves so there is more incentive for business managers to engage in communication with their IS peers, so completing a positive feedback loop. While elements of the extant research can be mapped to the co-evolutionary model, and while it might be argued that it is incomplete, it does provide a platform for future research, enabling a more complete understanding of the alignment process.

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