



Research Into Business-IT Alignment: Toward A Cognitive Perspective

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ABSTRACT

Contemporary empirical research into business-IT alignment is almost entirely behavioral in focus. They explore the alignment issue by examining the way organizations conduct themselves. In contrast, few studies have attempted to investigate the issue from a cognitive perspective. Managerial cognition is an area of growing interest and importance in strategic management. This paper proposes a framework to guide research into business-IT alignment through a cognitive lens. It also considers some of the cognitive theories and methodologies that may be appropriate for the study of alignment.

INTRODUCTION

One of the top two concerns of business and information systems (IS) executives is the need to improve the alignment between the organization's information technology (IT) and its business strategy (Galliers, Merali, & Spearing, 1994; Watson & Brancheau, 1991). This issue, termed as business-IT alignment, is an important concern to the practitioner community.

The 1990s saw great strides in the conceptual development and empirical examination of different aspects of alignment. A frequently cited conceptual work on alignment is Henderson & Venkatraman's (1992) Strategic Alignment Model. This framework describes the interplay of between IT and business domains. Bulk of the empirical investigations on this subject focus on the relationship between the business strategy domain and IT strategy domain and its impact on firm performance (Burn, 1996; Chan, Huff, Copeland, & Barclay, 1997; Tan, 1995, 1997). These studies agree that alignment is important to IS effectiveness and firm performance. Another aspect of alignment research concerns the conditions under which alignment is achieved. Several studies have examined the factors that influence alignment (Broadbent & Weill, 1993; Luftman, Papp, & Brier, 1999; Reich & Benbasat, 2000). All the above studies can be considered behavioral in nature and have largely ignored the impact of cognition of organizational members on actions taken.

Cognition in organizations is an area of growing interest and importance in strategic management and research (Huff, 1990; Walsh, 1995). The emergence of this research perspective in strategic management stems from the growing acceptance of the notion that organizations possess cognitive capabilities and that organizational development is dependent on collective or shared managerial cognition (Stubbart, 1989). Other works on cognition in organizations, have inferred that a link exists between managerial cognition and organizational action (Axelrod, 1976; Calori, Johnson, & Sarnin, 1992; Weick, 1984). Furthermore, there are some that contend that organizations consist of systems of interpretation with organizational members attempting to make sense of the events that occur around them (Weick, 1995, 2001).

A relatively small but growing body of cognitive research can be found in the IS field. However, it is primarily in the areas of the development, implementation and use of IT (DeSanctis & Poole, 1994; Griffith & Northcraft, 1996; Orlikowski & Gash, 1994). Despite the increasing acceptance of cognition in IS research, it is not apparent that a cognitive stream exists in business-IT alignment.

This paper calls for more cognitive emphasis in business-IT alignment research. It proposes a framework to guide business-IT alignment research. The framework takes into account the behavioral-

cognitive contrast in strategic management and hopes to offer researchers in the field some guidance in the study of alignment from a cognitive approach.

The paper begins with the framework for alignment research. Next, we consider some of the cognitive theories and methodologies that may be appropriate for the study of alignment. The conclusion follows.

A FRAMEWORK FOR BUSINESS-IT ALIGNMENT RESEARCH

A useful way of reviewing and organizing the research done on business-IT alignment is by mapping the research onto a framework. Research frameworks can help identify the types of articles published in the field as well as suggest areas that require attention (Gallupe & Tan, 1999; Ives, Hamilton, & Davis, 1980).

To date, two research frameworks of relatively narrow scope have been developed for studying alignment. For instance, Reich and Benbasat's (1996) framework is a mapping of both the intellectual and social dimensions of alignment against the cause (potential factors influencing alignment) and effect (the state of alignment) of alignment. This framework is a good start to organizing the research on alignment, but most of the studies in the model relate to IS planning than alignment itself. Thomas and Dewitt (in an edited book by Luftman (1996)), propose a second framework for reviewing alignment research. This framework is based on the work of Snow and Thomas (1994). The framework describes two main types of alignment research – concept building and concept testing. Each category in turn consists of descriptive research as well as studies that seek to provide both predictions and explanations of alignment. Although the framework is useful for evaluating the state of any alignment research, it is not comprehensive enough to include recent research into business-IT alignment. Consequently, a more inclusive framework is necessary to systematically review business-IT alignment and to fully appreciate the knowledge that has been accumulated in recent years. Such a framework should not only take into account the categories and dimensions published in the earlier frameworks but also consider the behavioural-cognitive contrast recently emphasised in the strategic management literature (Huff, 1990; Langfield-Smith, 1992).

This section addresses this shortfall by proposing such a comprehensive research framework. Figure 1 presents the framework.

As with other fields of study, research into alignment can be broadly categorized into conceptual and empirical works. Empirical research in turn examines alignment at content and process levels. Content level research tests and validates the relationships between

Figure 1: A framework for reviewing business-IT alignment research

	Conceptual	Content Level	Process Level
Behavioural	Describes the concept of alignment and discusses the characteristics of the concept I – well published	Tests and validates relationships between alignment and behavioural dimensions in organization context II – well published	Ascertains behavioural conditions under which alignment is enabled or inhibited III – emerging
Cognitive	Describes the concept of alignment based on cognitive theories and the associated characteristics IV – not published	Tests and validates the relationships between alignment and cognitive dimensions in the managerial context V – not published	Provides explanations of the cognitive profiles necessary for successful alignment VI – not published

alignment and other constructs in the organizational and managerial context. Process level studies explore the circumstances under which the relationships described in content level research exist. Content and process levels of research are considered similar to the intellectual-social, effect-causes dimensions posited by Reich and Benbasat (1996) and to the explanation and prediction type research proposed in Thomas and Dewitt's (1996) framework, respectively. Likewise, conceptual research defines and describes the alignment concept, its dimensions and characteristics and is considered the same as the descriptive category in Thomas and Dewitt's model. Conceptual works are highly descriptive in nature and are considered important to the early understanding of the alignment phenomenon (Butler & Fitzgerald, 1998; Thomas & Dewitt, 1996).

In addition, the framework also distinguishes alignment research into behavioral and cognitive perspectives. Social science research has traditionally focused on how organizations behave and how organizations think (Robey & Markus, 1998). Weick (1984) argues that "thinking is inseparably linked to action: 'managers behave thinkingly'..." (p.222). Including these dimensions of organizational behavior and organizational cognition in a research framework will provide a richer, more thorough assessment of the business-IT alignment construct.

A review of the extant business-IT alignment research published in IS journals between 1980-2000 revealed that there is no published conceptual or empirical (content and process level) works taken from a cognitive perspective. In order for the field to move forward, more emphasis needs to be placed on examining alignment, its dimensions and the process of achieving alignment from a cognitive lens. This paper's contribution therefore is to discuss potentially useful theories and methodologies from the cognitive discipline that IS researchers can employ in their future study of alignment. The following section expounds on some of these theories and methods.

COGNITIVE THEORIES AND METHODOLOGIES

The cognitive approach to organizational studies makes the individual, or more particularly his or her cognitions and subjective understanding of conditions faced and outcomes desired, the foundation for new paradigm of how organizations work and how people within organizations achieve shared action (Jelinek & Litterer, 1994). There is overwhelming evidence that suggest that people represent knowledge about their environment in the form of mental or cognitive models (Kelly, 1955; Stubbart, 1989) and that these models are invariably linked to action (Axelrod, 1976; Weick, 1984).

Cognition is defined as the assumptions, expectations, values and beliefs held by individuals in an organizational context (Orlikowski & Gash, 1994). Individuals use their cognition to help interpret and make sense of the events that occur around them (Weick, 1995, 2001).

This section elaborates on some cognitive theories and methods appropriate to the study of business-IT alignment.

Personal Construct Theory and Cognitive Mapping

Kelly (Kelly, 1955) argues that individuals use their own personal constructs to interpret and understand events that occur around them and that these constructs are tempered by the individual's personal experiences. "Man looks at his world through transparent templates which he creates and then attempts to fit over the realities of which the world is composed" (p. 8-9). Thus, individuals come to understand the world in which they live in by erecting a personally organised system of interpretation or constructs of experienced events. The system is personal in that each individual makes his own interpretations of his experiences. But, the individual can share a view and appreciate another individual's interpretation or construction of events. Kelly's supposition, known as Personal Construct Theory, is formally presented in the form of a fundamental postulate and eleven corollaries. These corollaries are extensions of the basic tenet and elaborate the postulate in different directions.

Constructive Alternativism: Underlying Kelly's (1955) fundamental postulate and eleven corollaries is a philosophical assumption - that the events an individual faces are subject to a great variety of constructions. He calls this philosophical position constructive alternativism, an assumption that all events are subject to as many alternative interpretations as the individual can contrive. Constructive alternativism stresses the importance of events and the meaning individuals assign to these events. Kelly's philosophy of constructive alternativism allows the individual to propose a reality, but contends that no interpretation of reality is absolute and irrevocable. Alternative ways of constructing an event may be offered.

Fundamental Postulate: Kelly's fundamental postulate is that individual understanding is "psychologically channelized" [Kelly, 1955 #4, p.46] by the way in which events are anticipated. The assumption of constructive alternativism is embedded in this basic postulate. According to this tenet, all of an individual's representations are anticipatory in nature, that is, the function of an individual's personal constructs is to anticipate events. An individual interprets his or her own environment through a system of personal constructs that provide a framework for assessing events as they occur. Kelly further argues that an individual's system of constructs is not constant but will change as a result of experience. Thus the individual both creates and is created by the world within which he or she operates.

Corollaries: Eleven corollaries elaborate Kelly's theory. These are listed in Appendix A. A number of these corollaries are central to understanding people. For instance, an individual's construct system is unique (Individuality Corollary), operates within a context (Range Corollary), evolves through social interactions (Experience Corollary), and that similarity of constructs amongst a group of individuals implies a level of similarity in their cognition (Commonality Corollary).

Cognitive Mapping: Personal Construct Theory provides the foundation for representing a person's system of constructs. A number of techniques have been used to elicit these systems such as unstructured interviewing techniques, but cognitive mapping is generally recognized as the superior technique. A cognitive approach to understanding variations in cognition begins with the recognition that managers organize their own experiences into patterns. A representation of these patterns is considered a cognitive map. There are several categories of cognitive maps. Category 1 maps assess attention, association and importance of concepts. Category 2 maps show categorisation schemes and Category 3 maps show influence and causality. There are also several types of mapping techniques – content analysis, linguistic analysis, repertory grid technique and causal mapping. Huff (1990) provides a very comprehensive discussion of the different kinds of maps and mapping techniques.

Possible Research Questions: Personal Construct Theory, cognitive mapping techniques and the resulting maps can be used to examine the mutual understanding of business and IT executives (Reich & Benbasat, 2000) regarding strategic IS issues in their organizations. Are there similarities or differences in the cognition of these executive groups? To what extent do these similarities or differences influence the strategic IS decisions they take and hence the alignment of business and IT in their organizations? Another important issue is user-analyst/developer relationship in requirements analysis. Can Personal Construct Theory and cognitive mapping help us better understand the cognitive profiles of users and analysts, and its impact on the alignment of IT to user needs?

Cognitive Categorization Theory and Visual Card Sort Technique

Cognitive Categorization Theory contends that the basis of mental activity is memory in which representations of previous experiences are recorded (Estes, 1994). Interest in how managers organize knowledge about their environment stemmed from research into strategic groups and competitive industry structures (Daniels, de Chernatony, & Johnson, 1995). Initial conceptions of managerial categorization were based on the hierarchical model of Mervis and Rosch (1981). Experimentally established principles of cognitive categorization are evident. First, categorization is almost always probabilistic, with some members of a category being closer to the central tendency of a category than others (Smith & Medin, 1981). Second, category structures can be context dependent, such that different situations may lead a person to categorize the same objects in different ways (Barsalou, 1982). Finally, categorization may take place by matching the features associated with category membership (Medin, 1989).

Visual Card Sort Technique: A flexible method is required in order to be consistent with the flexible nature of human categorization. One method that is consistent with the psychology of categorization involves a visual card-sorting task that shows how people categorize concepts within a particular domain (Canter, Brown, & Groat, 1985). This method requires the participant to name the objects within the domain of investigation. The names of the objects are written on cards. For instance, participants were asked to name all those companies that s/he can think of that compete with his/her own company (Daniels et al., 1995). The participant is then asked to sort the cards such that those that the participants consider as related are placed closer to each other. The participant is then asked why s/he placed the objects in the manner s/he did. In this way, the technique provides a quick and face valid way of representing the relationships between the objects in the research domain. It also provides descriptions of each object or clusters of objects, depending on how the cards are arranged. A photograph of the arrangement is taken as record of the exercise. A map can then be constructed representing the spatial relationships between the objects as they were arranged. To capture the context sensitivity of the participant's mental model, the participant is asked if s/he wishes to produce other ways of arranging the cards. In this way, a fuller and more accurate depiction of the participant's mental models is obtained.

Possible Research Questions: Investigating how business and IT groups categorize the factors enabling or inhibiting business-IT alignment has implications for how organizational members, as individuals and as groups, analyze the strategic environment and how they take decisions about aligning their organization's IT to its business strategy. Participants can be asked to name the business information systems that are critical to their company's operations and strategy. These are then written onto cards. Participants can then be asked to arrange these systems such that the ones that are more aligned to the business are placed closer. Participants can then be asked to explain the arrangement. A photograph is taken for record. Participants can be asked if s/he wishes to produce other ways of arranging the cards. In this way, factors enabling or inhibiting alignment can be elicited and illustrated using the card arrangements. This raises some possible re-

search questions include: Which factors are more central or important to achieving alignment in the participants' organization? Are these similar or different between business and IT groups? What impact do similarities or differences in the way business and IT groups organize their knowledge have on achieving successful alignment?

Social Cognitive Theory

Social Cognitive Theory (Bandura, 1986) is a widely accepted, empirically validated model of individual behavior. It is based on the premise that environmental influences such as social pressures or unique situational characteristics, cognitive and other personal factors including personality as well as demographic characteristics, and behavior are reciprocally determined. Thus, individuals choose the environments in which they exist in addition to being influenced by those environments. Furthermore, behavior in a given situation is affected by environmental or situational characteristics, which are in turn affected by behavior. Finally, behavior is influenced by cognitive and personal factors, and in turn, affects those same factors.

Cognitive Influences: While Social Cognitive Theory has many dimensions, IS researchers should focus on the role of cognitive factors in individual behavior within the business-IT alignment context. Bandura advances two sets of expectations as the major cognitive forces guiding behavior (Compeau & Higgins, 1995). The first set of expectations relates to outcomes. Individuals are more likely to undertake behaviors they believe will result in valued outcomes than those they do not see as having favorable consequences. The second set of expectations encompasses what Bandura calls self-efficacy, or beliefs about one's ability to organize and execute courses of action required to attain the desired outcomes. Self-efficacy influences choices about which behaviors to undertake, the effort and persistence exerted in the face of obstacles to the performance of those behaviors, and thus, ultimately, the mastery of the behaviors.

Possible Research Questions: While Social Cognitive Theory has been considered by IS researchers especially in computer skills and use (Compeau, Higgins, & Huff, 1999; Hill, Smith, & Mann, 1987), it has not been used in the study of business-IT alignment. The following are some possible research questions. To what extent does self-efficacy of business and IT executives influence outcome expectations and hence business-IT alignment in the participants' organization? Are there similarities or differences in self-efficacy and outcome expectations of business and IT groups in attaining alignment? Do these impact the achievement of alignment?

CONCLUSION

This paper reviews the literature on business-IT alignment. The framework presented in Figure 1 permits the systematic organization of the published works. Conceptual and empirical research into business-IT alignment has focused on patterns of behavior in organizations. Most of the published empirical literature examines the business strategy-IS-performance relationship with lesser attention being paid to how organizations achieve successful alignment.

There appears to be a lack of cognitive emphasis in business-IT alignment research. One reason for this is that dominant models of organizational theory give priority to economics-based assumption of rationality (Walton, 1985). Consequently, the individual's ability to make sense and give meaning to events has been largely ignored, leading to a poorer understanding of the alignment phenomenon. This apparent 'gap' has inhibited the development of overall and integrative theories in alignment research. What is needed is a better appreciation of what constitutes the cognitive perspectives of individuals or groups of individuals (eg. business and IT groups) and the impact of these on business-IT alignment, based on established cognitive theories and methods.

REFERENCES

List of References will be available upon request.

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