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Raymond Papp
Barney School of Business, University of Hartford, rpapp@uhavax.hartford.edu

Luvai Motiwalla
Barney School of Business, University of Hartford, motiwalla@uhavax.hartford.edu

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Raymond Papp
Barney School of Business
University of Hartford
200 Bloomfield Avenue
West Hartford, CT 06117
(860) 768-4051
rpapp@uhavax.hartford.edu

Luvai Motiwalla
Barney School of Business
University of Hartford
200 Bloomfield Avenue
West Hartford, CT 06117
(860) 768-4196
motiwalla@uhavax.hartford.edu

Recently, considerable attention has been given to the strategic alignment model developed by J.C. Henderson and N. Venkatraman (1990). Although this model provides useful theoretical constructs to help management in strategic alignment, implementing this model is not easy. One reason for this could be the lack of diagnostic tools to guide management in identifying their strengths and weaknesses identified by the strategic alignment model. Some survey instruments to assess an organization's strengths & weaknesses have been developed (Henderson and Thomas, 1992), but do not provide definitive implementation suggestions for management regarding how to achieve and maintain alignment as prescribed by the model.

This paper will explore the use of a knowledge-based decision support system to assist management in assessing their organization's position on the strategic IT alignment model and suggest alternative approaches to help management in the transition process given the firm's current alignment orientation or perspective (Papp, 1995). A prototype knowledge-based system (KBS) is currently being developed using EXSYS, an expert system shell software. The knowledge base of this system will be derived from the strategic alignment assessment questionnaire developed by Luftman and Brier (Papp, Luftman, and Brier, 1995), based on earlier work by Henderson and Thomas (1992).

Alignment is important to firms for many reasons. The primary reason is to ease the development and implementation of cohesive organization and IT strategies that enable firms to focus on the application of IT to improve the business. By understanding and leveraging the Business--IT partnership, organizations can concentrate on the application of IT to enable the business strategy. This harmony can be extended and applied throughout the organization as new opportunities are identified.

Strategic Alignment Model Construct

The strategic alignment model, the framework for this study, is based on the theoretical construct developed by J.C. Henderson and N. Venkatraman (1990). This model explores the interrelationship between business and IT. It is based on two distinct linkages: strategic fit and functional integration. Strategic fit is the vertical linkage concerned with the integration of the external environment in which the firm competes (e.g., business scope, partnerships, alliances, core competencies) and the internal environment in which the firm performs (e.g., organizational structure, human resources, business processes). Functional integration is the corresponding horizontal link between business and IT. This linkage extends the notion of internal and external fit to IT. These two linkages are used to determine the relationships between IT and business.

The model is divided into four quadrants. They are business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes (see figure). These four quadrants are interrelated; how they relate represents the organization's "perspective" or alignment orientation. Effecting a change in any single domain requires the use of three out of the four domains to assure both strategic fit and functional integration are properly addressed (Henderson & Venkatraman, 1990).

Alignment Perspectives

A total of twelve perspectives (each of which encompass three of the four domains) have been identified and described in the literature. These include the eight individual perspectives of Strategy Execution, Technology Potential, Competitive Potential, Service Level, Organization IT Infrastructure, IT Infrastructure Strategy, IT Organization Infrastructure, and Organization Infrastructure Strategy. In addition, four Fusion perspectives have been identified (Papp, Luftman, & Brier, 1995; Papp, 1995; Luftman, 1996).

Fusion is the combination of two perspectives. In fusion, the pivot (or weak domain) and the anchor (or strongest) domain are not adjacent to one another, but rather across from each other on the diagonal. Since there are two "paths" from the anchor to the impacted domain, it is necessary to identify the weaker of the two pivots and carry out this perspective first (Papp, 1995; Luftman, 1996).

Previous research has not only identified and described the above perspectives, but found that the combination of two perspectives--called Fusion--is common (Papp & Luftman, 1995; Luftman, 1996). The most common fusion perspective focuses on both Organizational Infrastructure and IT Strategy. This combination results in a fusion of two perspectives, Strategy Execution and Technology Potential, into IT Infrastructure Fusion. The fusion construct can be extended to include all eight of the previous individual perspectives, resulting in four distinct types of fusion: IT Strategy Fusion, IT Infrastructure Fusion, Organization Strategy Fusion, and Organization Infrastructure Fusion (Luftman, Papp, & Brier, 1995; Papp, 1995).

Strategic alignment, the appropriate use of information technology (IT) in the integration and development of business strategies and corporate goals, remains the key concern of business executives (King, 1995; Goff, 1993; Liebs, 1992; Watson & Brancheau, 1991). Alignment's importance has been well known and documented for almost a decade (Brancheau & Wetherbe, 1987; Dixon & John, 1991; Niederman, et al., 1991) and this trend has continued as indicated from its recent top ranking in the business press by executives (King, 1995). What is not as clear is how to achieve this harmony between business and IT, what the impact of misalignment might be on the firm, and what management can do to diagnose, achieve and maintain alignment.

Knowledge-Based Systems

The last decade has seen widespread proliferation and commercialization of knowledge-based or expert systems. KBS is a branch of the artificial intelligence field that focuses on leveraging the human expertise available within organizations to gain competitive advantage. It does so by capturing the problem solving heuristics from human experts and other sources and make it throughout the organization (Peppard, 1989). According to Turban (1990):

The basic idea behind KBS is simple. Expertise, which is the vast body of task-specific knowledge, is transferred from the human to the computer. This knowledge is then stored in the computer and users call on the computer for specific advice as needed. The computer can make inferences and arrive at a specific conclusion. Then, like a human consultant, it advises the non-experts and explains, if necessary, the logic behind the advice. (p. 14).

KBS are basically decision support systems that can provide on-line consultation in any specific knowledge domain. That is, they are not general-purpose problem solvers. Instead they provide specific recommendations using domain specific knowledge in a particular area. KBS is particularly useful to organizations because it can help in preserving and disseminating scarce expertise and make it available for non-experts.

KBS Development Methodology

A prototype KBS using domain specific knowledge from the Strategic Alignment Assessment Questionnaire (Papp, 1995) was used to determine the areas of strength and weakness as perceived by the manager of his/her firm. EXSYS, an expert system shell for Windows, was used to develop the KBS. EXSYS's custom user-interface environment was used to design an electronic questionnaire.

Therefore, a manager using this KBS would see an electronic questionnaire on his screen to which he can respond by clicking the appropriate button. The KBS stores these answers in the working memory. The EXSYS inference engine uses the rules (heuristics) as provided by the expert from the knowledge base to determine from the answers to determine the alignment perspective. The current version of our system asks 12 out of a possible of 36 questions. The answers become the facts and the perspectives become the choices for our KBS. Also, it addresses eight out of 12 strategic alignment perspectives. Our eventual goal is to expand to all the 36 questions and the 12 perspectives.

The key benefits of the KBS over the paper questionnaire method is that it provides flexibility for the managers to conduct "what-if" type scenarios and they get instantaneous response from the system. Further, if there are any changes in the model, they can be incorporated very quickly with the KBS.

Application of a KBS in Assessing Alignment

The KBS we developed to assess the firm's alignment perspective by analyzing the respondent's perception as to the strength of each of the 12 ellipses found in the model. From these 36 questions, the KBS will calculate a mean for each of the four domains. The domain with the highest score will be defined as the anchor, or most stable region, while the domain(s) with the lowest score(s) will be defined as the pivot, or area requiring focus. From these two, the impacted domain will be determined and the firm's perspective calculated. The respondent will then be given suggestions as to specific areas to focus on to achieve and maintain alignment.

The KBS will be tested and validated using a small sample of know firms, whose perspective and suggested course of action have already been documented and implemented. This model will allow management to not only determine their perspective, but provide them with concrete suggestions as to how to main synergy between business and IT.

Conclusion

Strategic alignment remains one of the leading areas of focus among business executives. The correct assessment of a firm's perspective can provide management with a strong foundation from which to formulate their business strategies. The use of a KBS can further assist management by providing suggestions and guidance in the implementation of their business and IT strategies by analyzing their current perspective and its implications on the firm.

Cooperation between business and IT to maximize investment in technology is vital. As IT's role increases in corporate strategy development, the application and analysis of alignment will facilitate both a more competitive and profitable organization.. Assessment of a firm's alignment is important to ensure IT is being leveraged to appropriately enable the business strategy.

References are available from the authors.