The Role of Business Intelligence within the Hospitality Industry's Information Systems Strategy: Historical Concepts and Future Trends

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This study explores the role of business intelligence systems and data mining technology as they exist within the information systems strategy of firms within the hospitality industry. A review of the literature related to data mining in hospitality and tourism industries is expanded into a discussion of the use of customer and human resources data, text mining and agile information systems strategy, and the future of intelligent environmental scanning and information acquisition.

INTRODUCTION AND STUDY PURPOSE

In decision making, the "trend is to develop algorithms, methodologies, frameworks, modelts, and theories to add structure…to add science to the core managerial task" (Piccoli et. al., 2004, p. 445). The use of business intelligence to aid in decision making is a steadily maturing field. Business intelligence is considered the method for traversing from data to informed decisions with knowledge discovery as the end-goal and a significant actualization of business intelligence is data mining or the discovery of patterns that were previously unknown in large amounts of data. Executives in the hospitality industry and managers responsible for operations understand that different information is appropriate at different times since many problems are dealt with based on their temporal importance. The purpose of this study is to review the specific needs for information that the hospitality industry has and the existing and forthcoming technologies available for achieving those needs. The paper begins with an alignment to a transaction cost economics related theoretical framework called information specificity. Following that, an in-depth review of the literature covers a plethora of relevant issues such as data mining in the hospitality industry, the use of customer information, loyalty programs, text mining, the use of human resources information, information systems strategy in the hospitality industry, managing strategy, and agility and information systems planning. The future trends section follows with a discussion on environmental scanning and the need for information specificity in acquisition and use. Finally, the study concludes with closing remarks about the importance of business intelligence in the hospitality industry and the need for its incorporation into overall business strategy.

THEORETICAL FOUNDATION

Transaction Cost Economics Framed by Information Specificity

In this section, the underlying theoretical construct for the paper is discussed. Transaction cost economics is "an effort to better understand complex economic organization" (Williamson, 2005, p. 41)

and it has been defined as a collection of appropriate governance structures used to conduct transactions. These structures are produced internally or are externally outsourced based on whether or not the production choice will minimize the sum of production and transaction costs. Information specificity, as an outgrowth of the transaction cost economics theory, is the theoretical foundation of this study and states that a firm's information acquisition choices are based on the specificity of the desired information (Choudhury and Sampler, 1997). If we view information as an asset of the firm, we can then determine the value of this asset based on its ability to affect decisions and contribute to competitive advantage. The way hotel firms and other hospitality industry business acquire and use information will be directly affected by their desired utility for that information.

LITERATURE REVIEW: DATA MINING IN THE HOSPITALITY INDUSTRY

Utilizing Customer Information

In this section of the literature review, academic literature has been explored and information related to data mining, business intelligence, and the collection and use of customer information is discussed. For many years, hotel firms have utilized data mining technology and business intelligence systems in an effort to better know their guests. The firms have endeavored to formulate marketing strategies to reach new and existing customers and to develop plans to maximize profits via the use of valuable data in their repositories. Consumer data is often made available through centralized reservation systems and property management systems and, once gathered by the hotel, can be organized and integrated so that important variables and relationships can be identified (Magnini et. al., 2003). Hotel firms often gather "guest history data, including such information as guest preferences and personal information. Information of this nature is imperative in the provision of personalized service" (Lee et. al., 2003, p. 428). Of the data gathered by hospitality firms, the invariant competitive intelligence is the category of data that remains the same (like room size) while the variant data is frequently updated (like promotions and rates) (Lau and Lee, 2005). Data mining systems and business intelligence activities support customer relationship management efforts in which the firm creates and manages relationships with customers more effectively leading to loyalty, retention, and profitability (Ngai, 2005). Customer relationship management is considered a comprehensive set of strategies used to manage relationships with customers in a way that relates to the overall process of marketing, sales, service, and support within the firm. The activities are supported by information systems such as business intelligence. Retention rates are a subset of the service and support aspects of customer relationship management while direct interactions with customers fall into the category of sales and interfaces. Customer relationship management can be supported by software tools in both data mining and knowledge management.

Data mining aids in the identification of patterns which in turn contributes to the decision making process. In the hospitality field, managers need access to these technologies but must also know what data mining can do, how it works, and what value it contributes to their underlying business plans. Data mining tasks include classification, clustering, deviation, association, and forecasting (Magnini et. al., 2003). In the classification task, information from predictor variables is used to assign customers to segments or categories while in the clustering task a continued, more fine-grained sub-grouping occurs. Deviation activities uncover anomalies or diversions from the normal patterns while probabilistic rules are formed and connections and relationships are made within the association activity.

This process can be automated using statistical analysis tools with which the computer-based exploration of previously unchartered relationships is made more powerful. Some important distinctions between data mining and statistical modeling exist. Data mining is machine driven model building whereas statistical modeling is theory driven hypothesis testing. In data mining, the level of prior knowledge needed by the model designers can vary since the process is data driven and links are revealed by dependency hypothesis. In statistical modeling, the process is user driven and the researcher has a preconceived notion that often can result in a biased representation of the data. Statistical modeling is not as good for representing the complexity of the typical business environment since it assumes linear relationships between variables. In general, data mining can add tremendous value in the hospitality

industry since it is easier to spot trends, handle large and complex data sets, and to affect gains in performance and user friendliness. It is a useful technology at the managerial and operational level making data a core tool for managers in the hospitality industry. Ultimately, clear goals for the data to be captured and analyzed are developed and manifested in a data strategy. Good predictive models within the marketing applications of the hotel firm can help to properly segment the population.

A comprehensive package of data mining tools includes machine assisted aids that support human learning like case-based reasoning attributes, descriptive statistics, query tools, regression models, and visualization tools. The package also incorporates machine learning methods like association rules, decision trees, algorithms, and networks (Magnini et. al., 2003). In thoughtful combination, these tools can be used to predict customer behavior trends. In the hospitality industry, strong relationships are important and most managers recognize the difference in level of difficulty between building a new customer and maintaining and existing one. Some firms have boasted profitability in discontinuing the "chase" after uninterested demographics instead of blanketing a massive assortment of possible clients.

This same set of strategies has been utilized in the tourism industry of which hospitality is a subset. Tourism boasts a wide range of transportation, accommodation, food and beverage, support services, and travel distribution services. Tourism firms have been known to build databases of useful information from data published in guide books. Data mining technologies provide managers with information and insight and help businesses as a whole anticipate and behave proactively in their environments. In any data mining undertaking, it is important to understand the project objectives and requirements from a business perspective and then assess the situation and determine the data mining goals. Once this has been accomplished, the raw data can be collected, described, and attributed a level of quality. The final data set is then built and the attribute selection, data transformation, and data cleaning activities can take place. The data is selected, the model is built and tested against objectives, and the usefulness of possible results is determined. A report can then be generated and repeatable processes implemented and affected (Danubianu et. al., 2010). The architecture of the system automating many of these steps can allow for multi-user access while still maintaining tight controls over the privacy and security of the customer data. The architecture can be a single client server setup or can be replicated over a network for a distributed database effect. The distributed nature of the architecture should allow for a well-managed association rules engine so that there is an authoritative source of data and a global confidence in the data (Danubianu et. al., 2010). Multiple data sources would therefore be fragmented pieces of the distributed whole.

Loyalty Programs

In this section of the literature review, academic literature has been explored and information related to loyalty programs as a natural vehicle for collecting customer preference information is discussed. The effectiveness of such systems can lead to operations efficiency, room inventory control, yield management, and improvements in marketing and sales for the hotel firm. Additionally, a wealth of data about existing customers can be synthesized and mined to determine how best to manage loyalty programs. The loyalty programs are an active opportunity for the hotel firms to make partners out of their customers and to recognize the profitability of keeping existing customers. Loyalty has been defined as "a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior"(Oliver, 1999, p. 34). The loyalty measure is affected by other issues like satisfaction, quality service, brand image, service performance, customer recognition, pleasant experiences, and even flexible technology (Hashim et. al., 2006). A possible use of data mining and business intelligence methodologies within the hospitality industry could involve improvements in the development of surveys to capture customer data to measure the brand attitude (how they feel about the hotel firm in question) and the relative brand attitude (how they rank the hotel firm in question with others in its competitive class). Input from such exploratory research could yield insights into improving loyalty programs. Such loyalty rewards programs are not only a boost to the customer's perception of the hotel firm, but can also offer benefits directly to the operation of the firm

since "reward programs add flexibility for firms to adjust their capacities to market demand and avoid intense price competition during the period of low demand" (Kim et. al., 2004, p. 515).

Text Mining

In this section of the literature review, academic literature has been explored and information related to mining unstructured text for the benefit of hospitality managers and hotel firm operations is discussed. Because accurate and timely competitor and customer intelligence enhances the hotel's effectiveness and customer's satisfaction, data mining should extend through to even the most granular format available including the text. In the past, "most of the unstructured data have been ignored because analysis by hand is prohibitively expensive." (Nasukawa And Nagano, 2001, p. 973). When including all such levels of data that is available to the hospitality practitioner, there is a lot to consider. Data mining can be used to extract meaningful patterns and to build predictive customer relationship management (CRM) models (Lau and Lee, 2005). Although it can be challenging to combine qualitative and quantitative data, both should be extracted from fragmented text and complete data sources and integrated into the business intelligence database. Text mining is a viable means for information management and it often allows the user to begin with a keyword search. It is beneficial to have a dictionary or repository of common terms to serve as a knowledge base within which the association of keywords and concepts can occur. This dictionary can be used to translate unorganized text into meaningful figures and indexes which can then be further analyzed and converted into actionable knowledge. This is useful in an organization's attempt to scan the business environment, perform direct searches for customer information, or improve internal knowledge management functions.

Traditional research seeks to understand the target population by using statistical inferences on a representative sample while text mining aims to study the entire population. Researchers can set queries without regard for what information is available (Lau and Lee, 2005) when mining text. Text mining technology can be useful when used on internal documents, media, and even call transcripts but there is also tremendous value in mining online text. Firms that are interested in harnessing this powerful exploration tool need to develop definitions of their mining contexts and concepts so that the types of information that is sought is clear. After well-organized data collection activities occur, the dictionary must be constructed and the data analyzed. Any text mining endeavor will require an effective search engine and researchers with strong and well-founded interpretation skills. The accuracy of a text mining activity is defined by how well the resulting concepts are a true representation of the text collected.

Utilizing Human Resource Information

In this section of the literature review, academic literature has been explored and information related to data mining, business intelligence, and the collection and use of human resource information is discussed. Human resource management is considered a significant challenge to hospitality managers (Singh et. al., 2007). Often, in order to produce a superior guest experience, accommodations must be supplemented by well trained and knowledgeable employees. Business intelligence has proven to be a valuable information system within the firm's strategy since people related competencies, intangible knowledge based resources, and human capital issues are often the key to hospitality success and therefore in need of formal management. In the service industry, interactions with customers occurs via the exchange of both tangible products and symbolic interactions. With the help of data mining technology, both exchanges can be captured, analyzed, and synthesized into actionable processes that can improve the operation of the business.

Content published in academic journals related to human resource management within the hospitality industry could be mined more effectively via text mining (Singh et. al., 2007). The use of human judgment during analysis could be improved by the use of breadth and depth approaches of exploration such as the use of high frequency keywords mined from the published text and archived firm data. In order to develop a scientifically sound business intelligence system, the mining parameters should be manipulated by experts of the hospitality domain even thought the underlying algorithms are designed by

a data mining or statistical expert. The knowledge retrieved could be used to advance the understanding of human resource management within the industry.

Information Systems Strategy in the Hospitality Industry

In this section of the literature review, academic literature has been explored and information related to information systems strategy in the hospitality industry is discussed. Information technology systems include information technology, processes, and people. All components interact and interface with one another. Although the firm cannot focus solely on information technology, the business intelligence information system should embrace the strategy that is inherent in the information technology infrastructure (Piccoli, 2008). Technology has "helped service firms to innovate their service offers and add value to what they offer their internal and external customers (Lee et. al., 2003, p. 424). Therefore, a strategy for implementing and managing such technology and the information it manipulates is paramount to the success of the hospitality industry. The hotel firm should aspire to manage its information technology resources effectively in an effort to make operations and business functions such as frequent guest programs more effective. The information technology strategy must be integrated into the general management strategy.

Any information technology, including business intelligence initiatives and data mining tools, should be used strategically in an effort to garner the most return on the information technology investment. The information technology investment is strategic not in and of itself but as a component of the firm's specific information systems and their information processing functionality. The introduction of technology alone cannot guarantee increases in productivity. The lodging industry saw no increase in revenue from 1995 through 2000 even after spending $7.6 billion in information technology. There was also no tangible increase in productivity (Piccoli, 2008). Hospitality firms will need to focus on information technology dependent strategic initiatives that clearly affect the firms' competitive moves and sustained improvements since strategy is a collection of interrelated activities. These activities are meant to foster the creation and appropriate use of economic value propositions within the firm. The firm can use them to develop sustainable competitive advantages since competitive imitation is said to occur in stages representing a response lag. Some response lag drivers are inherent in information technology strategy and can be manipulated as barriers to the erosion of one firm's competitive advantage (Piccoli, 2008). Information technology resources can act as a barrier that protects a leading incumbent from the threat of insurgents in the industry. Included in this list of resources are assets, infrastructure, repositories, capabilities, skills, business understanding, management skills, and relationships. None of these are easy to quickly imitate. The structure of information technology projects can also act as a barrier to the erosion of competitive advantage. The project's complexity, uniqueness, visibility, implementation process, and/or degree of process change all add to the inimitability of the work. These initiatives are not feasible without information technology but they must still be highly aligned with the overall business strategy.

Managing Strategy

In this section of the literature review, academic literature has been explored and information related to managing information and business strategy is discussed. Strategy has been described as the force that determines the organization's purpose, selects the business a firm will be in, achieves long-term advantage, identifies distinct tasks, unifies entities within the firm, defines economic contributions, develops core competencies, and provides a means for investing selectively for best returns (Hax and Majluf, 1996). Mintzberg et. al. (2005) define strategy as a formation about values, vision, competencies, capabilities, crisis, commitment, social revolution and many other facets of organizational issues. They have strategy as a pattern or consistent behavior as opposed to a proposed plan. It can be deliberate, unrealized, or even emergent. Strategy is used "to deal with changing environments" (Chaffee, 1985, p. 89). The content of strategy is composed of the actions taken and involves the processes by which these actions are decided and implemented. Strategy depends on a sophisticated understanding of business structure and can serve as a reliable pointer denoting why a firm succeeds or fails according to Porter (1991). Strategy is the act of aligning a company with its environment and the success of the firm is

manifested in the attainment of competitive position which then leads to superior and sustainable financial performance. Bower and Doz (1979) describe strategy formulation as an activity that requires positional and managerial frameworks. A managerial process focus coupled with positional definitional guidance offers both the intellectual substance of the strategy as well as the implementation. If the organization is seen as a behavioral entity then strategy as fragmented and complicated due to personal and motivational differences as well as dynamic processes and process feedback (Cyert and March, 2005).

Segars and Grover (1999) discussed five schools of thought as a framework for representing managerial attitudes in a firm. These cognitive perspectives included design, planning, positioning, learning, and political. The design school had an innovation and entrepreneurship focus with formalization seen as a frustration. The output of this school was a vision statement that served as a guide and the creative design often led to important strategic decisions. The design school is centralized yet informal. The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is an appraisal of both internal and external issues concerning the firm. Mintzberg et. al. (2005) notes that strategy in the design school includes SWOT analysis techniques, establishes fit within the organization, determines the core or distinctive competencies of the firm, and builds policy into the social structure of the organization. According to Wikipedia, strengths are characteristics of the business or team that give it an advantage over others in the industry while weaknesses are characteristics that place the firm at a disadvantage relative to others. Opportunities are external chances to make greater sales or profits in the environment and threats are external elements in the environment that could cause trouble for the business. Practitioners in the design school have a focus on values and aim to develop unique, tailor-made strategies. Strategy in this school is seen as a fundamental fit between the firm's external opportunity and internal capability, all possibly led by a centralized brain (Mintzberg et. al., 2005). Chaffee (1985) describes each of Mintzberg's schools of thought as a part of the adaptive model of strategy. In the adaptive model, organizations attempt proactive and reactive alignment with customer preferences. There is often the development of a viable match between opportunities and risks as well as between capabilities and resources. Continual assessments in this model lead to adjustments in the strategy and strategic adaptation is seen as overlapping cycles of entrepreneurial, engineering, and administration issues. Miles et. al. (1978) note that "An increased understanding of the adaptive process, of how organizations move through it, and of the managerial requirements of different adjustment patterns can facilitate the difficult process of achieving an effective organization environment equilibrium." (p. 547). In the adaptive model, the manager focuses on the means required to enact the strategy yet there is less centralized instruction in the top management realm with less integration throughout the firm. The evolution of the organization includes more variables than in a more linear model and structural complexities are dealt with.

The planning school was founded on the belief that strategic planning provides a succinct and well structured set of activities and a lack of structure leads to duplication and drift. Alignment and cooperation is difficult but analysis is quite possible and the endeavor is seen as controlled, conscious, and formalized. Bjorn (1999) lists Ansoff as the founder of the planning school which is a formal operation leading to the detailed programming of the strategy. Setting objectives within this school is the act of obtaining consensus for the minimum levels of achievement. Mintzberg et. al. (2005) noted that this prediction and preparation-focused school was built upon formal procedures and guided by planners. These planners can also be considered analyzers since "Analyzers, as previously described, tend to remain cost efficient in the production of a limited line of goods or services while attempting to move as rapidly as possible into promising new areas opened up by Prospectors." (Miles et. al., 1978, p. 560). Scenario building with the quantification of goals within the organization was a key element. The formal, almost mechanical programming formulation was tightly constrained while the implementation was more free flowing involving management only at key points in the process. There was some concern that planners had too much control over the business within the planning school and the instantiation of plans promoted an atmosphere of inflexibility taking the place of intuition and creativity. This school of thought can most closely be aligned with Chaffee's (1985) linear model of strategy which is methodical, directed and sequential. This model has strategy described as an integration of decisions, actions, or plans to set and achieve goals with planning, formulation, and implementation as important aspects of the process. top

managers have the capacity to change the organization via rational decision making and, although there can be a time lag in this linear outlook, profit and productivity are the desired results.

The positioning school resembles the design school but has a more calculative generation of strategy. The use of high-level planning tools like scorecards is coupled with the diverse sources of perspectives. Analysis is achieved even though plan improvement is often not and this process dimension produces a strategic objective that is biased by the technique and/or framework being utilized by the firm. Bjorn (1999) notes that Porter founded the positioning school in the 1980s with the three main strategies of cost leadership, differentiation, and focusing. Mintzberg et. al. (2005) note that, within the positioning school, strategy is a position involving a set of activities to be carried out by the firm. All of the previously mentioned schools are said to hold a positivistic view of knowledge placing the CEO as the person formulating strategy in a centralized and planned process leading to full-blown courses of action. This school emphasizes the importance of strategy content instead of just the process of strategy formulation and favors a small number of key strategies as a necessary part of the firm's arsenal. The strategies in this school of thought are generic and categorical strategies based on intense calculation. Strategy is seen as a position and has roots in military planning, the consulting industry, and empirical research which is the systematic study that can reveal strategy.

The learning school holds that strategic planning is creating, acquiring, and transferring knowledge and it is a continuous reconciliation made up of a portfolio of initiatives. This school involves systematic problem solving, strategic experimentation, efficient knowledge transfer, and formal reconciliation. It is extremely adaptive but has a high level of resource need. The emergent or incremental nature of the learning school stems from work done by Peter Senge (1990) on the learning organization. Nonaka and Takeuchi (1995) describe the flow from knowledge creation through continuous innovation towards competitive advantage and note the importance of an organization's ability to "shift the mind from seeing the parts to seeing the whole" via systems thinking (p. 10). Schendel (1996) even eludes to knowledge from the learning organization as the quintessential strategic asset. In the learning school, the organization is guided by the prospector-type as the "Prospector's prime capability is that of finding and exploiting new product and market opportunities" (Miles et. al., 1978, p. 551) and determining new ways of approaching business. Mintzberg et. al. (2005) define this as a descriptive school of thought with a focus on learning over time. This school introduces policy and politics into the realm of strategic management although politics becomes the focal point of a later school. Emergent strategy in this school denotes the firm's acknowledgement of its importance of and capacity to experiment. Knowledge Management is cross-functional and multi-faceted and is said to be facilitated by four major processes including socialization, externalization, internalization, and combination (Becerra-Fernandez et. al., 2001). Individuals socialize by sharing tacit knowledge that they have learned from experience. That knowledge is externalized or expressed via comprehendible conversation. External knowledge is internalized and transformed from explicit to implicit. A combinatory advancement of knowledge occurs when explicit knowledge is multiplied producing more explicit knowledge. Gangadharan and Swami (2004) describe Business Intelligence as "the result of in-depth analysis of detailed business data, including database and application technologies, as well as analysis practices" (p. 140). This intelligence represents the full potential of the organization's knowledge. In the learning school, strategy formation is seen as a process of collective learning. Chaffee's (1985) interpretive model of strategy is well-aligned with the learning school of thought. The interpretive model is an emerging model based on social contracts or a collection of cooperative agreements for mutually beneficial exchange. Orienting metaphors are used to frame the corporate environment so that understanding amongst stakeholders can be achieved. Strategy is seen as the emerging product of a partial resolution of environmental and inter-organizational issues. Strategy is considered a calculated behavior in non-programmed situations and an organization-wide activity with motivation as the critical factor. In this model, there is an emphasis on dealing with the environment as an open systems and top leaders, although capable of shaping the perspectives of the firm, do not actually make changes. The model deals with both attitudinal and cognitive complexities. There are, at time, inconsistencies "since (1) the formulation of specific strategic initiatives and their implementation do not originate at the same hierarchical level, and (2) since different hierarchical levels are found to be

relatively independent, it is inevitable that a certain degree of incoherence arises in strategic management and hence in management in general." (van Cauwenbergh and Cool, 1982).

The political school has the planner collecting data as opinions and is often built by reactive development where success is often difficult. Mintzberg et. al. (2005) note that this school has a focus beyond the economic influences on a firm, both internally and externally. Strategies emerge from non-optimal processes at times since slippage and distortion of motivations can occur in a political battle. Strategy in this school is more emergent than deliberate and more positional than perspective-focused. Some benefits include the fact that often the strongest members of the firm are catapulted into leadership. Full debates on relevant issues occur, and change is strongly stimulated. Externally, the firm negotiates through a network of affiliates, partners, and other associative entities to gain collective strategies and to build strategic alliances. Segars and Grover's process dimensions characterized the activity of strategic planning and included factors such as comprehensiveness, formalization, focus, flow, participation, and consistency. Comprehensiveness is the extensiveness or scope of the solution search and includes a thorough review of various alternatives. A survey of objectives, a cost and risk assessment, and an evaluation of alternative actions is also a component of comprehensiveness. Formalization is considered the extent of structures, techniques, written procedures, and policies that guide the planning process and a highly formalized process is a more rational process. Formalization produces efficiency gains and can systematically identify and store strategic issues, although adaptability is sometimes missing from highly formal endeavors. Focus is a balancing act between creativity and control. Creativity involves idea generation, entrepreneurship, innovation, and a systematic search for opportunities in the competitive environment. Control involves strict coordination of corporate executive views and resource allocation as well as cost performance measures and a search for internal opportunities. Flow is a vertical orientation and is based on a particular locus of authority. Top-down flow has limited participation of lower level managers during the initiation of the strategic plan and bottom-up flow employs the corporate executives as gatekeepers led by the proposals of the functional and operational mangers. Participation is a breadth of involvement and when it is narrow, isolated approaches ensue. Consistency involves the speed of decision making coupled with the firm's strategic adaptability. The frequency of and level of revisions included in cycles is a metric of this process dimension.

Two separate judgments of Strategic Information Systems Planning that represent the ends or outputs and the means or evolution of evaluation are the goal-centered and improvement judgments. One can measure the effectiveness of Strategic Information Systems Planning in the goal-centered judgment by the attainment of targets or the fulfillment of goals as it is a measurement against purpose. The improvement judgment measures the effective evolution of the process itself and planners are encouraged to determine a set of longitudinal patterns with relative metrics of the past and current process. Strategic Information Systems Planning effectiveness factors, denoted as success dimensions in this paper, are alignment, analysis, cooperation, and improvement of capabilities. Alignment is a goal that symbolizes a linkage that facilitates the acquisition and deployment of information technology consistent with the competitive needs of the firm and represents an understanding of the organization's objectives. Updates to the information systems objectives are made based on updates to the corporate strategy and there is an overall heightened view of information systems within an aligned firm. In a slightly different view, King (1978) writes that "The process for MIS strategic planning is one of transforming the Organizational Strategy Set into an appropriate, relevant, and consistent MIS Strategy Set." (King, 1978, p. 31). Analysis is a goal actualized when information systems managers endeavor to comprehend the overall company processes, procedures, and technologies. These managers determine ways to compete using information technology and the see a need for a cross-functional architecture. Likewise, Segars and Grover (1998) note that "When IS planners undertake a concerted effort to better understand the internal operations of the organization in terms of its processes, procedures, and technologies, a degree of analysis is realized." (Segars and Grover, 1998, 144). Cooperation is a goal indicated by the general agreement throughout the firm concerning development priorities, implementation schedules, and managerial responsibilities. The purpose of this success dimension is to gain support and reduce conflict. The capabilities improvement describes the strategic plan as something that should improve over time in an effort to support the

organization. This improvement is the presence of organizational learning and increased alignment and is near when a firm can anticipate and prepare for possible events.

Agility and Information Systems Planning

In this section of the literature review, academic literature has been explored and information related to firm agility specifically in the area of information systems planning is discussed. There are different ways information technology impacts performance via dynamic organizational capabilities like agility, digital options, and entrepreneurial alertness. Agility caninvolve the leveraging of the voice of the customer and it has been defined as ability to detect and seize market opportunities with speed and surprise. It involves both exploration and exploitation activities. Dynamic capabilities and strategic processes included logics of strategy like positioning, leverage, and opportunity. A firm's positioning referred to the establishment of value and uniqueness with a focus on external industry forces while leverage involved resource picking to create rents as well as capability-building with embeddedness as a key component of success. Another factor effecting firm performance is opportunity which was a necessary part of the equation since position and leverage could both be lost but the continuous evolution of innovation can serve as a staying force for firms. These firms must develop skills in the areas of surveillance, interpretation, initiative, opportunism, improvisation, and reconnaissance. El Sawy et. al. (1999) notes that "Core business processes may need to be rethought and redesigned, new organizational forms that foster collaboration and partnering may need to be developed and human resource and reward systems may need to be redesigned" (p. 307). Wide-ranging networks that improve responsiveness and performance represent a form of partnering agility. Operational agility reduces information asymmetries (Sambamurthy et. al., 2003). Entrepreneurial action is described as a firm's ability to recognize and exploit market opportunities via resources, customers, and markets in an effort to create new products, services, customers, or distribution channels. Co-evolution implies an iterative loop among assets, capabilities, and knowledge. This feedback loop is necessary for the successful operation and growth of a firm and "Extensive communication with colleagues and the external environment is likely to create feedback on performance, while clear responsibilities and priorities provide autonomy and accountability for significant aspects of the task." (Brown, 1997, p. 15). Together these characteristics served as antecedents to firm performance. Information technology has been presented in prior research as a digital options generator, a strategic differentiator and an enabler of agility in corporations. The importance of continual generation of options is noted by Eisenhardt (1989) when she writes "Decision makers who pursue multiple options have a lower psychological stake in any one alternative and thus can quickly shift between options if they receive negative information on any alternative" (p. 558).

FUTURE TRENDS

In this section of the paper, a synthesis of the academic literature has been developed and information related to future trends in environmental scanning and information acquisition is discussed. In many industries including the hospitality industry, environmental analysis and information acquisition are important and the resources to accomplish these strategic initiatives are required. Hotel firms can avoid information overload by developing effective strategies for acquiring relevant information in a timely fashion (Choudhury and Sampler, 1997). Studies have shown the great and growing importance of recognizing and harnessing "of human sources of information and sources outside the organization" (Keegan, 1974, p. 411).

Environmental Scanning

A firm is alert if it has proactive attentiveness operating via imagination, trial-and-error, experimentation, probing, and lessons learned. Information technology competence describes a firm's capacity for information technology based innovation. Digital options have been defined as a set of information technology enabled capabilities that are represented by enterprise work processes and knowledge systems. Competitive actions, derived from information technology competence, digital

options, and agility, are market based moves that challenge the status quo via innovation. This is when a launch, introduction, or cultivation of something new occurs. These actions are disruptive by nature and are precursors to financial performance. The number of competitive actions along with their level of complexity and sophistication is a key parameter in the success of the firm (Sambamurthy et. al., 2003).

Firms acquire information reactively due to problematic or decision oriented searches or proactively by way of surveillance or environmental scanning techniques. The proactive exploration is not bounded by the problem and therefore can yield significantly more data. However, firms must manage their resources well in a proactive search for data since the unbounded activity can present a tremendous pull on resources. Some scanning management techniques include a limit on the number of data sources referenced, a limit on the number of specific variables designated as signals, or a limit on the amount of emerging issues to track in the information repository (Choudhury and Sampler, 1997).

Hospitality firms must determine their scanning strategy including the frequency with which they choose to monitor the environment proactively. They will develop their method based on the expected value of the information they attempt to acquire as well as the expected time specificity of the resulting data: how much value it can add to the decision making process based on the time of its acquisition and use.

Information Acquisition and Information Use

The use of information requires a separate strategy from the acquisition of that same information and these strategies are developed based on the information specificity or the "extent to which the value of information is restricted to its use and/or acquisition by specific individuals or during specific time periods" (Choudhury and Sampler, 1997, p. 28). This information specificity is broken into a time component, since some information must be acquired and/or used immediately in order to obtain the maximum benefit, and a knowledge component since certain highly specific information requires highly skilled persons/systems for its acquisition and/or use. It is possible that that the productization of knowledge enables firms to systematize firm specific knowledge and build strategic foresight and systemic insight as key inputs to entrepreneurial alertness. Strategic foresight is the ability to anticipate discontinuities in business environment as well as the threats and opportunities in the enterprise and any impending disruptive moves to be made by competitors. Systemic insight is the ability to visualize connections when architecting competitive actions (Sambamurthy et. al., 2003).

In many instances, information is sought based on the previously held knowledge a firm has about that information. This is the foundation for the argument that domain expertise is a relevant and even required input into the design of business intelligence systems: this is the knowledge specificity in acquisition. The nature of the information a firm retains is a function of the filters that are applied to the data and the queries developed in an effort to mine the data. Filters are necessary so that the domain, in this case the hospitality firm, can discern relevant information from a large amount of data. The specific knowledge that is gleaned can be passed on to the decision maker for actionable response. Business intelligence systems can alter the degree of knowledge specificity since, when data mining activities are automated, many highly technical analysis activities become available to line managers with little technical expertise. A key to appropriate acquisition and use is that "Information acquisition and transmission in organizational decision making is an important and timely issue. Computer-based management information, decision support, and knowledge- based systems are increasingly relied upon to improve organizational decision making" (Saunders and Jones, 1990, p. 32).

CONCLUSIONS

Executives in the hospitality industry and managers responsible for operations recognize that "in order to gain the value-adding potential of organizational knowledge, it is not sufficient to simply adopt and deploy IT-enabled knowledge platforms. Significant business value will only be derived from these knowledge platforms when their implicit functionality is assimilated within the ongoing actions of individuals and teams" (Purvis et. al., 2001, p. 117). Strategically aligned data mining systems and

business intelligence activities support customer relationship management efforts as well as human resource management initiatives.

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