Semiotic Analysis of Knowledge Intensive Business Processes: Developing Interpretations for Sustainable Competitive Advantage

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ABSTRACT

In the age of information technology and internet, business processes in many organizations have evolved into a series of knowledge exchanging activities. This is especially the case of multi-national corporations, which have e-business activities spread across multiple locations world-wide. Under these circumstances, for any multi-national corporation, comprehending and responding strategically-in-time to the various positive and negative events that occur in a knowledge intensive business process are essential if sustainable competitive advantage is to be gained and retained. Grounded in semiotics, this paper presents an approach for understanding knowledge intensive business processes. Semiotic analysis helps in interpreting and making sense of the meanings afforded by different organizations to the positive and negative events and how these meanings relate to each other and, in turn, to the knowledge intensive business processes. Such an understanding allows easier creation and transfer knowledge between different organizations or networks of organizations and helps in defining knowledge intensive business processes for sustainable competitive advantage.

Keywords

INTRODUCTION

Growth of Internet and World Wide Web has created immense opportunities for organizations to forge inter-organizational relationships in the form of e-business (B2B) ventures with other organizations located worldwide. Examples of B2B applications include supply chain management, customer relationship management, etc (Medjahed et al. 2003). In e-business environment, typical business processes involve collaborative efforts among various organizations which can be either internal or external to the organization. Irrespective of the geographical location, these organizations in e-business ventures engage in knowledge intensive business processes (KIBPs). KIBPs use existing individual and organizational knowledge to create new knowledge for the competitive benefit of the organization (Slombe 2003). KIBPs enhance organizational value by efficiently and effectively leveraging each others’ capabilities. The new knowledge generated in the KIBPs may lead up to generation of new products, creation of new processes, consolidation or modification of existing processes, etc. Overall, KIBPs help organizations integrate the operations up and down the organizational value chain. Close integration of organizations’ operations would eliminate inefficiencies in the processes and create sustainable competitive advantages to the organizations. Sustainable competitive advantages in general cannot be easily copied or replicated by rival organizations. However, the real key to sustaining competitive advantages afforded by KIBPs in e-business environment largely depends on how well the organizations understand and interpret each others’ existing capabilities, strengths, weaknesses and the opportunities and threats latently present in such an environment.

Since KIBPs in e-business environment involve collaboration among the participating organizations, the complexity of such inter-organizational relationships increases with an increase in the number of participating organizations. At each of these multiple interaction points, the participating organizations emanate positive and negative signals that would consequently lead to positive and negative events. These positive and negative events are the facilitating factors that would either make or break the success of the inter-organizational relationship in general and the KIBP in particular. Early and continuous comprehension and quick strategic response to these facilitating factors would, in fact, enable an organization to leverage the sustainable competitive advantages. To aid and abet an organization in its early and continuous comprehension of the facilitating factors in any inter-organizational relationship, we suggest a semiotic analysis of the KIBPs and interactions.
Grounded in the theory of signs, a semiotic analysis of KIBPs would provide a deeper and better understanding of participating organizations’ existing capabilities, strengths, weaknesses and the opportunities and threats latent present. This analysis emphasizes the criticality of various levels of communication including context, semantics, social norms, etc., and helps interpret the meanings afforded by different organizations at various levels of communication. We argue that a deeper and better understanding provided by a semiotic analysis of KIBPs would allow organizations to sustain the competitive advantages.

In the following sections, we first present how knowledge acts as an enabler of competitive advantage for organizations and then define and discuss problems associated with the KIBPs. Next we introduce semiotics as a means to understand KIBPs. Finally, conclusions are presented.

**KNOWLEDGE INTENSIVE BUSINESS PROCESSES**

**Knowledge as an enabler of competitive advantage**

In today’s globally competitive world, a multi-national firm is one which manages its operations from various locations spread across the globe and deals with various vendors and suppliers up and down the value chain. The relationships between vendors and suppliers, and even customers, are aligned with inter-organizational relationships such as e-business B2B relationships. As these individual organizations influence each others’ operations, business processes tend to involve interaction and communication of information among these organizations. These collaborative efforts among the organizations generate new knowledge. Such collaborative efforts among the organizations making all the relevant business processes knowledge intensive.

In his post capitalistic counseling to executives, Peter F. Drucker emphasizes the importance of knowledge sharing among organizations. He argues that organizations can assert their presence in the market only by sharing the knowledge, not by hiding the knowledge (Drucker 1995). Ever since Peter Drucker professed that the future of the organizations depend on their ability to create and manage knowledge, knowledge became a sure source of competitive advantage (Nonaka et al. 1995). “Knowledge is power” has become the mantra of new-economy organizations. Acknowledging the differences of opinions in defining the word ‘knowledge’, there has been a consensus in academia that knowledge is typically associated with the individuals. Generally, in an organization, individual employees assimilate data and information and arrive at truths, “beliefs and conclusions by using their experience, intuition, and gut feelings. Alavi et al. (2001) defines knowledge as information possessed in the minds of individuals which is the result of cognitive processing triggered by inflow of new stimuli” (p.109). To be precise, knowledge is personalized information that is very uniquely attached to the individual who possess it. Knowledge, as a state of mind associated with an individual, enables further expansion and application (Alavi et al. 2001) in the organizational work settings.

As knowledge is closely associated with the individuals who possess it, it can be largely categorized as ‘tacit knowledge’ or “mental models, beliefs, and perspectives so ingrained that we take them for granted and therefore cannot easily articulate (Nonaka et al. 1995).” Efforts to make tacit knowledge more explicit would result in generation of ‘explicit knowledge.’ These conscious efforts are critical for organizations which aspire to differentiate themselves from their competitors. They have to make knowledge as central to their strategies and engage in activities to create, capture, acquire, share, disseminate and manage knowledge. This would create sustainable competitive advantages for organizations for organizations which focus on e-business or other forms inter-organizational relationships. For example, in an organizational e-business venture, in order for an organization to place an order for a good or service of another organization, the ordering organization must ensure, before hand, that various critical business processes such as payment transaction processing, order communication, inventory management, shipping processing, etc. are in place and functioning up to the expectations of all the parties. The prior establishment of these critical processes requires that each participating organization must have a thorough understanding of the activities of other organizations. In order to derive such an understanding, organizations must exchange relevant information in the form of signs, documents, etc. This exchange of information and signals is critical in the e-business ventures and makes these involved processes knowledge intensive.

**Knowledge Intensive Business Processes (KIBPs)**

A KIBP is a business process in which existing individual and organizational knowledge is utilized to make decisions or create outputs (Slembek 2003; van Leijen et al. 2003) for the competitive benefit of the organization (Slembek 2003). In an e-business venture which presupposes inter-organizational relationships, a KIBP ties together various activities among organizations and results in a successful and effective e-business transaction. Theoretically, all e-business ventures involve business processes among many organizations. Positive and negative signals emanate from participating organizations which
basically are facilitating factors. Cooperation and coordination among these organizations results in complex inter-organizational relationships. The complex inter-organizational relationships have not only put a lot of burden on the management of these relationships at inter-organizational level, but also increase the volume of interactions among organizations. However, if organizations view the inter-organizational relationships as KIBPs, they can manage these inter-organizational relationships in a better way by understanding and interpreting them at various levels of communication.

**KIBPs and associated problems**

Strong empirical evidence suggests that organizations forget (Alavi et al. 2001) or lose track of knowledge that is present in the ranks of the organization. This calls for better knowledge management efforts. Traditionally, one dimension of knowledge management involved conversion of tacit knowledge possessed by the internal stakeholders such as employees into explicit knowledge so that it can be used organization-wide and the benefits of knowledge can be reaped in the form of new or improved products or services or cost containment, etc. While researchers are focusing on various means, including tools and technologies, to address the problems of capturing, managing and sharing organizational knowledge through knowledge management systems (Alavi et al. 2001), these problems altogether take a different dimension when organizations have complex inter-organizational relationships among themselves.

Medjahed et al. (2003), with an intent to survey main issues in various layers of B2B interactions, identify business process layer as critical layer. They argue that the conversational interactions and interoperability is the most challenging issue because “it requires the understanding of the semantics of partner business processes (p.61).” Given the KIBPs within complex inter-organizational relationships, the information exchanged in the form of various positive and negative events performed by various organizations must be clearly comprehended by the participating organizations to respond strategically-in-time. Any non-response to any negative events might result in losing a sustainable competitive advantage forever. Justification for the sustainable competitive advantages though knowledge largely stems from the ‘knowledge-based perspective’ of the firm. Because knowledge-based resources are usually difficult to replicate or imitate, ‘knowledge’ certainly produces a long-term sustainable competitive advantage (Alavi et al. 2001). However, knowledge tied to a particular situation or social group such as e-business relationships has the following problems (Goguen 1997), most of which can result in negative consequences:

- Situated Knowledge: Knowledge exchanged in a KIBP can only be fully understood by the organizations in relation to the context in which the positive and negative events are unfolding;
- Local Knowledge: Interpretations by organizations are constructed in some particular context at a particular point in time, including a particular place and group or groups of other organizations;
- Emerging Knowledge: Knowledge cannot be understood at the level of the individual who are actively involved in its creation, because it arises through ongoing interactions among members of a group despite organizations involved in KIBP do consist people and it is the people who hold the knowledge individually which later becomes the collectively organizational knowledge.
- Contingent Knowledge: The interpretation of knowledge depends on the current positive and negative events, which may include the current interpretation of prior positive and negative events. In essence, interpretations are subject to negotiation, and relevant rules are interpreted locally, and can even be modified locally.
- Embodies Knowledge: Knowledge is tied to bodies (organizations) in particular physical situations, so that the particular way in which those bodies (organizations) are embedded in a situation may be essential for making knowledge explicit and interpret.
- Vague Knowledge: In practice, information is only elaborated to the degree that it is useful to do so; the rest is left grounded in tacit knowledge.
- Open Knowledge: Knowledge can never be static and it must remain open for revisions in the light of further analyses and future positive and negative events.

All of the above seven specific problems directly affect KIBPs in an inter-organizational relationships. The prevalence and persistence of these issues clearly indicate that the organizations in an inter-organizational relationship must deliberately make an attempt to understand the meanings attached to all of the facilitating factors with a close consideration to the semantics, context, social norms, etc. Lack of clear and concise understanding of facilitating factors in an inter-organizational relationship would be a strategic disaster for organizations in a knowledge economy. It is at this juncture, a semiotic analysis can provide deeper and better understanding of KIBPs and interactions.

Apart from the above issues, since a KIBP in an inter-organizational relationship involves exchange of information in the form of positive and negative signs between the participating organizations. This exchange of positive and negative signs...
includes, but not limited only to, exchange of documents. The exchange of signals includes various other pragmatic, semantic, syntactical, and physical signs with a specific meaning attached to each of these signs. While the nature of the signs that are exchanged or emanating in an inter-organizational relationship can be either positive or negative, the meaning attached each of these signs must be understood within a specific context and in direct relation to the norms and social values in which the sign is emanated. As each organization that participates in an inter-organizational relationship will operate under a specific set of norms and social values, the meanings attached to certain signs emanating out of such environment must be carefully evaluated to understand the exact and actual meaning. This creates a perfect opportunity for any other organization to either misinterpret the signs and the meanings attached to the signs. Any such misinterpretation in the business world might warrant some actions that are not either necessary in the first place or add unnecessary costs in terms of monetary or human resources. Hence, there is certainly a great motivation for all the organizations in an e-business venture to carefully understand the meanings afforded by the positive and negative signs emanating from other participating organizations.

In this connection, semiotics can be used as a lens to understand and afford the context-specific and norm-specific meanings to both positive and negative signs. A semiotic analysis of all the relevant signs exchanged in KIBP would provide a clear insight into the actual meaning of the signs. This clear insight into the actual meaning either might provide an opportunity to act or highlight a potential threat to the business of a relevant organization. These appropriate revelations would give the organizations a chance to decide on the next course of action to either grab and sustain the competitive advantage or respond to the potential threats in a strategically significant way.

**SEMIOTICS**

At a very general level, signs do convey a positive or negative sense of credibility, confidence and meaning. Semiotics is a discipline concerned with the theories of signs and facilitates the interpretation of signs and meaning making through the acts of significance (Falkenberg et al. 1998). According to semiotics, a sign is created by an individual who is the interpreter, referent, user and reproducer of a common meaning in a given context (Dhillon 1995). As semiotic analysis is based on the concept of signs which is in turn critical for understanding the process of interpreting the signs, it would be necessary to understand the definition of the word ‘signs’ before we delve into the concepts and intricacies involved in semiotics. Charles Sanders Peirce (1931), pioneer in Anglo-American traditions of semiotics, defines ‘sign’ as “something which stands to somebody for something in some respect or capacity. (vol.2, paragraph 228)” As such, signs are used in every day life by human beings either to convey various messages or to interpret the messages conveyed by these signs. In simple words, semiotics is a process of understanding and interpreting the meanings afforded by signs.

Semiotics, also known as theory of signs, is an attempt to provide a theoretical structure to understand the meanings afforded by signs. The main idea behind the proposed structure is to keep the structure simple in outline and yet comprehensive enough to embrace the results obtained from different points of view and walks of life and unite them into a unified and consistent whole (Morris 1972). Semiotics can be defined as the domain of investigation that explores the nature and functions of signs as well as the systems and processes underlying the signification, expression, representation and communication of the signs (Gorden & Kreiswirth, 2005).

Semiotics is not at all concerned with the study of a particular sign, but rather concerned with any sign in so far as it participates in semiosis, a process in which something functions as a sign. According to Peirce, semiotics involves a triadic relationship between the sign vehicle (S), the designatum (D) and the interpretant (I). In the traditional analysis of semiotics introduced by Charles Morris, there were only three layers of understanding, which deal with the structure (syntactic layer), meaning (semantical layer) and usage of representations (pragmatic layer) (Falkenberg et al. 1998). However, considering the modern day requirements and the development of organizational semiotics, additional layers have been added to the semiotics to develop a comprehensive framework for information systems concepts, called FRISCO (Falkenberg et al. 1998). FRISCO divides process of semiosis into six layers, namely social layer, pragmatic layer, semantic layer, syntactic layer, empiric layer, and physical layer. Together, these six layers form the semiotic ladder which can be traversed either from-bottom-to-top or from-top-to-bottom. Based on the FRISCO report (Falkenberg et al. 1998), these six layers of semiotics are briefly discussed below.

**Physical layer:**

In this layer, the physical representation of signals takes the form of either signal or mark depending on the nature of the signal being dynamic or static respectively, by taking into consideration all the physical properties of the signals and marks and the capacity of human senses to discriminate and come to a consensus.

**Empiric layer**
Empirical layer is principally concerned with the statistical properties such as coding of the signals, traces, marks, and various other physical layer representation artifacts, so that the statistical behavior of the messages can be matched most efficiently and effectively to the statistical characteristics of the media, meaning a better signal to error ratio. Methods that are included in empirical layer include, patterns, noise, entropy, nodes, channel capacity, etc.

**Syntactic layer**

The main goal in this layer of semiotics is to decrease the complexity and increase the structural richness of the information that is being conveyed by the signs. Rules are formed for generating, parsing, and measuring the formal expressions for a structure without any syntactic ambiguity.

**Semantic layer**

The primary communication issues that are significant at semantic layer are meanings and their validity. The semantic layer is concerned with both the objectively created and subjectively or constructively created meanings of the signs. The medium and the message encoding and transmitting format are irrelevant in this layer of semiotics.

**Pragmatic layer**

Pragmatic layer is concerned with the relationships between signs and the interpreters or the agents in a particular context as the meaning can change dramatically if it is either taken out of context or put it in a different context. Essentially this layer ties the nuances of the context very close to the meaning of the signs.

**Social layer**

While this layer is added with an explicit recognition to consider the social purpose of signs, the social layer also adds emphasizes the pragmatic value of the information that is being signified by the signs. The social norms, higher than the context, are considered for the interpretation of the meaning of signs.

**SEMIOTIC ANALYSIS OF KNOWLEDGE INTENSIVE BUSINESS PROCESSES**

As mentioned, a semiotic ladder with six layers namely, social layer, pragmatic layer, semantic layer, syntactic layer, empirical layer, and physical layer can be traversed either upwards or downwards provided a framework for meaning making and interpreting any communicative phenomenon. While the physical layer focuses on generating the signals and the social layer focuses on the resultant social consequences of signs generated (Stamper et al. 2000), the remaining four levels Pragmatic, Semantic, Syntactic, and Empiric consider sign processing (Dhillon 1995). As the critical activity involved in knowledge intensive processes includes signs (positive and negative events) processing, we have adopted these four levels for purposes of analyzing the knowledge rich processes. In the following Table 1, we have described these four layers and identified the issues relating to knowledge rich processes at each of these layers:

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<th>Semiotic Layers</th>
<th>Description</th>
<th>Issues Relating to Knowledge Intensive Business Processes (KIBPs)</th>
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| Pragmatics      | Context of an organization and behavioral aspects of various organizations with an intention to cause change | - Understand the nature of KIBP  
- Specify common assumptions of the organizations involved in a KBIP  
- Comprehend and resolve the ambiguities arising due to interaction among organizations  
- Analyze and decode signals (positive and negative events) |
| Semantics       | Analysis of meaning of acts of communication with minimum sense of frame of reference | - Understand communication intentions  
- Interpret and evaluate communication signals (positive and negative events)  
- Identify and understand behavior of responsible organizations  
- Project the effects of physical distance between the organizations on the meanings and interpretations of signals (positive and negative events) |
Syntactics | Formual system of rules and regulations to bring consistency and integrity and capable for meaning making | - Understand formal relationships among organizations and signs (positive and negative events)  - Identify relevant tasks within the realm of available rules and regulations

Empirics | Established means of communication and information handling | - Undertake actual communication or knowledge creation and management  - Transmit and handle signals (positive and negative events) so as to provide environment for other organizations for knowledge creation and management

Table 1. Issues relating to knowledge intensive processes

IMPORTANCE OF INTERPRETING KNOWLEDGE INTENSIVE BUSINESS PROCESSES

Semiotic analysis of KIBPs has several advantages. Primarily, it can bring new insights into the study of inter-organizational relationships such as e-business ventures. Inter-organizational relationships are social structures imposed by the market externalities and “semiotics can bring to the study of organizations and other kinds of social structures a degree of precision that is not so far enjoyed (Stamper et al. 2000).” Globalization and technological advancements have been forcing even multinational corporations to share their business secrets and processes to a reasonable extent with competitors and suppliers to stay afloat and survive in cut-throat competition. With its layered separation of activities distinctly, semiotics provides the best framework for interpreting the competitors’ (other organizations) which intentions and acts as a platform to recognize the strategic opportunities. Also, organizations which are part of the inter-organizational relationships need to interpret how meanings are attributed to the various facilitating factors by other organizations as these meanings translate into inter-organizational behavior or patterns of organizational behaviors. This would enhance the knowledge of such an organization and modify and/or amend subsequent facilitating factors which might provide sustainable competitive advantages to respond to strategically-in-time and to sustain these advantages over a long period.

Apart from the explicit strategic gains, semiotic analysis of KIBPs offers a major solution to the problem of knowledge management for organizations that are tied to a particular situation or social group such as e-business ventures or supply-chain relationships. Knowledge management in these specific groups is riddled with specific problems that have context and temporal dimensions. Better interpretations arising out of semiotic analysis also may directly contribute to the customer satisfaction as such analysis would ultimately result in enhanced understanding of customer needs and finding better ways to meet those needs.

A semiotic analysis of knowledge rich processes enables an organization to anticipate and better prepare to the changing competitive environment or market structures. As the organization and most, if not all, stakeholders see the impending change coming through the system, they are less likely to resist and are better prepared to embrace the impending and inevitable change.

CONCLUSIONS AND FUTURE RESEARCH OPPORTUNITIES

In this paper, we have described how knowledge is creating both opportunities and threats to organizations in inter-organizational relationships by consolidating the business processes into KIBPs. We also identified the problems associated with KIBPs in an e-business environment which results in complex inter-organizational relationships. We then used six levels of semiotics to analyze the issues related to KIBPs associated at each level. We also discussed the benefits of semiotic analysis to inter-organizational relationships in general and the KIBPs in particular.

Although the selected four levels of semiotics have been critical for the analysis of positive and negative events emanating from the organizations, in order to fully make sense of all information signs that are emanated between various groups or networks of organizations, understanding of the remaining levels, especially semantic is critical and necessary. Moreover, a semantic analysis of the facilitating factors provides an in depth understanding as to what affects the meaning making of the parties involved in the knowledge creation and dissemination in an e-business environment. These issues will be considered in the future research.
REFERENCES


