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LAYOFF AND FIRM LONG-TERM PERFORMANCE

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ABSTRACT

This paper investigates long-term stock price performance of firms that announce layoffs. Using event study methodology, evidence in this study suggests that, on average, negative returns are associated with layoff announcements.

INTRODUCTION

Downsizing is "the planned elimination of positions or jobs" (Cascio, 1993, p. 96). A key question in corporate restructuring is what role downsizing plays, and why firms' announcements are met with different stock price reactions. A downsizing action may signal organizational decline or may be part of an overall restructuring effort of management for future productivity and profitability improvements.

According to many financial publications, the announcements of downsizing actions are met with positive responses by investors[1] (Bleakley, 1995; Downs, 1995; Fefer, 1994; Lesly & Light, 1992; Seglin, 1996). Recently, however, casual observers are reporting that many companies which announced downsizings have not reached anticipated goals, and in fact, may be worse off than before the action as expected benefits do not come to fruition (Fefer, 1994; Lesley & Light, 1992; Margulis, 1994). Although there are success stories such as AT&T[2] (Bowman & Singh, 1993), some downsized companies are met with deteriorating productivity from low morale survivors (Cascio, 1993; Lee, 1992; McCune, Beatty, and Montagno, 1988), or with insufficient workers to meet market demand (Markels & Murray, 1996; Wyatt, 1994). Even though downsizing actions are widely observed, academic literature is sparse on this form of business restructuring.

Workforce layoff has become commonplace in American businesses over the last 20 years. While these actions are typically undertaken to improve firm performance and competitiveness, empirical research to date has been equivocal in supporting the efficacy of these initiatives (Guthrie & Datta, 2008). The purpose of this paper is to investigate long-term stock price performance, of firms that announce downsizing actions. In this study, the wealth effects, if any, are to be examined by investigating the long term stock price performance of firms that downsize.

Past research indicates that the overall market reaction for downsizing/layoff announcements is slightly negative and the returns are statistically significant. Additionally, long-term stock price performance can be tested to verify whether buy-and-hold returns are consistent with short-term performance results. Goins and Gruca (2008) study the impact of layoff on key stakeholders and their results suggest that reputation effects of layoff announcements spillover beyond the announcing firm and extend to other firms in the industry.

The motivation of downsizing firms may be quite different among those firms. A downsizing announcement releases information to the capital markets about the future opportunities available to the firm. On one hand, a downsizing may signal a reorientation, for purposes of restoring or improving competitiveness. Alternatively, a downsizing may signal an effort by management to stymie, or lessen the depth of, organizational decline. Examination of short-term and long-term returns may provide information regarding how the market interprets the announcement of those firms.

Market reaction of firms which downsize could possibly be just an unbiased reaction. That is, half of the firms have positive reactions and half negative reactions, with an overall result being no reaction. Conversely, firms with positive reactions may have systematic differences with the negative reaction firms.

SAMPLE AND METHODOLOGY

Events from the years 1990 to 1992, inclusive, were used to develop a sample. This period is clearly past the enactment of the Worker Adjustment and Retraining Notification (WARN) Act of 1988, which was part of the time period studied by Iqbal and Shetty (1995). The WARN Act of 1988 requires companies to provide a 60-day advance notice of plant closings and layoffs. Worrell et al. (1991) looked at layoffs in the pre-WARN years 1979-1987. Iqbal and Shetty (1995) found that passage of the act had little effect on stockholder reactions. The sample is drawn from the firms which make up the S & P 500 index. Guide database. The S & P 500 accounted for 69% of the database's capitalization" (Standard & Poor's, 1995, p.6) . Firms on the S & P 500 make up roughly 70 percent of the capitalization of the U.S. equity stocks (Standard and Poor's, 1995), and therefore fairly represents the top deciles of the market as a whole, as well as the most actively traded stocks.

Only companies that are part of the S & P 500 in 1988 are included in the study. This restriction is necessary to avoid a survival bias that choosing later periods may introduce. A company that is part of the 1988 S & P 500 will be included, provided they have a downsizing action, regardless of their membership from 1990 to 1992. Firms that have experienced significant change, such as going from wide market ownership to narrow or otherwise become too small, are periodically removed from the S & P 500 index. These firms will be allowed to stay in the sample.

The regression for normal returns will be performed over the estimation period -210 to -60 days. Standard error of the estimate is calculated over the estimation period from -210 to -60 days. The standard error of the estimate is calculated: (Peterson, 1989)

$$s_{ie} = [\sum_{t=1}^{T} (R_{it} - R_{it}^{*})^2 / T - 2]^{0.5}$$

where:

s_{ie} = Standard error of the estimate for firm *i* over T periods in the estimation period.

$R_{it} - R_{it}^{*}$ = Equation (1), or the return for firm *i* over period *t* minus the expected return for firm *i* over period *t*.

T = Number of periods used in the regression equation for parameter estimation.

An adjustment is made to the standard error of the estimate to derive the standard error of the forecast. Peterson (1989) writes that this adjustment reflects "the deviations of the independent variables in the estimation period from the values employed in the original regression." The standard error of the forecast is derived:

$$s_{ift} = s_{ie}\{1 + (1/T) + [(R_{mt} - R_m)^2 / \sum_{t=1}^{T} (R_{mj} - R_m)^2]\}^{0.5}$$

where:

s_{ift} = Standard error of the forecast for security *i* in period *t* in the event period.

Market return for period *j* within the estimation period.

R_{mt} = Market return for day *t* within the event period.

R_m = Mean return on the market over the estimation period.

The standard error of the forecast can then be used in the calculation of the standardized abnormal return. The standardized abnormal return is derived by dividing the abnormal return by the standard error of the forecast:

$$SAR_{it} = AR_{it} / s_{ift}$$

where:

SAR_{it} = Standardized abnormal return for security *i* in period *t*.

Standardized cumulative abnormal returns can then be aggregated using the individually standardized abnormal returns for each firm

$$SCAR_{in} = (1/\sqrt{n})\sum_{i=1}^{n} SAR_{it}$$

where:

$SCAR_{in}$ =Standardized cumulative abnormal returns for firm *i* over the *n* day event period.

Then, the standardized cumulative abnormal returns for the individual firms can be used to calculate the standardized cumulative abnormal returns for N securities over n periods:

$$SCAR_{Nn} = (1/\sqrt{N})\sum_{t=1}^{N} SCAR_{in}$$

where:

$SCAR_{Nn}$ =Standardized cumulative abnormal return for a group of N firms over the n day event period, and assumed to be distributed unit normal. (Peterson 1989)

Day t=0 will be designated as the day of downsizing announcement as indicated in *The Wall Street Journal*. Using an estimation period closer to the announcement than -60 days risks contaminating the estimation due to leakage of information prior to announcement. Additionally, cumulative abnormal returns can be calculated for each firm over specific time periods.

EMPIRICAL RESULTS

Initially, 294 events by 144 companies in the years from 1990 to 1992 were identified using *The Wall Street Journal Index* (*WSJI*). To be included as an event, the announcement must be a permanent downsizing, not just a temporary layoff, such as when auto manufacturers lay off for retooling reasons. The *WSJI* was used to investigate a six-year window--three years before and three years after--around the event. Additionally, articles were scrutinized when the facts regarding the proposed downsizing were unclear. In some instances the announcement was non-existent or temporary in nature. To be included in the sample, the companies must be part of the 1988 S & P 500 index, be included in the *Center for Research in Security Prices* (CRSP) returns tapes, and be included in the *Compustat* reporting disks. Due to these screens of the initial firms, 14 firms and 41 events were deleted from the sample.

After the screening criteria was met, 253 events by 130 companies were left in the sample. Of these companies, 64 events and 10 firms were restricted because of confounding events in the

announcement period, or indications that the announcement was anticipated by the market and/or press. Data are provided for the whole group (see Table 1) as an unrestricted sample (Set U), as well as data after confounding and anticipated announcements are deleted, which is referred to as Set A. Set A contains 189 downsizing announcements made by 120 firms over the three-year period. Multiple events by the same firm are considered separate observations. Only the restricted sample data from Set A are included in further breakdowns by category and later regression analysis.

Events by year are presented in Table 1, Panel B for Sets A. For Set A events, 18% of the events are from 1990, 39% from 1991, and 43% from 1992. A cursory review of the data revealed no distinguishing difference in returns based on the year of the event.

In this table, Panel A presents the number of announcements made by the number of firms in the sample. Panel B presents the events per year of the study. Events are presented for both Sets A and B. Panel C shows the main industrial grouping for each event. The main standard industrial code (SIC) for each company is used to identify the industrial grouping.

Table 1: Descriptive Statistics Of Sample Groups

Panel A: Number of Announcements By Number Of Firms

Group	Unrestricted	Restricted	Restricted
	Set U	Set A	Set B
# of Events	253	189	164
# of Firms	130	120	120

Panel B: Announcement events by year

Year	1990	1991	1992	Total
Set A	34	73	82	189
%	18%	39%	43%	100%

Events for Set A are also segregated by the main standard industrial code (SIC) and presented in Table 2. Under the industry classifications, eight subgroups are identified.

Tests of Market's Response to Downsizing Announcements

As shown in Table 3, Panel A, daily abnormal returns (AR) are provided for a three-day window. The day the *Wall Street Journal* reports the event is day 0. Since it is not apparent whether the announcements are on the day reported or the previous day, it is customary to report the abnormal return surrounding the event. The abnormal returns are cumulated to obtain the cumulative abnormal return (CAR), and shown in Table 3.

Table 2: Announcement Events By Standard Industrial Codes/ Industry Classification		
Industry	# events	%
1. Primary-Agr., Mining	7	3.70%
2. Mfg-Non-Durables	35	18.50%
3. Mfg-Durable Goods	94	49.70%
4. Transportation	8	4.20%
5. Utilities/Commun.	18	9.50%
6. Wholesale	4	2.10%
7. Finance & Insurance	18	9.50%
8. Services	5	2.60%
Total	189	100.00%

To test the hypothesis of whether there is a market response to downsizing announcements, it is necessary to determine the statistical significance of the returns. The standardized cumulative abnormal return (SCAR) is calculated for each return. The SCAR is used as the t-statistic to test the hypothesis of abnormal returns.

Overall, the market's reaction to downsizing announcements is negative. This overall result is consistent with evidence from other downsizing studies. (Iqbal & Shetty, 1995; Palmon et al., 1997; Worrell et al., 1991) However, as indicated by the standardized cumulative abnormal return (SCAR), the abnormal returns do not statistically differ from zero. Therefore, a definitive conclusion regarding the markets interpretation of downsizing events for this sample is not prudent. The other area of interest was to examine the long-term returns. This is discussed in the following section.

Tests of Long-Term Returns of Downsizing Firms

One-, two-, and three-year average holding period abnormal returns (AHPAR) are presented in Table 3, Panel B, for the sample events. Long-term tests measure the sample's return against a benchmark, either a matched-firm sample or a portfolio. In this study the return for the S&P 500 is used as the portfolio. To calculate the long-term abnormal return, the S&P 500 return is subtracted from the firm's return over the same period, providing the long-term abnormal return. One-year AHPARs are positive, but not statistically different from zero. Therefore, the stock price performance over a one-year window of the firm's announcing downsizing actions is very similar in magnitude to the overall market performance of the stock market as measured by the S&P 500. In other words, an investor would not earn excess returns over a one-year window by investing in firms announcing downsizing actions.

However, both two- and three-year returns are positive and statistically significant. Investors holding securities representing a broad portfolio of downsizing firms over the test period would have earned substantially more than the market return over exactly the same periods. This may provide evidence that stock prices of firms that announce downsizing actions are depressed. These firms use the action as part of an overall restructuring plan/effort towards a turnaround of the firm. The turnaround effort may take a couple of years before the market rewards the results.

In these tables, abnormal returns are presented for downsizing events. Panel A presents daily and cumulative returns for downsizing events. Panel B presents one-, two-, and three-year average holding period returns for downsizing events. Data are shown for all firms, in Set U, prior to deleting anticipated and confounding announcements. Set A represents the announcements after deleting anticipated and confounding announcements. Set B is further restricted by allowing only one announcement per firm in a six month period. The test statistic (SCAR) and 2-group Z test statistic (2-Grp Z) is shown below each return figure for the short-term returns and long-term returns in Panel A and Panel B, respectively. Returns that are statistically significant are marked accordingly with asterisks.

Table 3: Short And Long Term Abnormal Returns By Sets

Panel A

			Days			Cumulative
Grouping	# events	Period	-1	0	1	-1 to 1
All Firms	253	AR	-0.15%	-0.16%	-0.22%	-0.53%
Unrestricted		SCAR	-0.1265	-0.4959	-0.2254	-0.4896
Set U						
Restricted	189	AR	-0.18%	-0.31%	-0.235%	-0.724%
Set A		SCAR	-0.1299	-0.4917	-0.0770	-0.4033

Panel B

Grouping	# events	Period	1 year	2 year	3 year
All Firms	253	AHPAR	3.38%	15.36%	21.48%
Unrestricted		2-Grp Z	1.169	2.466***	2.933***
Set U					
Restricted	189	AHPAR	2.25%	16.45%	24.54%
Set A		2-Grp Z	0.661	2.095**	2.707***

*: Significant at the .10 level **: Significant at the .05 level ***: Significant at the .01 level

CONCLUSION

This study answers several questions of importance to both researchers and investors. Most previous studies have only examined the short-term market response and interpret the efficacy of the downsizing action. This study expands the research and evaluates the long-term stock returns to firms announcing downsizing actions.

Overall, this study found negative returns to downsizing announcements, but the returns were not statistically different from zero. The negative returns are consistent with other research results. The sample group did not exhibit significant returns in any of the short-term periods examined.

For both the two- and three-year AHPAR, firms that announced downsizing actions, for the sample period investigated, experienced significantly higher returns than the market portfolio.

This study is subject to several limitations which could affect the conclusions. One limitation is that daily returns may not be a good indicator for the interpretation of the event. Alternative interpretations for market reactions are available. For example, a negative market announcement return may indicate that the market interprets the downsizing announcement as a bad move by management. Alternatively, if the market was expecting a downsizing announcement and the firm cuts either too little or too much, it may also elicit a negative reaction. In other words, management did the correct and expected action, but either went too shallow in cuts or way overboard. The market reaction may be a factor of whether the management made the right downsizing announcement given the market's general appraisal of the firm's situation at that given time.

Another limitation is that it is extremely difficult to measure the labor-capital tradeoff when firms downsize, as well as what firms are able to make effective labor-capital swaps. For example, when a phone company downsizes human operators for computer technology we would expect a different market reaction than when a contractor downsizes due to cuts in federal military budgets.

A final limitation is data availability. To address this limitation, the research design limited the sample firms to those which are widely known and followed by the financial press. Results found here may not be applicable to small companies.

Extensions and Suggestions for Further Research

The primary implication of this study is that returns to firms that downsize are affected by the characteristics of the firm announcing the action. Not all downsizing actions are good, or bad, and further research may indicate which factors are most important for a firm undergoing this form of restructuring.

Additionally, an out-of-date-sample with a similar model may effectively deal with some of the questions. Were the strong long-term returns of firms with weak financial conditions mainly

related to the time-frame selected? The sample time-frame included a mild recession which may have affected returns of the cyclical industries.

The labor-capital tradeoff has long interested researchers and may provide some insight into this quagmire. This research was limited to investigation of the returns of firms that downsize. Further research may want to investigate the other costs and benefits, such as social and personal, to the communities of firms that downsize.

The fact that different industrial classifications result in differing returns suggests that downsizing is not a simple event which can be studied and described in isolation to other corporate events. Additional testing of results could include industry, book-to-market, and size matched paired sample analysis.

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STRATEGIC FIT AMONG BUSINESS COMPETITIVE STRATEGY, HUMAN RESOURCE STRATEGY, AND REWARD SYSTEM

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ABSTRACT

Competitiveness is inevitable in highly dynamic and uncertain environments. Business strategy is concerned with how businesses achieve a competitive advantage. Its implementation involves the fit between the organization's business strategy and its internal processes. An appropriate match enhances organizational effectiveness and generates superior performance. A strategic fit between a business strategy and a human resource strategy can help retain and motivate employees and translate into organizational performance and competitive advantage. Based on Porter's generic strategies as business competitive strategies and an extensive literature review, this study proposes and develops three different human resource strategies. We also thoroughly designate three alternatives of reward systems that are suited to each human resource strategy. Through a close linkage among business competitive strategy, human resource strategy, and reward systems, we hope to provide mangers with directions for designing and implementing an appropriate reward systems under various business competitive strategies and help firms to create competitive advantage effectively.

INTRODUCTION

In recent years, there has been marked increase in competition in virtually all areas of business. The ability to outperform competitors and produce above average profits lies in the pursuit and execution of an appropriate business strategy (Yoo, Lemak & Choi, 2006). This has resulted in greater attention to analyzing competitive strategies under different environmental conditions. Porter (1985) argued that the three generic strategies that require different resources, organizational arrangements, control procedures, styles of leadership, and incentive systems could translate into organizational performance and competitive advantage.

According to the resource-based view, the firm is regarded as a unit of resources and capabilities. The acceptance of this concept has prompted interest in identifying the nature of these various resources and in evaluating their potential to generate a competitive advantage (Lopez, 2005). As a result, the resource-based view provides a logical link between human resource

management and strategic management. Furthermore, according to the contingency view, there is no one best way to structure an organization; it all depends on the particular circumstances facing the organization. In this case, human resource strategy must fit with specific business strategy (Porter, 1985). The concept of fit refers mainly to the close connection between human resource strategies and business strategies in ways that will help retain and motivate employees.

Employees are the human capital of an organization. Organizations have the ability to reward employees in many ways (Lawler & Worley, 2006). To attract, retain and motivate employees, the company must implement an appropriate reward systems. The objective of this reward systems is to encourage desired employee behaviors to ensure the success of human resource strategies. Therefore, designing and implementing an appropriate reward systems that complements human resource strategies and fits business competitive strategies is currently an important issue.

The deployment of a strategy requires a focus on the organization's business processes (Reidenbach & Goeke, 2007). Based on an extensive literature review, this paper cites Porter's (1980, 1985) generic strategies as business competitive strategies, and then deduces and develops three different human resource strategies. At the same time, we designate three alternatives of reward systems to fit Porter's (1980, 1985) generic strategies above. To support the human resource strategies and facilitate the implementation of generic strategy, each reward systems must be tied to some alternatives with identifiable attributes, activities or contents. We have labeled these reward systems as human capital, output, and position reward alternatives, according to different human resource strategies and business competitive strategies. The following sections describe the criterion, object, and mode of each reward systems in detail. The strategic fit concept helps firms to manage their resources more efficiently, reduce operational costs, respond to environmental change, and take advantage of new opportunities. Consequently, an effective linkage among business competitive strategy, human resource strategy and reward systems should enhance organizational performance and create competitive advantage (Huang 2001).

LITERATURE REVIEW

Competitive Strategy

A competitive strategy involves a series of systematic and related decisions that give a business a competitive advantage over other businesses (Schuler & Jackson, 1987; Dowling & Schuler, 1990). The concept of business competitive strategy is primarily derived from Porter's (1980, 1985) classifications of generic strategies. He argued that superior performance could be achieved in a competitive industry by pursing a generic strategy, which he defines as the development of an overall cost leadership, differentiation, or focus approach to industry competition. Miles and Snow (1984) classified business strategies into three types – defender, prospector, and analyzer – and proposed corresponding strategic human resource systems. Schuler and Jackson

(1987) used labels slightly different from those Porter to classify three types of business competitive strategies: cost reduction, innovation, and quality enhancement. Schuler and Jackson (1987) also designated different types of employee behavior and human resource management methods for each competitive strategy. With the three types of Schuler and Jackson's competitive strategy, Dyer and Holder (1988) reclassified these as inducement, investment, and involvement, respectively. Dowling and Schuler (1990) combined the respective human resource strategies of utilization, facilitation, and accumulation.

In spite of these different classifications, competitive strategy consists of skills and resources that firms can use in a competitive industry. It defines superior skills in terms of staff capability, systems, or marketing savvy not possessed by a competitor. A superior resource is a resource that can be used to assist the implementation of strategy (Powers & Hahn, 2004).

Porter's generic strategies remain the most commonly supported and cited theory in key strategic management textbooks (David, 1999; Miller, 1998 ; Thompson & Strickland 1998) and in the literature (Kim & Lim 1988; Miller & Dess,1993). Although Porter's scheme may be too simple to represent all possible strategic behaviors, it captures the essence of more complex business strategies and plays a significant role in differentiating various strategic configurations (Campbell-Hunt, 2000; Hambrick, 1983; Kotha & Orne, 1989). Porter's (1980, 1985) generic strategies have also received more empirical support than other constructs have (Hambrick, 1984; Miller & Friesen, 1986; Dess & Davis,1984). Porter's typology is generally accepted as a useful interpretation of business level strategy. Therefore, this paper adopts Porter's generic strategy as the primary method of achieving a competitive advantage. Porter argued that the firm must adopt one of three generic strategies: overall cost leadership, differentiation, or focus. This classification of generic strategies has formed the basis for a whole body of research regarding the development of more generic strategies (Feurer & Chaharbaghi, 1995). The basic premise behind the generic strategy is that an industry's structure plays an important role in determining the competitive strategies potentially available to an organization in that industry. There are three generic strategies to compete in a selected industry according to Porter's methodology. According to Porter, there are three generic strategies for competing in any given industry. To be successful, a firm must decide how to position itself in a competitive market. The three generic strategies are determined by two factors, identified as competitive advantage and competitive scope. He proposed generic strategies that enable a firm to develop a competitive advantage and create a defensible position. The following sections briefly describe these generic strategies.

Overall Cost Leadership

Organizations that pursue the generic strategy of overall cost leadership seek to become the lowest cost producers in the industry. Cost leadership firms serve a broad industry segment or

several industries. They frequently sell a standard product and exploit scale and absolute cost advantages. By emphasizing cost control, these organizations aim to make above average returns.

A cost advantage can come from various methods, including economies of scale, proprietary technology, access to raw materials, rigorous pursuit of cost reductions from experience, tight cost and overhead control, and cost minimization in areas like R&D, service, sales force, advertising, etc.

Regarding the choice and viability of generic strategies in different environmental contexts, an overall cost leadership strategy is appropriate in a stable and predictable environment (Hambrick, 1983; Miller, 1988; Kim & Lim, 1988). This is because unpredictable environments may create severs diseconomies for organizations pursuing a low cost strategy as they attempt to control costs and improve efficiency (Kumar & Subramanian, 1998). Cost leaders also emphasize a highly trained and experienced workforce (Dess & Davis, 1984; Kim & Lim, 1988). Organizations adopting cost leadership strategy should foster and educate their employees in production efficiency and the idea of cost controlling.

Differentiation

The generic strategy of differentiation aims to create a unique product or service. Differentiation-oriented organizations attempt to create differentiated products and services that are perceived as unique by customers, provide value to them, and create loyalty.

Firms following the differentiation strategy try to be unique in a way that is valued and important for their customers. Possible sources of distinction include the product itself, the delivery system, or the marketing approach. Uniqueness will be rewarded by the ability to charge higher prices (Davidson, 2001).

The differentiation strategy must typically be supported by heavy investment in research, product or service design, and marketing. Firms trying to implement Porter's differentiation strategy have used many different bases, such as differentiating by types of technology, or the quality of customer services offered (Kumar & Subramanian, 1998).

A differentiation strategy is associated with dynamic and uncertain environments (Hambrick, 1983; Miller, 1988; Kim & Lim, 1988). Differentiation often involves new technologies, and unforeseen customer or competitor reactions (Lamont, Marlin & Hoffman, 1993). In this case, the management control system must emphasize flexibility and focus on long-term operations (Nilsson, 2000). The corresponding human resource strategy should enhance employees' adaptability and innovation to match the differentiation strategy.

Focus

The focus strategy is qualitatively different from the first two strategies. A firm adopting the focus strategy decides to select a narrow scope within an industry and develop a specialized strategy

to serve that segment only. This type of firm seeks to achieve a competitive advantage and superior returns by targeting specific segments.

There are two variations on the focus strategy theme both of which require that the target segment's needs are significantly different from the broader industry market. A firm adopting the cost focus strategy attempts to be the low-cost producer for a specific market segment. A firm adopting the differentiation focus strategy rests on identifying differences between the target market segment and the broader market. However, a narrow focus is insufficient to achieve strong performance in either the cost focus or the differentiated focus strategy. The focus approach must be combined with the ability to actually be the low-cost producer to a specific market segment or meet a unique need through product differentiation in that market segment. The focus strategy succeeds by taking advantage of an underserved niche in the market (Davidson, 2001).

The focus strategy is also known as a niche strategy. When an organization can afford neither a wide-scope cost leadership nor a wide-scope differentiation strategy, a niche strategy may be the best approach. An organizations adopting focus strategy forms a competitive advantage for this niche market by being a low cost producer or differentiator within that particular segment. To successfully achieve the focus strategy, human resource strategy should retain employees with a lot of experience and great vision in this segment (Chen & Hsieh, 2005).

Reward Systems

Rewards were viewed primarily as the paychecks employees collected every week or month. Today, that definition has expanded greatly. Bush (2003) defined the total rewards as cash compensation, benefits, other non-cash forms, and work experience. By this definition, a reward systems is everything employees perceive to be of value resulting from their employment relationship.

Gross and Friedman (2004) mentioned that rewards now encompass the overall value proposition that the employer offers to the employee. This total package includes compensation (including base pay, short-term and long-term incentives), benefits (including health and insurance, retirement, work/life and other benefits) and careers (including training, development, and career opportunities).

A good reward systems drives performance by motivating workers to achieve new levels of performance, and attracts, retains, and motivates employees to do their best and stay with the organization (Bowen, 2004). A suitable reward systems is essential to ensuring that an organization's investment in its employees is managed effectively. A reward systems also provides a powerful means of implementing an organization's competitive strategy. When properly designed and executed, a total reward systems can be a powerful driver of business success (Gross & Friedman 2004).

Howard and Dougherty (2004) have labeled some reward systems, including individual output, group output, human capital, position, and market. Different reward alternatives are likely to have different effects on organizational outcomes as follows: 1. An individual output reward alternative will improve productivity. 2. A group output reward alternative encourages cooperation and collaboration among workers, and fosters commitment to a higher level of goals. 3. A human capital reward alternative encourages people to develop their human capital and entices them to use it. This leads to increased skill scope and level as well as effort. Skill-based pay is often also used to develop flexibility in work scheduling because workers become generally more qualified. 4. A position reward alternative encourages workers to assume responsibility for greater job depth. The strategic consequence of a position reward alternative is greater technical competence within each specialized role in a worker's job description. 5. A market reward alternative that pays these individuals at or above the market rate can prove to be a wise investment, especially if their replacement would be particularly expensive or disruptive. This approach ensures that the firm's pay levels are at least competitive with the labor market.

Motivating employees is a challenging task, since their behaviors are driven by varying needs and desires, and expectations and perceptions of equity and fairness can vary. Motivation can be either intrinsic or extrinsic. Intrinsic motivation comes from inside individuals, and is based on their interest and involvement in the work. Extrinsic motivation is drive based on the goal of achieving something other than the work itself. The distinction between intrinsic and extrinsic work rewards was first popularized by Herzberg (Herzberg, Mausner & Snyderman, 1959). Rewards, which are defined as "anything that reinforces, maintains and strengthens behavior in a firm," could be viewed as extrinsic and intrinsic. Field research suggests that under certain conditions, intrinsic and extrinsic motivation may compliment each other and enhance outcomes (Gkorezis & Petridou, 2008).

Strategic reward management is now at the heart of the human resource management and business agenda in organizations around the world (Armstrong & Brown 2005). A properly executed and supported reward alternative can also motivate all employees to achieve organizational objectives, improve individual performance, and pursue career growth opportunities (White, 2005).

STRATEGIC FIT AMONG BUSINESS COMPETITIVE STRATEGY, HUMAN RESOURCE STRATEGY, AND REWARD SYSTEM

As competitive conditions grow increasingly turbulent, the importance of developing and sustaining a competitive advantage appears to be increasing exponentially. Mintzberg (1979) proposed the case for a contingency view of structure: there is not one best way to structure an organization; it all depends on the particular contingent circumstances facing the organization. These contingency variables included the age and size of the organization, the dynamism of the environment, the complexity of the tasks being performed, and the technical systems used in the core

of the business. Different and coherent combinations of these variables mean that certain forms of organization are more effective than others (Bowman & Carter, 1995). Similarly, the strategy to achieve competitive advantage is not the same for all organizations.

Strategy is a rational decision-making process in which the organization's resources are matched with opportunities arising from the competitive environment. Decision makers must know what the complementary internal processes are that support the successful pursuit of a chosen strategy. The key implication is that each strategy is accompanied by a unique set of internal processes, and a strong alignment between strategy and these processes translates into successful performance (Kumar & Subramanian, 1998). The resource-based view emphasizes the role of internal capabilities (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993). It is essential to implement the proper human resource strategy to accomplish a chosen competitive strategy (Boxall, 1998).

An effective human resource strategy systematically coordinates all individual human resource systems and implements them so as to directly influence employee attitudes and behaviors in a way that helps a business achieve its competitive strategy. An effective human resource strategy is unique because it is based on that organization's unique business strategy and business context. A reward systems, then, must be deliberately created to support this human resource strategy. Organizations are beginning to realize that they cannot merely mimic the reward practices of other organizations; they must figure out what works best for them by following a fit approach (Gross & Friedman, 2004).

Successful strategy execution requires the creation of a "fit" based on the interaction between external dependencies and internal capabilities (Snow & Hrebiniak, 1980). Due to differences in this pattern of interaction, different types of strategies prioritize their goals differently (Schultz & Alton, 1983). This paper adopts Porter's (1980, 1985) generic strategy as the way to achieve a competitive advantage, and designs different orientations of human resource strategies and reward systems that are suited to each competitive strategy. Our goal is to link organizational strategy and human resource strategy by devising and implementing appropriate and effective reward systems. An organization will create and sustain competitive advantage, as it fully utilizes its core competency and resource.

Reward Systems of Differentiation

A differentiation strategy involves the development of a product or service that offers unique attributes that are valued by customers, and which they perceive to be better than or different from the products of the competition. An organization with a differentiation strategy focuses its efforts on a particular differentiated value. The risks associated with a differentiation strategy include imitation by competitors and changes in customer tastes.

Product differentiation fulfills a customer need by tailoring the product or the service to the customer. This allows organizations to charge a premium price to capture market share. The

differentiation strategy is effectively implemented when the business provides unique or superior value to the customer through product quality, features, delivery systems, or after-sale support. The quality may be real or perceived based on fashion, brand name, or image. The differentiation strategy appeals to a sophisticated or knowledgeable consumer who wants a unique, quality product and is willing to pay a higher price. The differentiation strategy hinges on organization's ability to innovate and provide unique products or services. A human resource strategy that recognizes and fosters the development of new ideas and innovations logically supports this type of strategy. Therefore, an innovation-oriented human resource strategy should be reasonable.

Innovation–oriented Human Resource Strategy

The role of a firm's strategy in organizational success has received considerable attention from both scholars and practitioners. Human resource management is an increasingly important part of the strategic planning process. This is because strategic implementation and the firm's performance depend heavily upon the attitudes and behaviors of its employees (Burton, Lauridsen, & Obel, 2004).

The differentiation strategy is strongly innovation-oriented, and emphasizes product development and early entry. It is characterized by uncertainty, growth perspectives, risks, innovation, and considerable managerial discretion. Firms that succeed in a differentiation strategy should have the following internal strengths: access to leading scientific research, a highly skilled and creative product development team, the ability to successfully communicate the perceived strengths of the product, and corporate reputation for uniqueness and innovation. In this scenario, businesses must be prepared to adapt to rapid market changes and technological progress. Their employees need to be creative, to devote proper consideration to the uniqueness of products and services provided, be able to take risks, and successfully cope with ambiguity and uncertainty. Here, we define this human resource strategy as innovation-oriented. When an organization chooses the differentiation strategy, its corresponding human resource strategy should emphasize to stimulate and develop employees' creativity and adaptability to help meet changing market needs and environments.

Human Capital Reward Alternative

An organization's employees provide an important basis for a sustainable competitive advantage. As such, the strategic management of human resources can play a key role in an organization's survival. A firm's reward systems plays a prominent role in recruiting, motivating, and retaining employees, and thus is central to building a durable advantage (Boyd & Salamin, 2001).Modern organizations know that an optimal fit is more important than a supposed best practice. Reward systems should be tailored to the specific circumstances of the organization, based

on the competitive strategy and human resource strategy selected (Armstrong & Brown, 2005). A firm's strategic orientation can shape many aspects of its internal structure and processes. For example, managerial philosophies, planning systems, and human resource practices have all been found to vary according to strategic orientation. Consequently, the matching of pay and strategy has strong theoretical and empirical justifications (Boyd & Salamin, 2001). The differentiation strategy is to foster the research and the development of new products, incorporate the most advanced technologies and features into the company's products, develop a good image of products, and increase the company's reputation (Gonzalez-Benito & Suarez-Gonzalez, 2009) Therefore, a human capital reward alternative is feasible under an innovation–oriented human resource strategy.

Ward and Duray (2000) indicated that all manufacturing competitive priorities relate to a differentiation strategy in high performance firms, exhibiting a strong relationship with quality and a weak relationship with cost. Therefore, flexibility, as a competitive priority, appears to be a common mechanism for supporting a differentiation strategy (Similarly, Kotha & Orne, 1989). Organizations adopting this strategy attempt to be different from their competitors in the marketplace. Their employees must be willing to experiment with new ideas and take risks. Hence, innovative organizations should own necessary personnel practices to supply the required behavioral styles. Under the innovation-oriented human resource strategy, the criteria of a human capital reward alternative should be based on the skill, ability, knowledge, innovation, adaptation, and experience of employees. This means that reward is determined by the employee's skill, knowledge, innovation, and adaptation. This is because as employees acquire greater expertise, they become more adaptable, capable of performing multiple roles, and have a broader understanding of the work process. As a result, they become more aware of their contribution to the organization and the importance of their role within the organization (Uen & Chien, 2004). As employees acquire higher-level skills, experience, and knowledge, they can contribute more to the organization and provide resource to the organization. To carry out the differentiation strategy, an organization must reward to those who possess distinctive and innovative competencies. This encourages people to develop and use their human capital. This approach can also foster flexibility in work scheduling because workers become generally more qualified, leading to increased skill scope and level, as well as effort. It is reasonable to provide human capital-based pay to attract and foster outstanding and excellent employees to implement the differentiation strategy, and in turn create a competitive advantage.

People in organizations tend to behave based on what they perceive leads to rewards. Research suggests that a reward systems exerts a powerful signaling effect on an organization by conveying to employees what the company considers to be most crucial (Gomez-Mejia, 1988). A reward systems is therefore the most important source of motivation for professionals, including R&D specialists. Because of this, an innovation-oriented organization must develop a reward systems capable of attracting, retaining and motivating R&D professionals (Uen & Chien, 2004). When firms pursue innovation, R&D employees are critically important because they directly influence their firm's technological advantage. Firms that pursue innovation rely on human

resources to actually develop innovative products that will yield returns (Yanadori & Marler, 2006). In summary, when the differentiation strategy is chosen, a reward systems that focuses on R&D employees, engineers and professionals is the most effective. An organization adopting the differentiation strategy tries to be unique in the marketplace. Therefore, it is the most direct influence to create distinctive and unique products and services while the reward systems emphasizes these specialists mentioned above.

Reward systems serve as cost-effective compensation vehicles that focus employees on key business objectives while creating meaningful links between results and rewards. In addition, the mode of reward practices used by an organization is an important factor in employee motivation. This ultimately affects the performance of the organization. Firms that fully address the needs of their employees will be better able to attract, retain and motivate them. Total rewards consider all the rewards available in an organization and offer an opportunity to tap the unrealized potential of the organization. Opportunities for learning and development, and a quality work environment are a high priority for R&D employees (Rumpel & Medcof, 2006). Kochanski, Mastropolo and Ledford found that the reward of the work itself had the greatest impact on attracting retaining R&D people. Career opportunities ranked second, a unique work environment was third, and cash compensation ranked a distant last. Eisenberger and Aselage (2009) found that intrinsic rewards (e.g., working with competent colleagues, working on challenging assignments, and having freedom to pursue one's own ideas) ranked the highest. Intrinsic rewards may also make an important contribution to creativity. Intrinsic motivation is a direct effect, engendered by the execution of a job itself. Namely, it is an effect induced by the enjoyment of a job, and a sense of accomplishment (Matsumura & Kobayashi, 2008). Briefly, for a differentiation strategy, specific reward practices (for example, practices that encourage individuals to innovate, develop new products, and enhance existing products) are associated with higher perceived levels of organizational performance (Allen & Helms, 2002). Intrinsic rewards are an important element of the relationship between employees and the organization (Chen, 2000). As mentioned above, to induce the innovation potential of R&D, engineering and professional employees, besides the ordinary reward, an organization should especially offer intrinsic rewards including autonomy and flexibility of work, meaningful recognition and feedback, opportunity for personal growth and development, a fine work environment, and so on.

To effectively manage human resources, firms should nurture the type of employee behavior that is essential to the success of their competitive strategy (Guest, 1987). Firms that pursue innovation rely on human resources to actually develop innovative products that will yield a good return on investment (Yanadori & Marler, 2006). By emphasizing intrinsic rewards, a firm can develop and excite professionals possessing distinctive knowledge, skills, and creativity to research and design unique products and services. This in turn makes it possible to achieve an innovation-oriented human resource strategy and organizational differentiation strategy.

Reward Systems of Overall Cost Leadership

According to contingency theory and behavioral perspective, human resource management strategies must be combined with specific business competitive strategies. Alignment these strategies enhance organizational performance and HRM effectiveness (Bird & Beechler, 1995; Wang & Shyu, 2008). Organizations that pursue overall cost leadership aim to drive cost down through all the elements of the production, and seek to become the lowest cost producers in the industry. An overall cost leadership strategy often has a strong internal orientation, and emphasizes cost efficiency and a stable set of products and services. It is defined by more stable demand, pressure for lower costs and prices, reliable quality, and less managerial discretion.

Lower costs and cost advantages result from learning curve benefits, economies of scale, product designs that reduce manufacturing time and costs, and reengineering activities. A low-cost or cost leadership strategy is effectively implemented when the business designs, produces, and markets a comparable product more efficiently than its competitors. In short, an overall cost leadership strategy tries to compete on the basis of process efficiency and cost containment. In this scenario, a contribution-oriented human resource strategy is the best fit.

Contribution-oriented Human Resource Strategy

A contribution-oriented human resource strategy emphasizes the importance of employees performance and productivity. It tries to enhance employee contributions through various human resource management techniques, and is therefore useful for enhancing production efficiency, increasing sales, and reducing expenditures. Firms that succeed in overall cost leadership must have the skill to design products for efficient manufacturing, and maximize sales. By sufficient produce and sale acquire cost advantages. When the human resource strategy highlights employee contributions, it will encourage employee effort, improve productivity, increase sales amount, promote work potential, and support the overall cost leadership strategy.

Human resources are invisible assets that create value when they are embedded in the operational systems in a manner that enhances the firm's ability to implement a particular strategy (Chang & Huang, 2005). A contribution-oriented human resource strategy enlarges the scale of production, and improves production processes, allowing a business to sell its products or services successfully at a lower price in the market. In summary, the overall cost leader in any market gains competitive advantage from being able to produce at the lowest cost. As a result, it is most important for organizations to produce effectively. In this scenario, a contribution-oriented is the most feasible human resource strategy.

Output Reward Alternative

Employees who perceive a greater fit with their employer are less likely to leave the firm, are more committed to it, and have higher work satisfaction (Levesque, 2005). Reward practices logically serve as motivators, shaping employee behaviors. Rewarding employees for ideas that minimize or eliminate costs is more important in an overall cost leadership strategy. Therefore, when organizational human resource strategy emphasizes the degree of contribution, an output reward alternative may be the best approach.

Pursuing a cost-leadership strategy frequently requires a strong focus on cost management, economies of scale, and experience curve cost advantages through maintenance volumes. A low-price strategy, often based on low process technology costs, can be used to gain market entry and market share. Therefore, an output reward alternative links rewards to output performance, including individual-based and team-based output. It is the most effective method for improving productivity and increasing sales volume. A team output reward alternative is sometimes more appropriate in a situation where workers are highly interdependent and individual contributions are more difficult to determine. This type of alternative can encourage cooperation and collaboration among workers, and enlist their commitment to a higher level of goals. The criteria of an output reward alternative are based on employee performance, productivity, sales amount, growth, profit, and effort. This type of alternative motivates employees to perform better and develop infinite potential, and further, allow the organization to execute the overall cost leadership strategy successfully.

A cost leader attempts to develop capabilities that increase efficiency and reduce costs more effectively than its competitors. Porter used economies of scale and efficient manufacturing systems as primary examples of manufacturing capabilities associated with a cost leadership strategy. In general, there is a very close relationship between on-line producers/salesmen and organizational overall productivity/sales amount. This implies that offering proper rewards can obviously enhance production and reduce cost. It is very helpful to accelerate and enhance output when organizations provide on-line producers/salesmen attractive reward. An organization that ties rewards to employee output can achieve high production and economies of scale more effectively than its competitors.

A reward strategy includes both intrinsic and extrinsic rewards, where determination of the combination of different reward depends on a number of factors including the level and determinants of employee motivation, the organizational culture, and the values and mission of the organization (Bakhru, 2000). For a cost leadership strategy, specific reward practices (for example, group-based incentives which encourage cost reduction and control, responsibility, and authority) are associated with higher perceived levels of performance (Allen & Helms, 2002). Research ties higher productivity to the types of motivators the company offers its employees, and money is still the most powerful of these incentives. Employees work harder to increase productivity when they believe their efforts will result in greater reward. As a result, firms in nearly every industry use monetary incentive plans to attract, retain, motivate, and reward their employees (Gkorezis & Petridou, 2008;

Rumpel & Medcof, 2006). As mentioned above, this implies that it is possible to enhance production and reduce cost by offering extrinsic rewards, including performance-based incentives, profit sharing systems, and quantitative measurement pay to employees engaged in manufacture, produce or sales. An organization that adopts an overall cost leadership strategy must rigorously control and minimize expenses, and strive for greater economies of scale. This strategy also required the adoption of a contribution-oriented human resource strategy. The practice of increasing the weight of extrinsic rewards to on-line producers/salesmen, base on their performance or productivity/sales amount can more validly increase yield and reduce manufacture cost. This allows a contribution-oriented human resource strategy and organizational overall cost leadership strategy to be implemented thoroughly.

Reward Systems of Focus

The focus strategy is also known as a niche strategy. When an organization focuses its efforts and resources on a narrow, defined segment of a market or product, it can generate a competitive advantage specifically for that niche. The focus strategy concentrates on a narrow segment, and attempts to achieve either a cost advantage or differentiation within that segment. The premise of this approach is that the needs of the group can be better served by focusing entirely on them. A firm adopting the focus strategy often enjoys a high degree of customer loyalty, which discourages other firms from competing directly.

Proper alignment between business and human resource management strategies is a key factor of success for organizations. When the human resource management strategy and business strategy are aligned, organizational effectiveness is better than "that of not aligned" by contingency perspective. Therefore, a commitment-oriented human resource strategy is essential to implementing the focus strategy effectively.

Commitment-oriented Human Resource Strategy

When an organizational human resource strategy is properly configured, it provides a direct and economically significant contribution to organizational performance (Allen, Helms, Takeda & White, 2007). The essence of the focus strategy is to offer the lowest cost or differentiation product in a niche or segment. Organizations adopting this approach should stress the retention of senior employees, as their knowledge and experience are invaluable to clearly understanding the context of this particular segment. They are most likely to know the nature, character, and needs of this segment, and how to live in this niche.

The focus strategy calls for a firm to narrow its marketing target to a buyer group, product line segment, or geographic region. This allows the firm to better meet the needs of the customer base, resulting in differentiation from better service or cost leadership through marketing or operating efficiencies. When an organization focuses its effort on one particular segment and

becomes well known for providing products or services within that segment, it needs highly-devotion and experienced employees. Organizations that possess employees who have planning abilities and strong commitment to organizational goals can implement the focus strategy smoothly. These firms not only need to retain senior employees, but also enhance current employees' loyalty to wholeheartedly design and execute an overall plan in a particular segment. This is called a commitment-oriented human resource strategy in this paper.

Position Reward Alternative

The design of an effective reward strategy depends on a proper understanding of what motivates employees. Focus strategies grow market share by operating in a niche market. A niche arises from a number of factors, including geography, buyer characteristics, and product specifications or requirements. While several researchers have examined the legitimacy of the focus strategy as a separate generic strategy, it is generally concluded that a firm must first establish its domain within the broad versus segmented market as a precondition to generic strategy determination. Therefore, a focused firm must make a market determination before embarking on a specific strategic action plan. When a commitment-oriented human resource strategy is selected, a position reward alternative is applicable because senior and experienced employees who understand the characteristics and strengths of the organization are better able to determine future directions in a particular market.

For a focus-cost leadership strategy, specific reward practices that emphasize a balance of both customer service and cost control are associated with higher perceived levels of organizational performance (Allen & Helms, 2002). Moreover, for a focus-differentiation strategy, specific reward practices that emphasize customer service for a unique niche and marketing and creativity rewards are associated with higher perceived levels of organizational performance (Allen & Helms, 2002). The most common form of person-contingent reward is seniority-based pay, where benefits accrue based on loyalty, retention, and stability (Shaw, Gupta, & Delery, 2001). Seniority adds value through learning curve effects that only occur with experience over long periods of time (Shaw, Gupta, & Delery, 2001). A position reward alternative encourages employees to take responsibility for greater job depth. A job evaluation process further expresses the value-added of the individual's role in the organization, and tying rewards to the job expresses the expectation that each employee will take ownership of his or her job and role. The strategic consequences of a position reward alternative include greater technical competence within the specialized role described by the worker's job description. This means awarding those who wholly exert and accomplish their mission of position. In this case, the reward criteria are based on employee title, seniority, status and responsibility. This implies that the higher a title is, or the greater the scope of responsibility is, the greater the reward.

From the resource-based view, an organization's employees provide an important basis for a sustainable competitive advantage. Therefore, the human resource strategy can play a key role in an organization's survival. Further, a reward systems is a prominent factor in recruiting, motivating, and retaining employees. When an organization adopts the focus strategy, internal senior and professional employees are important because they have experienced the evolution of the organization and understand its various strength and weakness of the organization. An organization should rely on this distinctive manpower to improve its present situation and determine its future direction. Benefitting from senior manager, director, and staff member devotion and commitment, an organization can find a correct segment or suitable niche in its industry, successfully implementing its focus strategy. Therefore, the emphasis of position reward alternative facilitates a commitment-oriented human resource strategy.

If a firm wants to pursue a particular strategy, the reward program needs to include those elements that motivate the desired behavior (Galbraith & Merrill, 1991). According to Porter (1985), focus can be based on differentiation or cost. To retain experienced managers and foster their dedication to the organization, an organization adopting a position reward alternative should offer both intrinsic and extrinsic rewards. This includes employee stock ownership plans, extra vacation time, benefits, regular expressions of appreciation by leaders, and employment security. It helps to retain competent senior employees. The sense of increased job autonomy reward is very important to the focus strategy. Research shows that autonomy empowers employees with the decision making latitude required to provide the level of customer service required for their unique market niche. It also permits them to make the necessary decisions to differentiate their organization's service from the competition.

More and more organizations are attempting to identify the best reward systems for their organizational strategy. A firm can encourage managers with higher titles, seniority, or responsibility to elaborate and devote their experiences and wisdom to organization by providing both intrinsic and extrinsic rewards. A position reward alternative helps an organization retain and motivate distinguished mangers and staff member. It is also essential to a commitment-oriented human resource strategy. Ultimately, this makes it possible to adopt a successful focus strategy.

Table 1 summarizes the organizational reward systems frameworks that fit various human resource strategies and organizational competitive strategies.

CONCLUSION AND DISCUSSION

Competitiveness is inevitable in highly dynamic and uncertain environments. Organizations that want to remain secure in the long-term should pursue proper and suitable strategies. A corporate strategy is an essential management tool, and is important to firm performance. Further, achieving a competitive advantage through strategic initiatives is becoming increasingly important (Powers & Hahn, 2004).

Table 1. The integration among competitive strategies, human resource strategies, and reward systems			
Competitive strategy	Differentiation	Overall cost leadership	Focus
Human resource strategy	Innovation-oriented	Contribution-oriented	Commitment-oriented
Reward systems	Human capital reward alternative	Output reward alternative	Position reward alternative
Criteria	skill, knowledge, innovation, adaptability	performance, productivity, growth, profit	title, seniority, responsibility, status
Object	R&D, engineer, professional	on-line producer, salesman	manager, director, senior staff
Mode	intrinsic reward	extrinsic reward	both extrinsic and intrinsic

Strategy is the direction and scope of an organization over the long term. Ideally, this strategy matches its resources to its changing environment, particular markets, and customer requirements so as to meet stakeholder expectations. The strategy of an organization is essentially how it chooses to use its resources to achieve its goal (Hofer & Schendel, 1978). Therefore, a competitive strategy focuses on understanding the sources of sustained competitive advantage (Barney, 2001; Priem & Butler, 2001).

Human resource strategy is designed to diagnose a firm's strategic needs and planned talent development that will be required to implement a competitive strategy and achieve operational goals. Since strategic human resource management links human resource functions with strategic goals and organizational objectives, organizations must carefully plan human resource to improve performance and achieve their intention.

A reward systems is an important part of an organization's human resource strategy. The old reward model is no longer effective in today's business environment. Modern organizations must align their reward systems practices with their organizational strategy to achieve higher levels of performance at both the individual and organizational level. An appropriate reward systems can help the organization deliver the right amount, to the right people, at the right time, for the right reasons (Gross & Friedman, 2004). Managers must understand the resources that enable the firm to attain sustainable advantages, and the development of these resources should become an important priority (Fahy, 2000). For example, if some employee groups are more important than others, then organizations may choose to develop reward systems that consider their differing strategic contributions (Yanadori & Marler, 2006). Total rewards include base salary, incentives, and benefits, as well as intangibles things like career-growth opportunities, nonfinancial recognition, meaningful work, and so on (Anonymous, 2009). Therefore, under limited resources, employers

should determine the best fit for their organization from the wide array of reward tools and approaches available.

This article attempts to move from a literature review, mapping key ideas and relationships, to building a reward systems ideally suited to human resource strategy and competitive strategy. We start with Porter's generic strategies: differentiation, overall cost leadership, and focus. Based on the individual characteristics of competitive strategy, we design corresponding human resource strategies: innovation-oriented, contribution-oriented, and commitment-oriented. Finally, we deduce and develop appropriate reward alternatives: human capital reward, output reward, and position reward. This study also introduces the criteria, objects, and modes for each reward alternative.

To survive in a changeable environment, employers are turning to performance management to ensure that their employees are maintaining motivation levels and working efficiently (Hansen, 2008). Based on an extensive literature review, this paper develops an original contingency framework for reward systems alternative under various business competitive strategies. We hope to provide mangers with an idea of how to design and implementing reward systems for various competitive strategies. We stress the relationship and collocation among competitive strategy, human resource strategy and reward systems. Therefore, we do not especially discuss when to adopt competitive strategy. Additionally, the different reward alternatives suggested for each underlying competitive strategy only reflects its relative and weighted importance, but it does not mean that others cannot be adopted absolutely. When an organization selects the overall cost leadership strategy, this study suggests that it adopts a contribution-oriented human resource strategy. At the same time, it should increase the weight of using output reward alternative.

The goal of this study is to provide a framework of the fit among business competitive strategies, HR strategies, and reward systems. Future research should make greater effort to integrate theoretical and empirical data to verify the practicability of this framework.

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A SOCIAL-COGNITIVE PERSPECTIVE ON FIRM INNOVATION

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ABSTRACT

Innovation is the central value of economic behavior, and this paper proposes a social-cognitive perspective for studying the sources of firm innovation. In the context of firm innovation, the cognitions of top management teams or an entrepreneur shape the way they use the social structure available to them, while the social structures influence the embedded actors' cognitions and ultimately their strategic actions. Managers and entrepreneurs form collaborative partnerships designed to achieve innovation and competitiveness. During this dynamic social learning process, cognitive differences influence the formation of social capital and its realized benefits. The impact of social capital on innovation can hardly be evaluated without understanding individual cognitive characteristics first. By distinguishing between cognitive structures, as well as social capital characteristics, and by investigating their effects on firm innovation, this paper extends the literature on organization theory and innovation research.

INTRODUCTION

Innovation is the driving force of economic growth, but much confusion centers on how to encourage it. This paper reviews the literature on social networks and organizational learning and incorporates the cognitive and social factors that influence innovation research. A firm's social capital constitutes an important source of its innovation, and the cognitive understanding of a firm's management team or its entrepreneurs of innovation also contribute to this initiative. Accordingly, this paper addresses three related questions regarding cognition, social capital, and innovation. First, how do external social capital and internal cognitive structure influence each other in the process of undertaking innovation? Second, how does social capital influence a firm's innovation? Third, how do cognitive structures influence innovation? In examining these questions, I addresses one fundamental question in strategic management — How do firms achieve innovation?

Innovation involves both the generation and the exploitation of new products, processes, services and business practices. As a special kind of economic activity, innovation requires special kinds of informational and coordination mechanisms (Teece, 1992). Technological innovation is, of course, an important source of differentiation in organizations (Nelson & Winter, 1982). A firm's competitive advantage rests both on exploiting current technologies and resources so as to achieve efficiency, and on exploring new opportunities (March, 1991; Teece, Pisano, & Shuen, 1997).

Meanwhile, social capital has been defined as networks of relationships and assets located in these networks (Batjargal, 2003; Bourdieu, 1986; Burt, 1997; Coleman, 1988; Lin, 2001a). Dynamic industries find social capital crucially necessary to support innovative activities. In a competitive marketplace, the profitable commercialization of technology requires timely access to complementary assets, and the study of the effects of various social networks on innovation output can provide insights into this process. In a homogeneous social network, firms focus on logical extensions of their past successes. In a diverse social network, a firm's access to external heterogeneous knowledge and ideas can enhance its explorative innovations.

Cognition has been defined as the knowledge structures or mental templates that actors impose on an information domain to give it form and meaning (Lyles & Schwenk, 1992; Walsh, 1995). The process of innovation is influenced by the cognitive mechanisms through which people acquire, store, transform and use information. Innovative activities arise from the actors' actions; therefore, understanding why and how these persons act as they do becomes essential to understanding the innovation process itself. Since minds propel actions, managerial cognition lies at the center of the strategic management process (Stubbart, 1989). This paper incorporates the top management team's or the entrepreneur's cognitions in the creation of a firm's social capital and explores their effects on innovation output.

RESEARCH ON INNOVATION, SOCIAL CAPITAL AND COGNITIONS

Next I present a focused literature review of innovation research, social capital studies of innovation, and cognition studies of innovation. I then build a theoretical model based on the representative works reviewed in this section.

Innovation Research

Product and process innovations constantly disturbed the evolutionary process of enterprises (Nelson & Winter, 1982; Schumpeter, 1934). Innovative behavior is a strategic activity by which organizations gain and lose competitive advantage (Jelinek & Schoonhoven, 1990; Von Hippel, 1988). Innovation can involve the implementation of new combinations of different resources in a firm (Drucker, 1998; Hargadon, 2002). Two principal types of innovation include technological innovation and social innovation. At the firm level, this paper focuses on technological innovation. In technological innovation, firms conduct exploratory and exploitative search activities. Exploration and exploitation have been shown as fundamentally different search behaviors (Benner & Tushman, 2002; Katila & Ahuja, 2002; March, 1991). In exploitative search, a firm builds on its existing technological capabilities, whereas in exploratory search, a firm looks for new capabilities. This is a two-dimensional construct. A firm could leverage its existing knowledge base and explore new

technological trajectories simultaneously (Christensen, 1997; Rosenkopf & Nerkar, 2001; Sorenson & Stuart, 2000).

In the organization learning literature, exploitation – or incremental improvements to knowledge – results in greater rates of success through practice; exploration – or radical extensions of knowledge – results in increased variation with reduced probability of success from each effort (March, 1991; McGrath, 2001). Knowledge is a strategic resource the firm can possess and upon which it can build a sustainable competitive advantage (Marsh & Ranft, 1999; Nonaka, 1994; Simonin, 1999). Learning promotes comparative innovative efficiency, and firms must be able to identify, create and continuously manage knowledge, technological knowledge in particular, to generate value (Hitt, Ireland, & Lee, 2000). Technology is a form of knowledge, and one can understand technological change by examining knowledge development (Bettis & Hitt, 1995; Garud & Nayyar, 1994; Mokyr, 1990). Organizational arrangements that provide access to knowledge quickly and reliably produce competitive advantages (Nelson, 1990; Stinchcombe, 1990). In organizational sociology, the system within which one finds economic or social exchanges generates value and meaning apart from the instrumental worth (Rumelt, Schendel, & Teece, 1994). The embedded members of a network engage in reciprocal exchanges without expecting immediate benefits in return. Network exchange need be neither simultaneous nor subject to the short-term rational calculations of a market transaction (Gopalakrishnan & Damanpour, 1997). In the process of innovation, shared values and mutual trust facilitate economic exchanges.

Strategic decisions and managerial controls also shape innovation. Managers make strategic choices among competing research ideas so as to advance them into product innovations. A strategy of concentrating innovation in new areas unrelated to the existing customer base or existing technologies is purely exploratory, whereas focusing new product innovation entirely around existing complementary assets is essentially exploitative (Danneels, 2002). In other words, exploitation builds on or extends a firm's existing knowledge while exploration requires new knowledge and capabilities. New entrants typically conduct exploration (Foster, 1986; Sull, Tedlow, & Rosenbloom, 1997). By contrast, established incumbents often choose exploitation (Abernathy & Utterback, 1978; Tushman & Anderson, 1986). The balance between exploration and exploitation is driven by strategic decisions to become an inventor or an early imitator, or a strategy to reduce risk by "sticking to the knitting" of existing core competences (Dosi, 1988). Managers control the innovation novelty path by selecting among those ideas to be advanced into innovations, with an underlying dependence on the firm's strategy to stick to existing competences and resources or to take risks in new areas.

Social Capital Studies of Innovation

Social capital refers to the resources a firm's contacts possess and the structure of those contacts in a network (Burt, 1992). These actual or potential resources are embedded in social

networks accessed and used by actors for actions (Lin, 2001a). These actions are linked to the possession of a durable network of relationships, mutual acquaintances and recognition (Bourdieu, 1986). The term social capital was first used to describe the social networks one finds in mixed-use neighborhoods in large cities (Jacobs, 1961). The term expanded to acquire a general application to economic development (Coleman, 1986; Coleman, 1988). Different from physical capital and human capital, social capital exists in the structure of relations between and among associated actors, facilitating cooperation among them.

An actor's social capital has three dimensions: (1) structural embeddedness, (2) relational embeddedness, and (3) resource embeddedness. Structural embeddedness is the structure of the overall network of relations (Granovetter, 1990). Its structural properties include network size, density and diversity. Relational embeddedness is the extent to which the quality of an actor's personal relations affects economic actions (Granovetter, 1990). The relational dimensions of dyadic ties include relational content (Burt, 1983; Burt, 1997; Podolny & Baron, 1997); tie strength (Marsden & Campbell, 1984); and relational trust (Tsai & Ghoshal, 1998). Resource embeddedness is the degree to which network contacts possess valuable resources (Bourdieu, 1986; Lai, Lin, & Leung, 1998; Lin & Dumin, 1986; Marsden & Hurlbert, 1988). Various resources must be available for instrumental mobilization (Granovetter, 1982; Lin, 2001a, 2001b). Actors must know of the existing resources embedded in the network, and their business partners must put those resources at each other's service. A firm's unique portfolio of tangible and intangible resources influences the rate and direction of its growth and diversification (Barney, 1991; Mahoney & Pandian, 1992; Penrose, 1959; Peteraf, 1993). A firm can achieve sustainable growth if its core competences (Hamel & Prahalad, 1994) cannot be easily imitated by competitors (Barney, 1991; Lippman & Rumelt, 1982). The heterogeneous structural, relational and resource properties of networks lead to different firm performance (Batjargal, 2003). This paper focuses on two characteristics of social capital: density and diversity.

Previous research has studied the role of social capital in the social and economic phenomena. Gargiulo and Benassi's study shows managers with cohesive communication networks to be less likely to adapt these networks to the change in coordination requirements prompted by their new assignments (Gargiulo & Benassi, 2000). Kale, Singh, and Perlmutter's research suggested that one of the main reasons that firms participate in alliances is to learn know-how and capabilities from their alliance partners. At the same time firms want to protect themselves from any opportunistic behavior of their partners in order to retain their own core proprietary assets (Kale, Singh, & Perlmutter, 2000). Their study provided empirical evidence that when firms build relational capital in conjunction with an integrative approach to managing conflict, they often achieve both objectives simultaneously. Relational capital based on mutual trust and interaction at the individual level between alliance partners creates a basis for learning and know-how transfer. At the same time, it curbs any incentive for opportunistic behavior among alliance partners, thus preventing critical know-how leakage.

Reagans and Zuckerman (2001) reframed demographic diversity in terms of the network variables that reflect distinct forms of social capital. They predicted that decreased network density would lower a team's capacity for coordination, whereas high network heterogeneity would enjoy an enhanced learning capability. Their findings support most of the hypotheses (Reagans & Zuckerman, 2001).

Recent work on social networks emphasizes the importance of social capital or business networks for innovativeness. With increasingly modular products and distributed knowledge (Baldwin & Clark, 2000), firms recognize a need to collaborate with other firms both formally and informally. With knowledge broadly distributed, the locus of innovation resides in a network of inter-organizational relationships (Powell, Koput, & Smith-Doerr, 1996). Many scientific and technological breakthroughs result from numerous contributions of many actors working in networks (Bougrain & Haudeville, 2002). Furthermore, an emerging research stream looks to patterns of relationships as predictors of innovation, focusing on whom an individual knows rather than on his or her personal characteristics. For example, the value of collaboration for innovation has appeared in the biotechnology industry (Baum, Calabrese, & Silverman, 2000; Shan, Walker, & Kogut, 1994); in the global chemicals industries (Ahuja, 2000); and in other high-tech industries (Coles, Harris, & Dickson, 2003; Frenken, 2000; Reed & Walsh, 2002; Streb, 2003).

In conclusion, the evidence shows that the innovation process, particularly the exploratory innovation processes, benefits from engagement with a diverse range of partners. This engagement invites the integration of different information, knowledge bases, behaviors and ways of thinking. Formal and informal communication between people with different information, skills and values increases the possibility of novel combinations of knowledge (Conway, 1995). The more risk-averse firms, however, tend to link their innovation activities and networking relationships to customers, because a knowledge of clients' demands reduces the risk of failure for the innovating firm. In this case, innovation is more exploitative, and productivity gains are more modest. This pattern suggests a direct relationship between differences in networking activity and technological innovation.

Cognitive Studies of Innovation

Cognitive psychology (Neisser, 1967) helps explain the mental processes by which individuals interact with other people and the embedded environment. Social cognition theory (Bandura, 1986; Fiske & Taylor, 1984) developed as a specific way to explain the individual behavior in this person-environment interaction. This theory introduced the idea of knowledge structures: mental models ordered so as to optimize personal effectiveness within given situations. Cognitive studies explore the cognitive processes that govern strategic choices. Complementing the theory of rational choice, cognitive science attempts to explain why or how economic decisions happen in an uncertain and subjective world (Kahneman, Slovic, & Tversky, 1982; Simon, 1957; Smircich & Stubbart, 1985). As thinking drives strategy formation, managerial cognition lies at the

core of the strategic management process (Stubbart, 1989). Managers take strategic action intentionally to respond to a changing environment.

Managerial cognitive structures shape firm growth strategies because the management team's conceptualization and employment of its firm's resource base influence the direction of expansion. Managers pursue competitive actions and deploy resources in a way consistent with their mental models of the firm's capabilities and with the competitive threats they believe it faces. The determinants of the growth and direction of a firm include the productive capabilities engendered by resources interacting with managerial cognitive frameworks instead of the actual resources themselves (Mahoney & Pandian, 1992; Penrose, 1959; Porac, Thomas, Wilson, Paton, & Kanfer, 1995).

Innovation is a dynamic social learning process; actors continuously assimilate information and knowledge from those they interact with. As learning depends on experimentation and feedback, learning opportunities tend to grow directly from previous knowledge (Teece, et al., 1997). Actors with more training and experience diversity will create ideas with greater novelty than those with access to a narrower range of knowledge. Demographic differences that help explain the origins of homogeneous and diverse network performance generally appear to reflect underlining differences in cognition (Lawrence, 1997). The innovation period abounds in information about the definition of identities and the establishment of social roles (Harrisson & Laberge, 2002). Social interaction plays a critical role in such firm innovation as technology adoption (Fulk, 1993; Pinch & Bijker, 1986; Wilkinson, 1983).

Scholars have studied the role of management cognition in shaping organizational actions. Weick (1990), for example, contended that new technologies are subject to a variety of interpretations and require "sensemaking" in order to be managed (Weick, 1990). Lowstedt (1985) suggested that researchers looking for direct relations between technology and organization tend to ignore the cognitions of the principal actors, which are crucial in mediating these relations. Since the people that describe and interpret organizations socially construct organizations and technologies, no objective "real" organization or technology independent of the cognitions of the people involved exists. People design technology and organization in keeping with their perceptions and explanatory frameworks (Lowstedt, 1985).

Swan (1995) described the nature and importance of knowledge bases and cognitions for decisions about technological innovation and suggested how to use process research to explore knowledge and cognitions (Swan, 1995). In an earlier study, Swan and Newell (1994) used a cognitive mapping methodology to reveal managers' beliefs about the causes of and effects of a particular type of technological innovation. They compared these beliefs with suggestions made in the literature about the factors that influence a firm's level of innovation. The factors the literature found to increase the likelihood of innovation the managers believed to be unimportant direct causes. These managers considered involvement in professional associations to be a causal factor crucial to innovation in production and inventory control. Other factors seen to be direct causes included

the ratio of professional and technical staff to others in the firm, the promotion activities of vendors, and the competitors' levels of technology (Swan & Newell, 1994). Swan (1997) also emphasized the importance of cognition in decisions about technological innovation. But a lack of research tools and techniques has led to a low emphasis on cognitive processes in the empirical studies of technological innovation. She reviewed the cognitive mapping methodologies, evaluated their limitations, and concluded that one should distinguish between cognitive maps and the output of mapping techniques (Swan, 1997).

Kaplan, Murray and Henderson (2003) attempted to link management mental models to strategic choices in the face of discontinuous innovation. They drew upon 23 years of data covering 15 major pharmaceutical firms to ascertain the degree to which each firm's responses to the revolution in biotechnology was shaped by the senior team's recognition of biotechnology's importance. Their findings suggest that cognition at the most senior level can play a critical role in shaping the established firm's response to discontinuities (Kaplan, Murray, & Henderson, 2003). Jelinek and Litterer (1994) proposed a cognitive theory of organizations that links individual level phenomena (e.g. cognitions and actions) with organizational level phenomena (e.g. output, coordinated actions, organizational change and organizational learning). An individual's beliefs may be just noise in the organizational decision-making process but sometimes they may actually guide the direction of an organizational decision, and the actions that occur as a result of that decision shape and modify the beliefs of the individual (Jelinek & Litterer, 1994).

A SOCIAL-COGNITIVE PERSPECTIVE ON FIRM INNOVATION

Innovation is the generation and the exploitation of new products, processes, services and business practices. During the process of acquiring and translating new ideas into practice, people's internal cognitions and external relations play important roles. The primary interest in this paper is to integrate managerial cognition studies with social networks studies so as to investigate the origins of innovation.

Social Capital and Cognitive Structure

Social capital derives from a firm's business network where reciprocal exchange occurs. I characterize networks along two dimensions: structure and content. Network structure refers to the way in which the relationships between the embedded actors are arranged. A structural property is network density – that is, the extent to which the actors are connected to each other. Network content refers to the characteristics or attributes of the members embedded in the network. At the network level, heterogeneity or diversity describes the extent to which each member's attributes differ from those of other members. The content and structure of networks being conceptually distinct, both can influence the nature and the transfer of resources. Despite this conceptual

distinction, however, network structures correlate with their contents. Dense networks correlate with homogeneity whereas sparse networks appear more likely to correlate with diversity. This discussion treats the dense and homogeneous networks together and the sparse and diverse networks together. Members of a network form both strong and weak ties as they transmit knowledge. Homogeneous networks of cohesive and frequent social relationships improve cooperation and optimize network tasks; however, they lack the flexibility essential for creative problem solving (Reagans & Zuckerman, 2001). On the other hand, diverse networks of sparse and infrequent social relationships are responsive to changing market conditions, provide access to new resources and ideas, and promote innovation (Gargiulo & Benassi, 2000; Reagans & Zuckerman, 2001); however, diverse networks lack the cohesiveness, trust, coordination and task specializations available in homogeneous networks.

Cognitions are actors' mental reflections upon a certain phenomenon – innovation in this study. With only a limited information processing capability, managers of an embedded network find themselves unable to perceive the environment precisely and interpret information perfectly, particularly in a complex and uncertain environment. Their mental models change with learning and adaptation. Two cognitive characteristics apply to strategic flexibility: complexity and centrality. Complexity reflects the level of differentiation and integration in an actor's mental model (Walsh, 1995). Centrality reflects the level of focus and hierarchy in an actor's mental model (Eden, Ackermann, & Cropper, 1992). Complexity measures an actor's information-processing capability – his or her ability to capture a broad collection of environmental, strategic and organizational concepts. Centrality measures an actor's tendency to centralize a strategy frame around a few core concepts.

In a social network, actors outsource the cognitive tasks to their associates (Clark, 1997). An actor's social network serves as a decision-making entity, providing the fact and value premises upon which the actors rely in decision-making. Knowledge and information become dispersed among the actors embedded in the network. In a homogeneous social network, groups diffuse shared beliefs and social norms. Actors embedded in this network learn and share similar information and knowledge, promoting efficient and specialized use of resources. For example, managers in the same industry demonstrate similar cognition (Huff, 1982; Porac, et al., 1995; Reger & Huff, 1993; Spender, 1989). Two mechanisms explain why managers think and act similarly: (1) such collectively established "scaffolding" as industry standards (Clark, 1997); (2) identical solutions provided by such outside organizations as consulting, market research, and accounting firms. By contrast, actors embedded in a diverse network are more likely to maximize the non-redundant information received from contacts. This information diversity increases the possibility of an actor's comprehension of a business context or phenomenon from multiple perspectives. Furthermore, this information diversity enhances an actor's ability to differentiate core concepts from peripheral concepts. Diverse information and knowledge assimilated from different social relations may,

however, create information overload. When this occurs, an actor tends to develop a hierarchical cognitive structure to process efficiently this diverse information and knowledge.

Proposition 1a: *In a sparse and diverse social network, the embedded actor's cognitive structure is more likely to be more complex and more centralized.*

Proposition 1b: *In a dense and homogeneous social network, the embedded actor's cognitive structure is more likely to be less complex and less centralized.*

Simultaneously, an actor actively searches for new relationships to outsource cognitive tasks. A network is a series of social relations with a specific content (Emirbayer & Goodwin, 1994). Actors' narratives describe links in this network (White, 1992). Only an approach that brings human agency into a network analysis can adequately explain the formation, reproduction, and transformation of networks themselves. In the high technology industries, business networks constantly change to respond to the new environments. Meanwhile, interacting individuals influence each other to produce a homogeneity of belief (Carley, 1991; Friedkin & Johnsen, 1990, 1999; Kilduff, Angelmar, & Mehra, 2000).

An actor's cognitive characteristics influence his/her networking process, and thinking drives strategy making. A key strategic action, networking becomes a process of an individual's interacting with the environment. Resources flow through social ties (Lin, 2001a; Snijders & Bosker, 1999). An actor, such as an entrepreneur (Baron & Markman, 2003; Shane & Cable, 2002; Shane & Stuart, 2002), actively establishes ties through which information and aid flow.

People differ in discovering the benefits of network homogeneity and diversity, and human actors with different cognitive structures play a critical role in the formation of different types of social networks. An actor with increasingly complex cognitions is more likely to discover and access the new productive resource opportunities from his/her contacts. This greater heterogeneity of resource choices motivates the actor to construct a diverse social network. Reciprocally, the development of a diverse network can positively reinforce the complexity that initiated this network structure. Therefore, an actor with more complex cognitions is more likely to construct a diverse network, and create new resource opportunities because heterogeneous knowledge stimulates persistent innovations. Furthermore, actors with more centralized cognitive structures are more efficient to establish ties with diverse social contacts because they can differentiate the key social relations from the other social relations for the peripheral factors.

Proposition 2a: *An actor with a more complex and more centralized cognitive structure is more likely to construct a sparse and diverse social network.*

By contrast, an actor with a less complex and less centralized cognitive structure is more likely to form a dense and homogeneous social network because he/she is less able to differentiate the key social relations from the other social relations. These individuals are more likely to form cohesive network relationships with others having similar knowledge and experience than with individuals of differing knowledge and experience (Coleman, 1988; Granovetter, 1983; Mcpherson, Popielarz, & Drobnic, 1992). A less complex cognitive structure means these actors are less likely to interact with others with different knowledge and experience. Furthermore, a less centralized cognitive structure means these actors are less efficient in establishing diverse social relations. This inefficiency leaves them more likely to interact with similar others.

Proposition 2b: *An actor with a less complex and less centralized cognitive structure is more likely to construct a dense and homogeneous social network.*

Social capital, Cognitive Structures, and Firm Innovation: a Theoretical Model

The organizational learning literature differentiate innovations along two dimensions: exploration and exploitation (Benner & Tushman, 2002; Katila & Ahuja, 2002; March, 1991). Exploitation refers to the refinement and extension of existing competencies; exploration refers to experimentation with new alternatives (March & Simon, 1958; Weick, 1979). This construct has two dimensions. A firm could leverage its existing knowledge base and explore new technological trajectories simultaneously (Christensen, 1997; Rosenkopf & Nerkar, 2001; Sorenson & Stuart, 2000). Different innovation activities require different information, reference points, and work routines. The discussion turns now to how a firm's external social ties and internal cognitive structures influence these latent factors.

In firm innovation, forms of exchange depend more on relationships and partners' reputation, and are guided less by authority and price (Cohen & Fields, 2000). Networks are better suited to coordinating knowledge-intensive, high-technology production than are either markets or hierarchies (Adler, 2001; Powell, 1990). Markets fail to function well in the allocation of knowledge because of the incomplete information problem, and the public goods aspect of knowledge (Robertson & Langlois, 1995; Stiglitz, 1994). Hierarchies lend themselves well to mass production and distribution, but it is difficult for authority to bring widely spread and individually held knowledge to the center. Instead, networks lend themselves particularly well to the exchange of commodities whose value is difficult to measure, such as knowledge and technological know-how. In an entrepreneurial context, contact resources together with structural and relational dimensions of networks can exert a significant impact on firm performance (Batjargal, 2003).

Actions of economic agents tend to become solidified, ongoing systems of social relations, and these relations can both facilitate and constrain profit- and rent-seeking actions (Granovetter, 1985). Members of a network learn through networks to stay current in rapidly changing

environments. Collaboration enhances organizational learning (Dodgson, 1993; Hamel, 1991). In a homogeneous network, actors' business contacts provide similar information about the product, supply markets, technology, and changes in the external environment. Every actor is directly or indirectly connected to every other by frequent and cohesive social interactions (Coleman, 1988; Gargiulo & Benassi, 2000; Kilduff, et al., 2000; Reagans & Zuckerman, 2001). This familiarity creates a high density of social relationships that produces homogenous and clustering behaviors (Gargiulo & Benassi, 2000; Granovetter, 1983).

Moreover, the business network provides a context in which the managers can observe and emulate similar firms. When facing a choice with limited information, one common heuristic is to emulate the behavior of others (Gigerenzer & Todd, 1999). In a homogeneous network, a firm tends to imitate the strategies of similar firms and focus on increasing efficiencies in resource use. Such an organization is routine based, history dependent, and target oriented (Levitt & March, 1988). A business network provides routines that can be made part of or adapted to a firm's current routines. Meanwhile, an employee's tasks and responsibilities tend to become formalized, often in a written job description, and technical standards often go beyond design specifications to mandate specific steps. A standard business routine is likely to emerge in a homogeneous business network, and its members are inclined to adopt it. However, a standardized business process management inhibits a firm's exploratory innovation output (Benner & Tushman, 2002).

By sharing similar information and resources, imitating similar firms, and standardizing organizational routines, a firm embedded in a homogeneous network is more likely to be exploitative in its innovation activities.

Proposition 3a: *A firm embedded in a dense and homogeneous network is more likely to conduct exploitative search in technological innovations.*

Structural-hole theory suggests, however, that the benefits of diverse information connections outweigh the mutual coordination and specialization benefits of homogeneous networks (Burt, 1997; Gargiulo & Benassi, 2000; Perry-Smith & Shalley, 2003). In a diverse social network, members share non-redundant information and knowledge. Diverse networks benefit from brokering dispersed knowledge and information sources. Actors encounter information, ideas and resources unavailable in a homogeneous network (Burt, 1997; Gargiulo & Benassi, 2000; Perry-Smith & Shalley, 2003). Because information transmitted through diverse networks tends to be novel, diverse networks have a greater capacity to discover new productive opportunities and relationships (Burt, 1997; Powell, Koput, & Smith-Doerr, 1996). Since new ideas and knowledge can be accessed and recombined from non-redundant sources, diverse networks provide benefits of creativity and innovation (Granovetter, 1983; Perry-Smith & Shalley, 2003; Reagans & Zuckerman, 2001). In industries like biotechnology with rapid technological developments, frontier research can be more quickly adopted in networks consisting of diverse collaborations (Powell, et al., 1996).

Finally, a firm with diverse networks has various companies to imitate. Multiple reference points can help a company explore new productive resource opportunities. Furthermore, a standard business routine is less likely to emerge in a diverse social network, and a lack of a standardized business process management encourages a firm's exploratory innovation output (Benner & Tushman, 2002).

Proposition 3b: *A firm embedded in a sparse and diverse network is more likely to conduct exploratory search in technological innovations.*

In any event, actors construct their innovation networks, and innovation results from exchanges of knowledge and ideas by individual actors or groups mobilized through legitimization activities and influenced by given internal and external contexts (Pettigrew, 1985, 1990). People tend to operate first in local situations in the initiation of their interactions (Knorr-Cetina, 1981). To understand the sources and processes of innovation, one should incorporate cognitive factors into the social network studies. An actor's cognitive characteristics influence the process of receiving information, seeking reference points, and establishing work routines.

Actors construct knowledge structures consisting of organized knowledge about an information environment. These knowledge structures help the actors interpret this environment and take responsive actions (Walsh, 1995). Knowledge structures are discussed in terms of frames of reference (March & Simon, 1958), cognitive maps (Axelrod, 1976), and industry recipes (Spender, 1989). Managers and entrepreneurs create models of the world in their minds and then use these models to simplify a complex environment. Based on the assumption that actors' mental representations guide cognition and actions relative to strategic choices, an actor with increasingly complex cognitions tends to be alert to various types of information and new productive resources opportunities. During the process of interacting with a technology, actors' cognitions help them construct different interpretations of the technology (Bijker, Pinch, & Hughes, 1990; Bloomfield, 1986; Woolgar, 1981). This social construction of technologies influences the process of firm innovation.

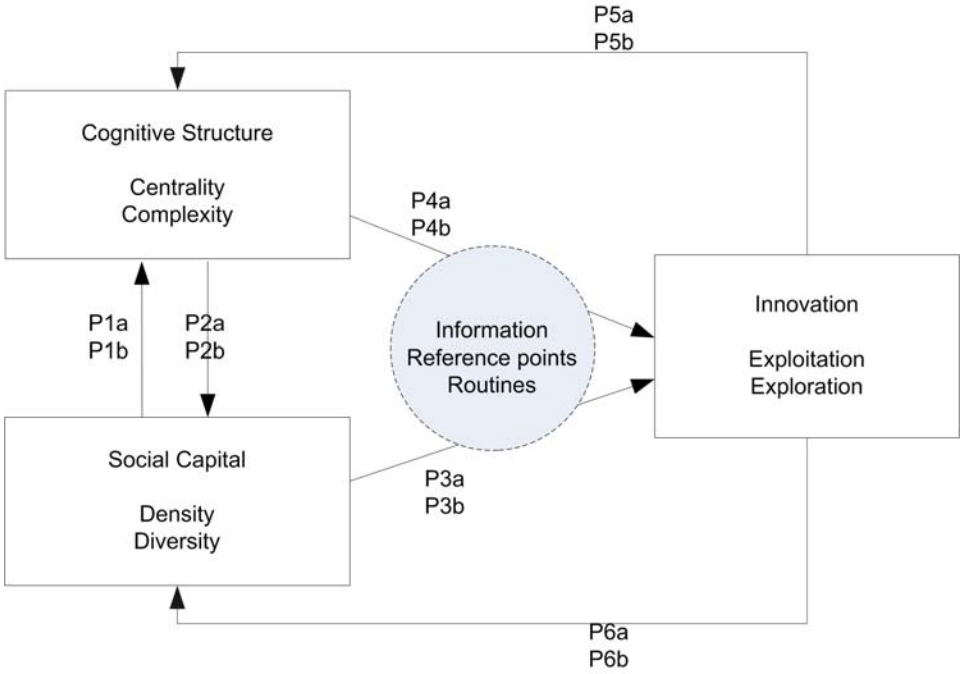
An actor with complex cognitions tends to pay more attention to different reference firms. Learning from diverse sources enables a firm to build a diverse knowledge base and ultimately create new technologies. In addition, actors who perceive firm innovation from multiple perspectives tend to feel less constrained by standard routines. They behave flexibly with process management; therefore, they tend to resist standardized work routines. Diverse information flow, multiple reference points, and flexible process management ultimately allow a firm to be more exploratory in its innovations.

Proposition 4a: *An actor's cognitive complexity is associated positively with the firm's exploratory search in technological innovations.*

Finally, an actor with a centralized cognitive structure receives certain information and knowledge relevant to the core concepts and peripheral concepts selectively. This efficiency enhances the actor's ability to assimilate more information and knowledge en route to exploring new productive resources. This hierarchical cognitive structure enables an actor to imitate diverse reference companies to adduce different factors. These actors tend to be alert to environmental changes, while the ability to differentiate factors enables them to change current organizational routines quickly.

Proposition 4b: *An actor's cognitive centrality is associated positively with the firm's exploratory search in technological innovations.*

Figure 1: Social Capital, Cognitions And Innovation: A Theoretical Model



Feedback Loop

Figure 1 provides a schematic presentation of the theoretical model under discussion. The model illustrates a two-way relationship as the feedback loop. In the feedback loop, as independent

variable, firm innovation influences the actors' cognitive structures and social capital. The managers' mental models change through adaptation and learning. As managers receive feedback about organizational performance, they correct their mental models to keep up with the environment. An organization can learn from its own experience and borrow experience from others (Huff, 1982). A firm's performance triggers the adaptive learning process (Greve, 1998; Lant & Hewlin, 2002; Lant & Hurley, 1999; Lant, Milliken, & Batra, 1992). Organizational change is based on interpretations of experience, and performance feedback serves routinely to determine whether past performance is satisfactory and to detect problems (Cyert & March, 1963; Levitt & March, 1988). An increase in exploitative searches will send the routines, information flow, and reference points in different directions. To refine and extend the existing competencies, a flexible and chaotic organizational routine has to become better ordered. Information flow becomes more top-down rather than bottom-up and firms are more likely to look to their competitors with superior capabilities of exploiting the existing innovations.

During this feedback process, increasingly exploratory searches reinforce the actors' cognitive complexity because managers or entrepreneurs are forced to diversify their points of view and establish causal relationships between more diverse factors. An increase in exploratory searches change established routines and information flow in a firm. A rigid organizational routine becomes more flexible, and the decision-making authority becomes more decentralized. More information is generated from the bottom of a firm, and information flow is more diversified. Meanwhile, the firm changes its reference points to more innovative firms or institutions.

Proposition 5a: *A firm's exploratory search in technological innovations is associated positively with the actors' cognitive complexity.*

Furthermore, the increasing exploratory searches reinforce the actors' cognitive centrality because managers or entrepreneurs become more efficient at differentiating the core factors from the peripheral factors in exploring new productive opportunities. Hence,

Proposition 5b: *A firm's exploratory search in technological innovations is associated positively with the actors' cognitive centrality.*

Simultaneously, a firm's social network changes with different innovation output. With more exploratory search activities, managers or entrepreneurs adapt to new requirements by building business ties with diverse businesses. The positive feedback will reinforce this tendency to build a diverse social network. Meanwhile, with more exploitative search activities, firms are more likely to focus on their existing competencies and look to the current business network for information and knowledge. Positive performance will also reinforce this tendency to build a dense social network. Accordingly, two propositions emerge:

Proposition 6a: *A firm's exploitative search in technological innovations is associated positively with the density of its social capital.*

Proposition 6b: *A firm's exploratory search in technological innovations is associated positively with the diversity of its social capital.*

DISCUSSION

I derived twelve propositions linking social capital (density and diversity), cognitive structures (centrality and complexity), and technological innovation (exploitation and exploration). This social-cognitive perspective integrates social network studies and managerial cognition studies to evaluate the business phenomenon of firm innovation. The proposed theoretical model describes the mechanisms by which social capital and cognitions influence the innovation process. These propositions have important implications for managerial practice, especially in market domains where innovation success largely determines firm performance. Meanwhile, this research makes important theoretical contributions, and it extends the literature on organization theory and firm innovation.

Organization theory

Social capital exerts significant effects on the embedded actors' cognitive structures, and a firm's search activities in technological innovation. First, this paper established a link between social networks and managerial cognitions. In the strategic management research, few known studies have explicitly linked managerial cognitions research with social networks studies, and no previous research has enunciated the effects of social networks and managerial cognitions on technological innovations at the same time. The propositions illustrate the decision process in the selection of relationships, a concept heretofore taken for granted in social network studies. Existing social network research treats individuals as identical, and has not considered the role of individual differences that influence the realized benefits of social networks (Gargiulo & Benassi, 2000; Kilduff, et al., 2000; Reagans & Zuckerman, 2001). An adequate analysis of social network should include the ability of the actors to transform or reproduce long-term structures (Harrisson & Laberge, 2002). By incorporating the actors' cognitions into their social capital in order to study the business phenomenon of firm innovation, this paper develops a theory of action that connects individual interests with social structure (Coleman, 1986; Poole & Vandeven, 1989).

Firm innovation

Depending on the embedded actors' cognitive idiosyncrasies, social capital exerts contingent effects on firm innovation. This research contributes to a richer understanding of the sources and process of firm innovation, and it provides a comprehensive examination of the role of external social capital and internal cognitive structure in firm innovation. Firms face challenges in initiating and sustaining exploration into new domains when their business networks are homogeneous and when their top management team focuses on extremely limited strategic factors. Accordingly, this social-cognitive perspective on firm innovation has broad implications for practitioners in technology firms and their support networks consisting of venture capitalists, lawyers, accountants, and other policy makers, and it helps managers focus on the specific aspects of their cognitive structures and social capital in the process of innovation.

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SMALL-FIRM COMPETITIVE STRATEGY

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ABSTRACT

This study examined the competitive strategies of 167 small firms in rural Kansas and Missouri. Fifty-eight firms were differentiators and forty-five were cost leaders. The remaining firms were unable to articulate a specific generic strategy and are what Porter described as "stuck in the middle." We consider these results to be important because with fifty years of combined experience consulting with small firms, we strongly believe that the most successful generic strategy is focused differentiation.

INTRODUCTION

In 1980 Michael Porter published *Competitive Strategy: How to Analyze Industries and Competitors*. This book quickly became a New York Times best seller. Thirty-one years later, it remains in print in hardback only. Porter's thesis was that there were only two ways to compete successfully: Cost Leadership and Differentiation. He called these "generic competitive strategies." Cost Leadership means just what it says: achieving the lowest cost of goods or services sold in the firm's competitive domain (industry or industry segment). The Cost Leader in discount retailing is Wal-Mart; through massive scale, the efficiency of its distribution system, and effective advertising, it has become the world's largest retailer. The challenge for the cost leader in any domain is not to be so cost-focused that it fails to spot innovations which change the domain. Examples: Sears, independent booksellers.

In contrast, differentiation is about being different. Porter's phrase is "perceived uniqueness." Successful differentiators set themselves apart from the competition by offering something – features, options, customer service, image, etc. – for which customers are willing to pay more. Examples in department-store retailing are Nordstrom and Neiman Marcus. The danger for differentiators is not to allow the price gap between them and the cost leader to become so large that customers are no longer willing to pay the difference. Examples: Wanamakers (Philadelphia) and many other now-defunct upscale, local department stores. Common characteristics of cost leaders are large production facilities, long production runs, centralized decision-making, and tight control systems. Differentiators, on the other hand, rely heavily on surveys to keep them abreast of what their customers value and perceive in the differentiator's product or service offerings. They are also characterized by decentralization, informality, higher gross margins, and significant investments in

R&D. They are ever-alert to complaints about price because those tell them that customers don't perceive value.

Porter also offered a 2x2 matrix of these strategies. The "Y-axis" is for the scope of operations. "Wide" means a business that competes industry-wide, and "narrow" is for a company competing in an industry segment, which the strategy literature (Caves & Porter, 1977) calls a 'strategic group.' Marketers might think of such a group as a "niche." The Porter strategy matrix, then, is a 2 x2 matrix with two choices for how to compete and two for scope.

Although numerous studies have attempted to relate these two basic strategies to firm performance, we are aware of none that address this research question: "What percentage of small, non-public companies employ which type of strategy with which breadth of scope?" The purpose of this study was to answer that question. We define "small non-public companies" as those employing fewer than one hundred people.

METHODOLOGY

MBA students and final-semester undergraduates conducted 167 onsite interviews with CEOs and sole practitioners in the Fall 2010 semester. Interviewees were from southwest Missouri and southeast Kansas. Each respondent was asked to complete a questionnaire – Appendix 1. All of the interviewers had been trained (in class) about generic strategies. That turned out to be important because, as we later learned, in most cases the interviewer had to explain what "generic strategies" are.

Respondents were also asked to check the appropriate block on the survey form indicating the generic strategy they employed, to indicate their type of business (service, retail, manufacturing or wholesale), and to disclose employment levels for 2009 and 2010.

RESULTS

All companies reported employing fewer than 100 people in 2010. Thirty-two (19%) reported an increase in employment last year, while the rest reported flat or declining headcount . These are consistent with trends in the U.S. economy at large.

Forty-five companies (27%) said cost leadership was their choice of strategy, while fifty-eight others (35%) chose differentiation. The remaining enterprises (38%) reported "both or none" as their strategy; Porter (1985) described this as "stuck in the middle" – a company tries to be all things to all people and refuses to commit to a strategy. We saw no obvious connection between the type of business or employment levels and the firm's generic strategy.

DISCUSSION

We can only speculate about why most interviewees needed a definition of 'generic competitive strategy' before they could answer that particular question, but we believe it derives from the use of 'generic' in that context. Had the questionnaire used the phrase 'competitive strategy' with the labels "low-cost" and "being different," we suspect explanations would not have been necessary.

We are more concerned, however, about what we see as a strikingly self-destructive strategy choice by some companies: the choice to compete on cost. Though we didn't ask for financial performance figures, we are confident that many of these 'cost leaders' are making subnormal rates of return and, thus, are in a slow state of liquidation, but don't even know it. This creates a teaching opportunity for small colleges in rural areas: the market of small-business owners and senior managers. It seems to us that knowing the unsustainability of having a cost-leader strategy in a domain where the cost leader is a much larger company would be valuable for them to know.

Of course, they might well ask, 'What then?' Classes could instruct them about resources and about, as Penrose (1995) wrote, the importance of identifying additional services that can be provided by existing resources or combinations of resources. The second author of this paper, in fact, did that in his own consulting practice: he saw that the tools of strategic management lent themselves to easy and needed applications in valuing middle-market closely-held companies where the assumptions of traditional microeconomics (profit maximization, the firm-asproduction-function, etc.) do not apply. He has carved out a lucrative niche which, 17 years later, only he occupies.

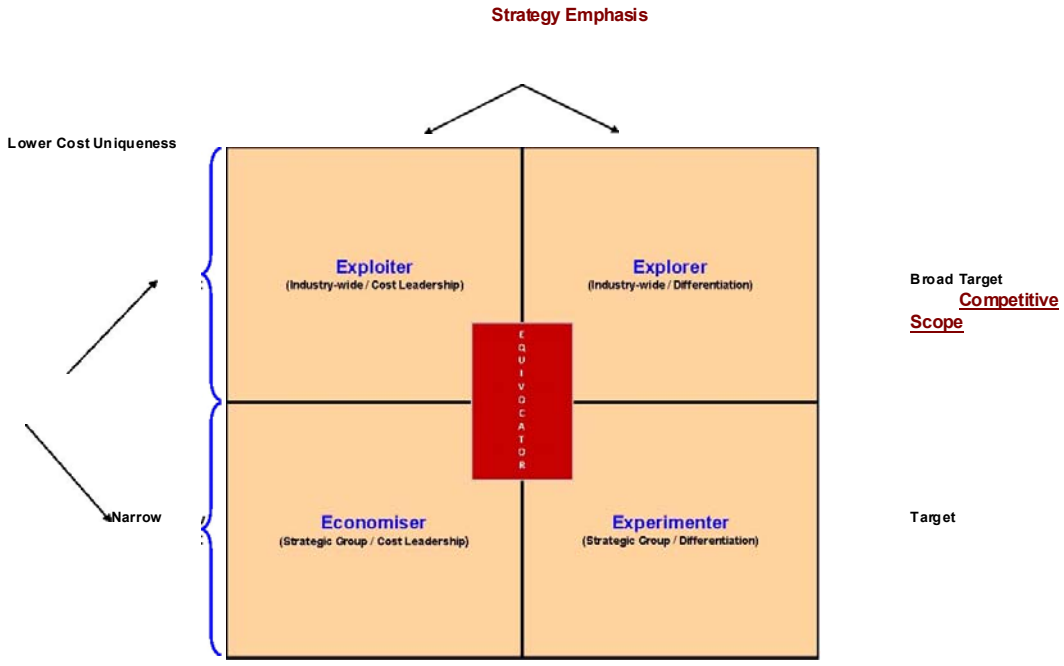
In addition, small-business owners and managers could be encouraged to develop their employees by, you guessed it, underwriting their attendance in evening classes. This could be done in conjunction with what Miller (2010) called "personal development programs." These offer a way for owners, officers, and employees to take personal ownership of their careers and grow their skills and knowledge in order to support companies' growth. It is much less risky to promote from within.

CONCLUSIONS

Of the 103 firms making a deliberate strategy choice, 58 chose differentiation. Because interviewers had to explain "generic strategy" to business representatives, we infer strategy, in general, and generic strategy in particular was not a "front burner" issues for them. This is a troubling because a consistent strategy has been demonstrated to correlate with performance in a large number of empirical studies.

In addition to picking the appropriate strategy, firms must decide how to implement the strategy. This means figuring out what to do in each of the functional areas of the business in support of the strategy and this requires transformational leadership (Parnell, 2008).

Based on a combined half-century executive and consulting experience, we have found that the strategy *du jour* for smaller non-public firms is differentiation with a narrow scope (Box, 2010; Miller, 2010). This reflects the fact that few middle-market companies have either the resources needed to be cost leaders or the footprint to compete across an entire industry (Peters, 2007). Working from Porter's 2x2 matrix, Miller (2010) devised a typology of 'strategy archetypes':



Note that each archetype begins with the letter 'E'. The name of each label conveys a basic idea of what it's about. Both alliteration and names make them much easier to remember. The 'stuck in the middle' Equivocator clearly conveys a mistaken strategy.

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Appendix 1

Pittsburg State University Fall 2010 Strategy Survey

Interviewer:_____ Class:_____
Name of the Firm Interviewed:_____ _____
Name and Title of the person interviewed:_____
What is your primary line of business?____ _____
Number of full time employees (2010):_____ _____
Number of full time employees (2009):_____ _____

How does your firm compete? Please check ONLY ONE block that best describes your strategy.
[ ] Low Cost and Low Prices: We diligently control costs and prices. It is common to use long production runs or large batches. We have very tight control systems. We (generally) have lower costs and selling prices than our competitors. [ ] Differentiation: Based on in depth knowledge of what our customers want, we have a wide variety of products and services. Our selling prices are "premium". [ ] Neither of the above or both.

UNDERSTANDING, FINDING, AND APPLYING CORE COMPETENCIES: A FRAMEWORK, GUIDE, AND DESCRIPTION FOR CORPORATE MANAGERS AND RESEARCH PROFESSIONALS

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ABSTRACT

In recent years, managerial interest in corporate core competencies as competitive tools has risen greatly. Corporate managers and professionals often have three questions regarding them. First, what are corporate core competencies? Second, how can the ones held by a particular firm be identified? Third, how do core competencies integrate with other kinds of corporate knowledge to produce particular products and services? This paper answers the first question by presenting a framework describing the internal dynamic and elements of core competencies. It answers the second by providing a usable guide to discovering them within a firm. It answers the third by describing core competencies' place within the structure of organizational knowledge held by corporations. The authors hope that this framework, guide, and description will prove useful to corporate managers and research professionals interested in strengthening their core competencies and applying them more effectively.

INTRODUCTION

The construct of the core competence—sometimes called by other names such as organizational competencies or distinctive capabilities—has been widely studied (Bogner & Thomas, 1994; Fowler et. al., 2000; Lei, 2000; Leonard-Barton, 1992; Nelson & Winter, 1982; Pitt & Clarke, 1999; Post, 1997; Sanchez et. Al., 1996; Walsh & Linton, 2001; Winter, 2003), especially since the publication of Prahalad and Hamel's influential 1990 article, "The Core Competence of the Corporation." Since then, empirical and conceptual research on this concept has brought about many views of what these competencies are and how they can be applied to create better products and services.

In general, core competencies have been seen as capabilities held by people within a firm that, when applied to create products and services, make a critical contribution to corporate competitiveness. For a more complete discussion of core competencies, see Edgar and Lockwood (2008), which reviews the core competence literature, describes their components, and identifies research that remains to be done on them.

What has not been published, however, is a paper intended for intellectual leaders within corporations and their executives to help them conceptualize core competencies, discover the ones their

firms hold, and know the place of these competencies within the structure of organizational knowledge. This paper provides such direction in three ways.

First, it presents a conceptual framework, drawn from previous research, for understanding the core competencies of a firm, revealing the internal dynamic and elements of the core competence. This is an initial framework and, as will be discussed later, applying it will likely lead to its revision.

Second, the paper presents a useful guide for applying this framework to discover the core competencies held by a particular firm. This guide has several advantages. It draws upon numerous perspectives as to an organization's competence. It is inexpensive to do. It also illuminates the complexity usually found within a core competence while making one comprehensible. Corporate managers and research professionals may find both the framework and the guide useful for understanding their firms' core competencies.

Third, the paper places core competencies within the structure of knowledge held by a firm. This reveals how they are supported by underlying bodies of corporate knowledge and in turn how they enable more specific kinds of knowledge, such as familiarity with specific products and services serving customers.

CORE COMPETENCE FRAMEWORK

This framework for discovering core competencies draws upon research that examined four corporations (Edgar & Lockwood, 2008), each with annual revenues in excess of one billion dollars. Oriented around providing knowledge and information in different forms, the four corporations provide an array of advanced products such as switches, multiplexers, routers, transmitters, copiers, printers, scanners, and integrated circuits. They also offer complex services such as communication network planning, network design and implementation, and document management.

Across the four firms, five core competencies were identified as enabling these products and services. Three emerged from an understanding of the communication network. A fourth was based upon an understanding of both physical and digital documents. The fifth was based upon understandings of silicon and the creation of silicon-based integrated circuits.

The framework draws upon its underlying research to reveal two things:

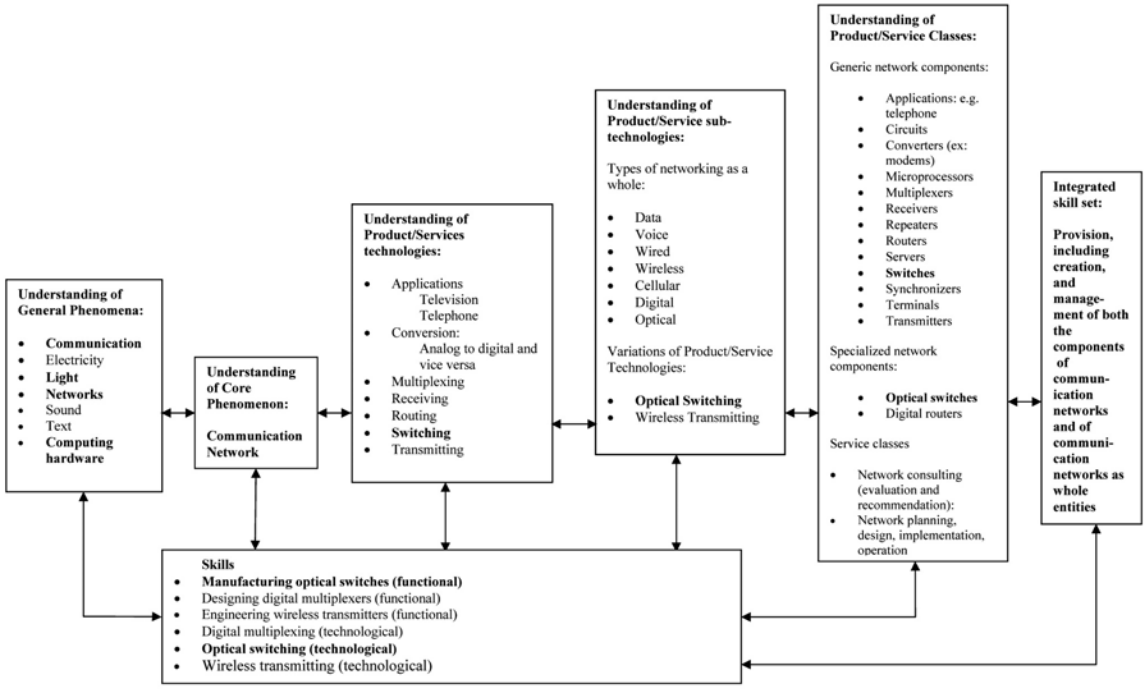
1) How core competencies work (their internal dynamic)
2) What they are made of (their elements)
3) How core competencies work (their internal dynamic)

The common dynamic among these competencies was initially revealed through conceptual analysis (also known as content analysis) of corporate documents and through interviews with internal corporate professionals. The interviewees stressed the dynamic's progressive iteration.

For instance, Figure 1 depicts one of the three core competencies emerging from an understanding of the communication network. Here corporate understandings of the general phenomena of communication and networks converge into a thorough corporate understanding of the communication

network core phenomenon. (These are shown in bold on the Figure, as are the other examples discussed here.) Out of this emerges familiarity with specific product technologies, such as switching, and using an understanding of the general phenomenon of light, with product sub-technologies, such as optical switching. Drawing upon familiarity with the general phenomenon of computing hardware, this focused expertise brings about an understanding of the product class of optical switches.

Figure 1 Core Competence Chart



Emerging from—and contributing back to the understandings of network technologies and product classes—are the functional skills in manufacturing optical switches to be elements of communication networks, as well as the technological skill of optical switching. These skills are in turn part of a larger integrated skill set supporting the creation and management of both the elements of communication networks as well as complete networks.

As this iterative progression occurs, people holding the competence are able to use a range of technologies related to the communication network, and to provide specific products and services arising from them. The result is complex but varied competitive power to meet the networking needs of customers.

What core competencies are made of (their elements)

This progressive, iterative dynamic just described occurs through the interaction of competence elements. Guided by the competence literature, conceptual analysis performed upon corporate documents like annual reports and product catalogs revealed seven major elemental categories of understandings and skills that exist within each of the five identified competencies; it also revealed numerous instances within each category. Understanding of the categories and instances was subsequently refined by the interviews with corporate professionals.

Table 1 presents the elements for three of the five core competencies. For simplicity, Table 1 includes only one of the three competencies based upon the communication network, as shown, since the other two contained similar elements. For all three competencies, the instances, or members, within the seven elemental categories are shown as bulleted items. Only a sample of the most important instances within the categories is presented, since each competence had too many understandings and skills to present them all.

Documentary analysis and interviews of corporate professionals revealed the first five competence elemental categories included complex understandings of different phenomena, disciplines, technologies, and types of products or services (Table 1, left column). Similarly, they showed the last two categories to involve singular and integrated skills.

1) Understandings of core phenomenon and related disciplines (Table 1; Row 1).

A core phenomenon, the foundation of a core competence, is the entity(ies) which people holding a core competence *understand* most thoroughly. Understandings of general phenomena, discussed below, converge into the thorough understanding of this phenomenon, and it is out of this thorough understanding that the other understandings and skills comprising the rest of a firm's core competence emerge. These understandings are often enriched by corporate employees' knowledge of related disciplines. Analysis revealed four variations of core phenomena. They include the following:

1. Something created by the company holding the competence.
2. Something the company's customers create.
3. Something that exists naturally.
4. Something that people within the firm do (an activity).

An example of the first variation occurs in Competence One (Table 1), since its core phenomenon is the communication network, which the host firm provides to customers. Related disciplines for it include computer science and mathematics. Competence Two (Table 1) is an example of the second variation, since its core phenomenon is the customer documents the host firm manages. Related disciplines supporting it include linguistics and psychology. Competence Three is an example of the third variation, since one of its core phenomena is the element silicon. Related disciplines supporting it include

materials science and engineering. Competence Three is also an example of the fourth variation, since its other core phenomena are the design and manufacture of silicon circuits.

Table 1 Core Competence Components

Competence Component Categories		Competence One	Competence Two	Competence Three
Understandings	1) Core Phenomenon	• **Communication Network**	• Document	• Silicon • Design integrated circuits • Manufacture integrated circuits
	2) General Phenomena	• Communication • Electrical Systems • Networks • **Light**	• Text • Paper • Color • Digital format for content	• Electrical systems • Materials
	3) Product/ Service Technologies	• Switching • Multiplexing • Routing • **Transmission**	• Imaging • Marking	• Controlling content • Storing content
	4) Product/ Service Sub-technologies	• Optical Networking • Optical Switching • **Optical Transmission**	• Color Digital Imaging • Color Copying • Digital Printing	• Personal computing • Server computing
	5) Product/ Service Classes	• Optical switches • **Optical Transmitters**	• Color copiers • Digital printers	• Micro-processors • Routers
Skills	6) Functional and Technological Skills	• Manufacturing optical switches • **Manufacturing optical transmitters** • Optical switching • Optical transmitting	• Installing color copiers • Repairing digital printers • Color Imaging • Digital marking	• Designing microprocessors • Manufacturing routers • Microprocessing • Data routing
	7) Integrated Skills	• **Provision**, and management of communication networks and their **components**	• Provision of document management equipment, software, and services	• Provision, including creation, of computers and their components.

2) Understandings of general phenomena (Table 1; Row 2).

General phenomena are ones that can be used in many areas of life, not just with regard to the core competence. However, they often combine to form a core phenomenon, as occurs in Competence One, where the two general phenomena of communication and network combine to create the core phenomenon of the communication network. This also happens in Competence Two, where the general phenomena of text and paper are combined to create the core phenomenon of the document.

3) Understandings of product/service technologies (Table 1; Row 3).

Product/service technologies emerge directly from the core phenomenon. Sometimes they are activities that create it. An example occurs in Competence One, where the product/service technologies of switching and transmission act together to form the communication network core phenomenon.

A second variation occurs when the product/service technologies are the activities that can be done to the core phenomenon. Competence Two is an example. In this, product/service technologies are actions such as imaging and marking that can be performed upon the document core phenomenon.

A third variation happens when product/service technologies are the activities that arise from understanding of a core phenomenon that exists naturally. Competence Three is an example. In this case, the functions of computing (e.g., controlling data or storing it in memory) are made possible by a thorough understanding of the natural element of silicon.

A fourth variation develops when product/service technologies arise from skills necessary to do the core phenomenon. This occurs in Competence Three. Here, the functions of computing, such as controlling data, are made possible by the activities of designing and manufacturing integrated circuits.

4) Understandings of product/service sub-technologies (Table 1; Row 4).

Product/Service sub-technologies emerge from product/service technologies, usually in combination with general phenomena. Essentially, they are more specialized versions of product/service technologies. Several variations exist.

First, product/service sub-technologies can arise from the application of one general phenomenon to one product/service technology. This occurs in Competence One with optical transmission, which is performed when the general phenomenon of light is applied to the product/service technology of generic transmission.

Second, they can emerge through the application of one general phenomenon to multiple product/service technologies. This also occurs in Competence One, where the general phenomenon of light is applied to all the functions within a network, such as switching and multiplexing, to create optical networking. In Competence Two, this happens in the application of the general phenomenon of color to the product/service technologies of imaging and marking to create color copying.

Third, product/service sub-technologies can arise through the application of multiple general phenomena to one product/service technology. This occurs in Competence Two, where the general phenomena of color and electricity are applied to the product/service technology of imaging to create color digital imaging.

Fourth, they can arise through the application of multiple general phenomena to multiple product/service technologies. One example occurs in Competence Three. In this, the general phenomena of electrical systems and materials are applied to the product/service technologies of controlling and storing intellectual content such as data to support personal computing.

5) Understandings of product/service classes (Table 1; Row 5).

Product/service classes are types of products and services made possible by product/service technologies and sub-technologies, often in combination with an understanding of a general phenomenon. An example occurs in Competence One. Here the product technology of switching, the sub-technology of optical switching, and the general phenomenon of light enable the production of optical switches.

6) Skills (Table 1; Row 6).

A core competence's skills—the ability to do something—can exist in functional or technological forms. Functional skills are made possible by understandings of classes of products and services (Table 1, Row 5). Examples of functional skills include manufacturing optical switches (Competence One) and designing microprocessors (Competence Three).

Technological skills, in contrast, are made possible by understandings of technologies related to specific products or services. Differing from the technological understandings shown in Rows 2-4 of Table 1, these skills are the capability of people to use the technology itself. For instance, in one of the firms, the people contributing to Competence Two have an understanding of the product/service technology of imaging (Row 3), but they also can *apply* this to the next step and actually create color images (Row 6).

7) Integrated skills (Table 1; Row 7).

This is the ability to do an activity caused by the functional *and* technological skills discussed above. This integrated skill consists of the individual skills and the relationships between them. An example is the ability to provide communication networks as whole entities (Competence One). These networks arise from the integration of functional skills in engineering and manufacturing of optical network components; however, they also emerge from the integration of technological skills in optical switching and transmission.

Given this structure of competence elements, note that general phenomena take two forms. Sometimes they are what can be thought of as "entities" because they are relatively unchanging, stable objects, such as the general phenomenon of paper is for the core competence based upon the document. Other times, however, they can be thought of as "processes" because they involve relatively dynamic, changing things that occur repetitively, such as the general phenomenon of light is for the core phenomenon based upon the communication network. Either way, general phenomena can be considered the "raw materials" of core competencies because understandings of them are repeatedly incorporated into understandings of core phenomena, product/service technologies and their variations, and classes of products and services.

Framework Summary

Employees' competence-related understandings include ones of general and core phenomena; supporting product or service specific technologies; and classes of products and services arising from the understood technologies. The skills within a competence can be specific ones, as well as integrated ones encompassing multiple functional or technological skills. Functional skills emerge from understandings of types of products or services, while technological skills arise from understandings of technologies. Utilized together, the different understandings enable the competence's specific and integrated skills, and the skills in turn reinforce the corporate understandings of phenomena, disciplines, general or product/service specific technologies, as well as of types of services and products.

This core competence framework identifies how core competencies work and what they are made of. It shows that core competencies are a set of progressive, iterative understandings and skills held by corporate employees that collectively operate at the core level, providing the intellectual foundation for corporate competitiveness.

A GUIDE TO DISCOVERING CORE COMPETENCIES

Far more than an abstraction, this framework can be applied using a three-step guide to discover a particular firm's core competencies. The first step is to determine the competence's breadth using conceptual analysis of key corporate documents. The second is to verify and revise results from the conceptual analysis by integrating them into a core competence chart. The third step is to use this chart to interview key corporate managers and professionals, enhancing understanding of the competence gained during the first two steps.

Step One: Determine Core Competence Breadth

The first step of the guide to discovering a firm's core competencies is to apply conceptual analysis to corporate documents concerning the company's products and services. One assumption here is that strong evidence of a firm's competencies will be found in the documents it creates and maintains to support the products and services which are created by the competencies' application.

In order to determine the breadth of each company's core competencies, the authors recommend that a team of perhaps two or three investigators work together to identify a set of representative, publicly available documents either authored by the company or approved by them. Ideally, to protect the firm's competitive secrets, the investigators should not use confidential documents, and, to aid in conceptual analysis, the documents should be available digitally. Designed to provide a reader with an overview of the firm's capabilities, the documents can include the following:

* Business statements within annual reports of the last two to three years
* Current corporate profiles and factbooks
* Product overviews

* Product catalogs
* Research laboratory agendas and reports
* Technical briefs and white papers

It is possible to use "outside" documents not approved by the firm, such as journalistic accounts of its activities in trade publications. The advantage of this is the potential objectivity of perspectives outside the firm as to its core competence. The disadvantage could be the lack of intimate familiarity with the firm held by its insiders.

Once the documents are identified, the process of conceptual analysis involves applying two steps to each document:

1. List major words and/or phrases within these documents alphabetically, along with the number of times they occur.

2. Classify these words or phrases as representing instances in one of the seven elemental categories of the core competence revealed by the core competence framework, recording them into a Core Competence Breadth Table. Table 2 provides a simple example of such a table and a more compete one is given Appendix 1. In this way, major words in the analyzed content are incorporated into the specifics of the core competencies for each company. The authors do recommend using content analysis software to do this categorization. By forcing incorporation of all of the most commonly occurring major words or phrases, documentary analysis provides a useful intellectual check against omitting important concepts delineated by the framework.

Adding rows to this table represents adding understandings or skills to the core competence, increasing its breadth. Keep in mind too that, as explained more fully below, the investigator should not include in the Core Competence Breadth Table words or phrases that represent specific customer segments, since this knowledge is not included within a core competence.

Eventually, this table can become quite large. However, its results will be consolidated during the guide's next step, summarizing the competence's breadth into a chart.

During the conceptual analysis and construction of the Core Competence Breadth Table, the authors recommend that each investigator on the team work alone. He or she should analyze the most general documentary materials first, such as business statements within annual reports as well as corporate factbooks. These describe the overall vision, customers, product capabilities, and products of the firms. Then the investigator should analyze documents with more detailed content about the firm's capabilities and operations, such as product catalogs or research laboratory reports.

The result of this conceptual analysis, a Core Competence Breadth Table, is only a preliminary depiction of instances within the seven elemental categories of the core competence. Therefore, some points about the core competence framework must be kept in mind. One is that the framework itself is an initial one, subject to revision. Investigators may find they need to add another competence element to the seven given here.

A second point is that investigators might also differ as to the operation within each of the seven elemental categories. For example, they might not agree as to whether the core phenomenon of a particular competence is something the firm creates or something that exists naturally, leading to a disagreement as to the competence's core phenomenon.

Table 2 Core Competence Breadth Table

Core Competence	Word/Phrase	Number of Occurrences in Documents
Core Phenomenon (Understanding)	Communication Network	150
General Phenomenon (Understanding)	Network	30
Product/Service Technology (Understanding)	Switching	20
	Transmission	25
Product/Service Sub-technology (Understanding)	Optical Switching	15
	Optical Transmission	10
Product Service Class (Understanding)	Optical Switches	12
	Optical Transmitters	10
Skill	Manufacturing Optical Switches	8
	Manufacturing Optical Transmitters	7
Integrated Skill	Providing Optical Networks	5

A third point is that investigators might find too many instances within a category to be realistically included within the competence; they might even disagree about which instances are included within one. For example, they might find dozens of potentially applicable functional or technological skills and disagree on which skills are within the competence.

If any of these situations occur, then the investigative team addresses them using the next two steps in the guide, which involve collaboration among investigative team members and interviews with key corporate personnel. Using the examples just given, these could lead investigators to resolve or record the investigators' discrepancies as to the number of elemental categories within a core competence, the operation of the core phenomenon, or the key competence skills among the many people in the firm hold.

Step Two: Verify Core Competence Breadth and Dynamic

Once the breadth of a firm's core competence is determined, its individual understandings and skills recorded in the Core Competence Breadth Table (Table 2), can be summarized into a *Core Competence Chart,* as shown earlier in Figure 1. The idea here is for the members of the investigative team to finish the individual analysis they performed during Step One of the guide and then collaborate together, combining their competence breadth findings in order to depict the iterative interactions across them. For instance, through debate among team members, it is through the Core Competence Chart that potential general phenomena are shown to apply across product/service technologies and product classes. It is here that singular skills are shown to combine into an integrated one. It is also here that the technological understandings and skills of the competence are shown to reinforce each other. As debate among its members occurs, the investigative team verifies whether general phenomena, product/service technologies, product/service classes, singular skills, and even related disciplines really are ones applicable to this core competence.

In a Core Competence Chart, the columns and the box along the bottom represent the seven elements of a core competence. The individual bullets or items in the box along the bottom represent the individual technologies (whether of general or product/service type), related disciplines or phenomena, product/service classes, skills, and integrated skills. As such, the bulleted items are the equivalent of the rows within the Core Competence Breadth Table presented in Step One of this guide. Here, adding a bulleted item or a skill in the box along the bottom represents increasing the breadth of this core competence, and vice versa. If done well, this type of figure effectively represents the complexity of a firm's core competence yet provides a comprehensible means for understanding it.

This kind of Chart is developed for a specific core competence as members of the investigative team debate and apply the seven elemental categories of the core competence framework. For instance, the first step is to verify the core phenomenon or phenomena (e.g., communication network), which is the entity(ies) which people within a firm *understand* most thoroughly, and not, as one might believe, what a firm can *do* best. (The skills grow out of and in turn influence the understandings and come later in this process). Verifying this means deciding if the core phenomenon(a) is something created by the firm holding the competence, something the customers' create, something that exists naturally, or something that people within the firm do (an activity). Next, disciplines related to the core phenomenon(a) must be isolated. Then the core phenomenon must be decomposed to see what items it has which can be used in other entities besides the core phenomenon (e.g., communication and networks). These are general phenomena and should be put into the column on the left.

Once the depiction of the core phenomena and their related disciplines is complete, the investigative team must make a decision. They must verify whether the competence's product/service technologies are activities necessary to create the core phenomenon, ones that can be done to it, activities that arise from the understanding of a core phenomenon that exists naturally, or are skills necessary to do the core phenomenon. In the case of the communication network core competence, these are activities, e.g., switching or multiplexing, that are necessary to create the core phenomenon of the communication

network. Then, the investigator should place these product/service technologies in the column to the right of the core phenomenon.

Following this comes a very challenging step as the investigators determine the competence's product/service sub-technologies. As discussed in the core competence framework, these arise from different combinations of general and product/service technologies. For instance, the product service sub-technology of optical transmission, which is understood within the core competence depicted in Figure 1, arises from the application of a single general phenomenon, light, to the single product/service technology of generic content transmission. Similarly, on a larger scale one general phenomenon can be applied to multiple product/service technologies. This occurs in a core competence based upon the communication network when the general phenomenon of light is applied to all of the product/service technologies of networking such as switching and transmission, to create the powerful product/service sub-technology of optical networking.

This process should be continued as the investigative team verifies the product/service classes which emerge from the product/service technologies and sub-technologies. That is, there is some added element(s), often some form of hardware, whose presence takes a product/service technology and creates a class of products or services out of it. Again, if this added element can be used in other entities besides the core phenomenon, then it too is a general phenomenon and should be put in the far left column. An example occurs when the product technology of switching, the sub-technology of optical switching, the general phenomenon of light, and hardware are combined to form the product class of optical switches. The process of moving left and right out from the core phenomenon continues until the investigators believe that understandings all of the general phenomena, core phenomena, related disciplines and phenomena, product/service technologies and sub-technologies, and product/service classes have been depicted in their appropriate columns on the Core Competence Chart.

Next, the investigative team should, through debate, verify the skills arising from and supporting these understandings and depict them on the bottom of the core competence chart.

Two types of skills can be included within a core competence. The first is functional skills, which arise from understandings of product and service classes. An example is the skill of manufacturing optical switches. The second type is technological skills, which arise from understandings of general and product/service technologies. An example of a technical skill would be to do optical switching using the appropriate hardware. As discussed earlier, it is here that a useful distinction must be kept in mind: the difference between understanding a technology, such as the product/service technology of optical switching, and being able to perform it, which is expressed as a technological skill. In the first case people in the firm *know* about optical switching; in the second they can *do* it.

The final step for the investigative team is to determine any integrative skills, which are placed at the right of the core competence chart. These arise from combining individual functional and technological skills of the competence. An example would be the ability to provide complete communication networks to customers. This arises from integrating functional skills in engineering and manufacturing of product classes, e.g. switches and transmitters. It also arises from integrating technological skills in switching and transmission. When this entire iterative process—involving moving

outward to the left and right and up and down from the core phenomenon—is complete, the figure is finished and the core competence has been succinctly described.

As the team constructs the Core Competence Chart, it is important to remember that any core competence involves *two* kinds of integrations. The first is of individual functional and/or technological skills into a multidimensional one, represented on the Chart by the arrows between the bottom and far right boxes. The second integration is of all the understandings within the competence with each other and with the individual and integrated skills, represented on the Chart by the arrows connecting all the boxes.

Investigators should remember too that representing the core competence in this kind of chart is a collaborative and imprecise act, so the process of thinking and debating together can be as valuable as the final chart. Also, it may be that the result of this debate may not be one definite chart for each competence, but instead several charts representing different perspectives. This can happen when trying to represent the action and supporting knowledge of a large group of people. It may be that collectively the multiple charts provide a more accurate depiction of the core competence than does a single chart. It addition, it is the authors' experience that a firm's core competence exists at the business rather than at the corporate or divisional levels. Moreover, given each competence's complexity, each business unit has relatively few core competencies, often only one or two. Remember that individual skills or understandings do not make a competence; instead multiple ones do when they are effectively integrated. As a guide, illustrative examples of Core Competence Charts for core competences based upon the core phenomena of communication network, documents, and silicon are given in Appendices 2.1-2.3. These provide a fuller description of the competencies depicted in columns 1-3 of Table 1.

Step Three: Enhance Understanding of Competence Dynamic and Elements

Once a core competence chart has been completed, interviews with the intellectual leaders of the corporation, whether executives leading large divisions or individual scientists and engineers, can enhance the results of the first two steps of this core competence discovery guide. In each firm, the investigators should interview, either individually or as a team, from twelve to fifteen of these leaders. At least two criteria can be used to identify the interviewees: their intellectual diversity and their reputation within the firm for being knowledgeable and thoughtful concerning the firm's intellectual strengths. The respondents' education and work backgrounds can include a variety of disciplines such as physics, computer science, and information science. They can also include a variety of professional practices, such as computer engineering, finance, marketing, strategic management, product management, public relations, manufacturing, customer service, and research and development.

As was true in document analysis, it is possible to use "outside" interviewees not employed by the firm, such as trade publication journalists or industry analysts. The advantage of this is the potential objectivity of these experts as to the firm's core competencies. The disadvantage could be the lack of insider understanding held by the firm's own personnel.

The purpose of the interviews with corporate professionals and managers is to present them with the results from steps one and two and to elicit their reaction to these results. A sample Core

Competence Interview Instrument for this is given in Appendix 3. Also, the instrument's questions elicit depictions of the specific corporate products and services arising from a Core Competence. Finally, the Instrument's questions are designed to determine what the respondents think will be happening in the future to their firms' core competencies. The interviews usually last between one to two hours.

The need to enhance the findings of content analysis through interviews has been strongly verified by previous research using this three-step guide (Edgar 2000). During this study, one interviewee stressed that the conceptual analysis of publicly available documents did not penetrate completely to the real core phenomenon of his firm's competence. He said that is probably because the firm wants to present tangible products and services to customers rather than drawing attention to its underlying strengths making those products and services possible. It was only the interviews with internal people which allowed the real core phenomenon to emerge.

In general, this kind of interview is semi-structured, meaning that it asks for very specific responses in some questions and then allows the interviewees great flexibility in their responses based upon the specific answers they have given. Also, these interviews follow what is known as a "tree and branch" approach, in which the interviewer(s) models the interview like a tree. "The trunk is the core topic; the branches, the main questions. You plan the questions to explore each branch with more or less the same degree of depth" (Rubin & Rubin, 1995, p. 159). The idea is to learn about all the questions but to maintain balance in coverage across the questions. Ideally, these interviews are guided, thorough conversations with knowledgeable, internal people regarding the firm's core competencies.

CONTEXT OF THE CORE COMPETENCE

Structure of Knowledge and Practice

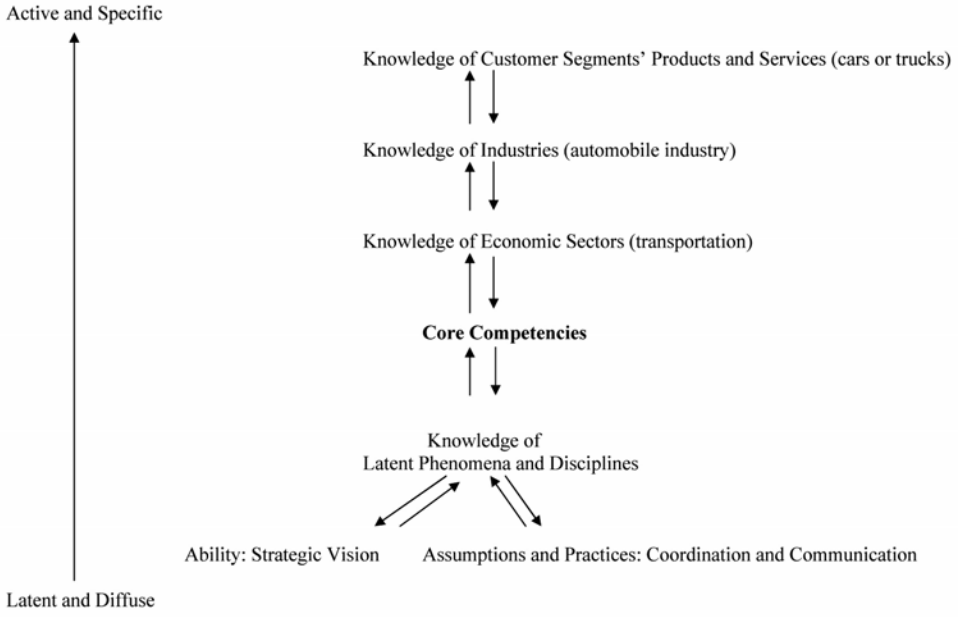
Once they are discovered, core competencies can be applied powerfully to provide new lines of products and services. Nevertheless, these competencies are only one type of organizational knowledge that must be utilized if a corporation is to be competitive. Previous research employing the three-step guide presented here (Edgar, 2000; Edgar & Lockwood, 2008), particularly the interviews with fifteen corporate managers and professionals spanning four large corporations, revealed a structure of six levels of knowledge and practice within which a firm's core competencies operate. The result is not only a clear depiction of what core competencies are, as described in the Core Competence framework, but also what they are *not*. Keeping this structure in mind can guide managers as they direct the development and use of organizational knowledge. The structure is shown in Figure 2.

In the Figure, as the levels become higher, knowledge is held by relatively fewer people within the organization, and it is more likely to be applicable to providing specific products or services. Conversely, as the levels become deeper, knowledge becomes relatively more widely held within the organization and tends to be in latent form, potentially supporting products and services yet to be developed

The Figure also reveals that core competencies, depicted in bold, are intermediate types of organizational knowledge, located in the middle of the structure. Grounded in a thorough understanding

of core phenomena, they are concrete enough to enable the provision of classes of products and services, yet they are not so specific as to involve the knowledge related to a particular product or customer. (For a more complete discussion of the relationship between a firm's core competencies and its strategic environment, please see Edgar & Lockwood, 2009.)

Figure 2 Structure of Knowledge and Practice



BELOW CORE COMPETENCIES: SKILL SETS, ASSUMPTIONS, AND COLLABORATIVE PRACTICES

During previous research the interviews of corporate professionals revealed an important question: Though core competencies are clearly essential for corporate competitiveness, what knowledge can be extended to create core competencies in the first place? As a group, the respondents indicated strongly that it is a series of capabilities, intellectual assumptions (often known as culture), and practices, which are extendable and so create an atmosphere within the firm conducive to the development of core competencies. More specifically, below the core competencies there seem to be two levels within the knowledge structure, as shown at the bottom of Figure 2. Both are levels which the firm must manage in order to change its core competencies as needed, and they are also ones which strongly influence how the core competencies are applied.

Interviewees reported that at the base of the intellectual structure exists a strategic capability present among the firms' top leadership. This is the ability to create and carry out a strategic vision of the customer benefits they want the firm to create and of the particular products and services the leaders

want the firm to provide at one point in time in order to carry out that vision. Complementing this are the diffusely held intellectual assumptions, or culture, within the firm that intense, disciplined, comprehensive communication across the firm is necessary to carry out this vision. The overriding concern among the firms that consistently created new competencies was that appropriate people have input into their development, regardless of their location or rank in the firm. This intense practice of communication goes both ways: managers must facilitate the communication and the employees must be receptive to that communication. In addition, there must be a practice of discipline in the way products and services are introduced and refined, so that products and services are very tightly controlled as to their location, consistency, and development.

Arising from vision, coordination, and communication, the second level of knowledge and practice consists of two forms of latent knowledge that are available to be substantiated into a core competence. The first is knowledge concerning phenomena that are conceptually related to a potential core competence. A good example within one firm studied is its people's expertise in extremely miniature electronic components, which can be applied to communication networking technologies like switching or transmission.

Moreover, complementing this focused knowledge of specific phenomena is broader knowledge of underlying intellectual disciplines. For a core competence based upon the communication network, these included physical science disciplines --such as physics or chemistry--information science disciplines--such as communication or computer science--or even social science disciplines--such as anthropology or psychology. As a firm's core competence coalesces, these could easily become related disciplines supporting understanding of the competence's communication network core phenomenon.

Core Competencies

The third layer up in this knowledge structure comprises the core competencies themselves—in which latent, diffusely held organizational knowledge is transformed into its more active, specifically applicable form. This happens in the layer below, as the knowledge of related phenomena and underlying disciplines enable fundamental understandings of one or more core phenomena. These provide the foundation for applied understandings of product technologies and product classes, which in turn enable technological and functional skills, i.e. the abilities to do things. All of these different kinds of knowledge, located within the core competence, remain latent until these skills are applied to operate the technologies or provide the product classes. Once this skill performance occurs the latent intellectual potential of the core competence becomes realized. It is through this transition from latent to active knowledge that core competencies are extended to support knowledge applicable to multiple sectors, industries, and segments.

Above Core Competencies: Knowledge of Customer Segments, Industries, and Sectors

In the knowledge structure depicted in Figure 2, the fourth layer up involves employees' knowledge concerning entire economic sectors, such as transportation, which can encompass one or more

industries, like those based upon automobiles or airplanes. Incorporating knowledge of arising from the core competence, this can be applied to serve multiple industries operating within the sector. For example, when enabled by a core competence based upon the core phenomenon of the communication network, understandings of the video-conferencing needs within the transportation sector can be applied to serve the customers of different transportation industries.

The fifth layer involves people's knowledge of entire industries. This could include the video-conferencing needs served by the automobile industry as a whole, spanning for example customer segments requiring not only industrial trucks but also luxury sedans or sports cars.

At the top of the structure, at the most active, specifically applicable level is the knowledge people within a firm have concerning the individual products and services required by specific customer segments, which are served by groups of firms located within industries. An example for a communication network core competence could be knowledge people within a firm have concerning video-conferencing products required by the segment of automobile firms that manufacture industrial trucks.

Application Spiral

Based upon these six layers of knowledge and practice depicted in Figure 2, respondents indicated that a tiered approach is often followed to achieve organizational success. For example, moving up the Figure from bottom to top, one of the firms studied has strong vision and practices tight control and coordination. These led to deep latent knowledge of underlying disciplines within the broad areas of physical and communication science, which supported an understanding of the related phenomenon of integrated circuits. As integrated circuits came to be used in networking, this led to a core competence based upon the communication network, which in turn enabled people within the firm to produce the product class of servers.

In their early years of use, servers had been used for relatively simple tasks such as retrieving and delivering files. As microprocessors used in servers gained power, servers have come to be used as switches, the equivalent of Private Branch Exchanges (PBXs), at a fraction of the PBX's cost. Furthermore, since the server, unlike the PBX, has an architecture open to new applications, it can add new ones, such as voice recognition. This understanding has led people in this firm to develop knowledge arising from core competence that could be applied to specific server products for various sectors, industries, and customer segments. One of the corporate managers from this firm aptly named this intellectual progression "application spiral."

This complex progression of knowledge application reveals how core competencies contribute to the competitive success of their host firms: they are necessary but not sufficient. Located in the middle of the intellectual structure, they are created by latent, diffusely held corporate knowledge and practice but in turn they do enable the application of knowledge applicable to specific industries and customers.

CONCLUSION

This paper presents a framework describing core competencies, a relatively inexpensive yet thorough guide to discovering them, and a brief description of their contribution to the structure of organizational knowledge. The framework reveals core competencies to encompass seven elemental categories of phenomena. These include understandings of core and general phenomena, various technologies, and classes of products and services. They also include individual skills based in operational functions and technologies, as well as integrated skills. These understandings and skills affect each other iteratively, creating a complicated internal dynamic within a competence.

Two often conflicting issues often arise in considering core competencies' elements and dynamic. One is the need for an abstract conceptualization of them that encompasses their complexity and competitive power. The other is the need for concrete examples of this power, especially ones involving corporate products. The framework meets both needs because it reveals core competencies to be complex but understandable, enabling the provision of a range of products and services by creating a powerful collective capability for people within a firm.

The guide to discovering core competencies presented in this paper uses the analysis of corporate documents and interviews of corporate personnel to determine the competence's breadth and dynamic. The guide's three steps demonstrate that discovering core competencies can be done in a rigorous yet cost-effective manner. They enable the creation of Core Competence Breadth Tables, Charts, and Interview Instruments, which are powerful conceptual tools that reveal the elements of a core competence as well as the interactions across them. More importantly, the guide provides a structured approach for organizing deliberation within a corporation concerning its core competencies. As discussed earlier, this debate may lead to Tables, Charts, and Interview Instruments agreed to by all that definitively describe a firm's core competence. However, just as importantly, such debate might lead to differing versions of these conceptual tools, revealing multiple valid perspectives of a firm's competence.

Finally, the paper's brief description of the core competence's place within corporate knowledge shows that a competence's competitive power arises from a broad intellectual and operational context. A firm's core competence emerges from the firm's relatively enduring strategic and cultural assumptions and practices and its extensive bodies of knowledge. A core competence makes these "come to life" as products and services through the application of functional, technological, and integrated skills. The products and services in turn compete within the environments of economic sectors, industries, and customer segments. Over time it is this virtuous, progressive spiral of knowledge application that generates corporate wealth.

We hope this framework, guide, and brief description of core competencies' contribution to corporate knowledge make these vital corporate capabilities more comprehensible. We also hope the paper proves to be useful to corporate managers and professionals interested in strengthening their core competencies and in applying them more effectively. We welcome questions on and suggested revisions to the framework, the guide, and the description. Collectively, we believe it is possible to understand and identify these knowledge resources so vital to competitive success.

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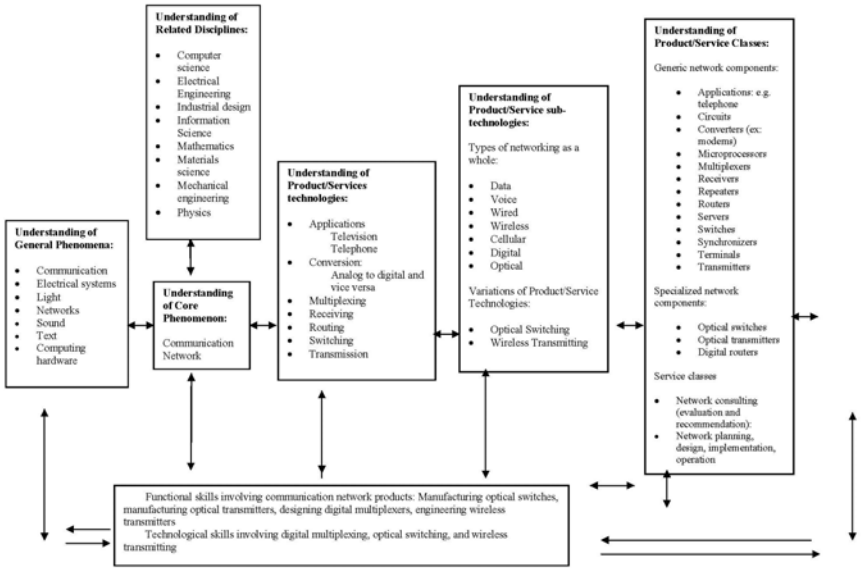
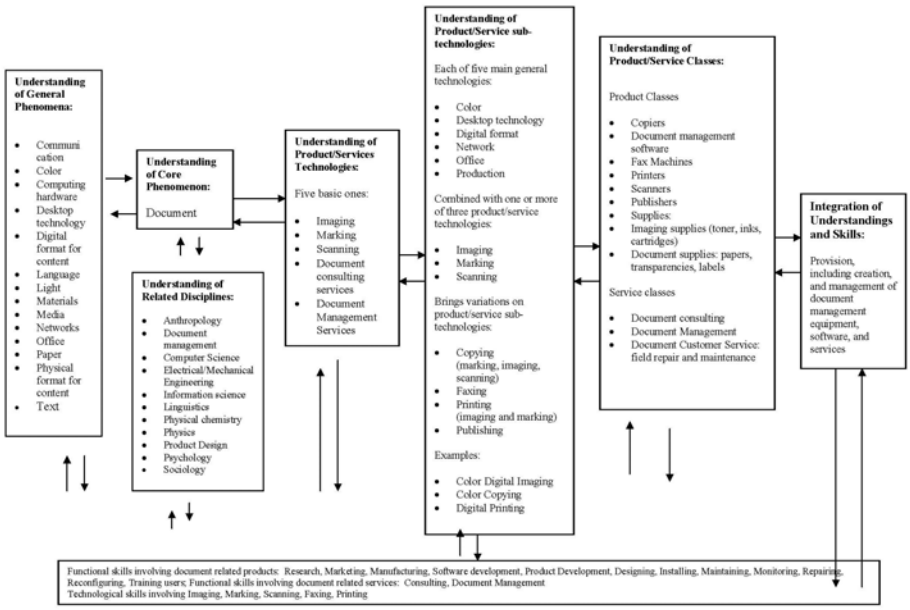
Appendix 1: Core Competence Breadth Table		
Conceptual Competence Category	**Word or Phrase**	**Number of Occurrences in Documents**
Core Phenomenon (Understandings)	Communication Network	41
General Phenomena (Understandings)	Data	41
	Network	7
	Video	32
	Voice	37
Product/Service Technology (Understandings)	Hubs	8
	Multiplexing	4
	Switching	2
Product/Service Sub-technology (Understandings)	Inverse multiplexing	2
	High speed networking	2
Product/Service Class (Understandings)	Faxes	10
	Phone	13
	Routers	9
Skills	Design	2
	Install	4
	Market	4
Integrated Skill	Provide Network	10

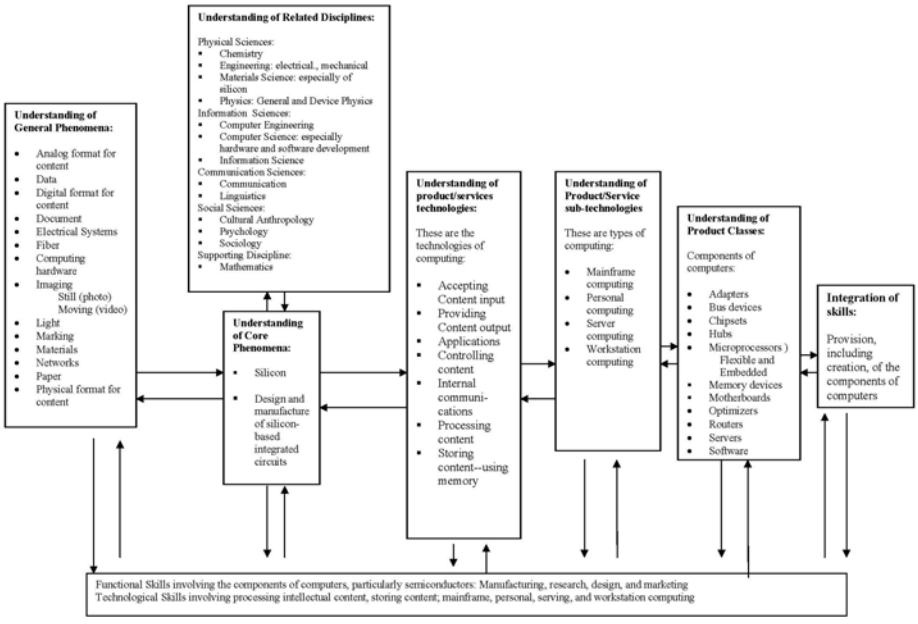
Appendix 2.1 Communication Network Core Competence



Appendix 2.2: Document Core Competence



Appendix 2.3 Silicon Core Competence



Appendix 3
Core Competence Interview Instrument

This is a generic example of a questionnaire that can be used in interviews with corporate professionals and managers. Its approach is to elicit reaction to the core competencies of their firms as the competencies were revealed by the first content analysis of key documents, developing core competence charts, and patent analysis. Ideally, this will lead to revisions in understanding of the core competence. These revisions can then be incorporated into core competence Breadth Tables and Charts.

From our study of the literature on core competencies, the intellectual strengths of companies, as well as annual reports, and product overviews and catalogs your company provides describing its activities, we have divided a firm's core competencies into seven elements. Five of them involve an intellectual understanding of different topics and two of them involve actual skills, the ability to do something, based upon the understandings of the first five elements. The basic idea is that understandings of some general phenomena lead a firm to a thorough understanding of a core phenomenon, which leads to the firm's understanding of product or service technologies and sub-technologies, which leads to the firm's understanding of classes of products and services. This understanding of classes of products and services in turn leads to certain skills and these skills are ultimately integrated into a combined skill. (Please see accompanying Core Competence Chart). More specifically:

Core phenomenon: the thing which a company understands most thoroughly and out of which emerges the rest of its core competency. Example: the communication network.

General phenomena: capabilities that can be used across many products and services and even many areas of life. Examples: communication, networks.

Product/services technologies: basic capabilities upon which classes of products and services are based. These emerge from the core phenomenon. Examples: Switching, transmitting.

Product/services sub-technologies: specific variations of product/service technologies, such as specific types, components, or capabilities of them. Examples: Optical switching, wireless transmitting.

Product/Service classes: types of products and services made possible by a firm's understanding of its product/service technologies (and with that, of its product/service sub-technologies). Examples: optical switches, wireless transmitters.

Skills: abilities to do activities caused by an understanding of product/service classes or product/service technologies. Examples: manufacture optical switches, install wireless transmitters; perform optical switching or wireless transmission.

Integration of skills: a combined skill, one the firm has because it has two or more skills. Example: the skill above, when combined with others, leads to the integrated skill of the provision, including creation, of communication networks as whole entities.

Please see the chart on the next page, representing what seems to be your firm's core competence in the provision including creation of communication networks as whole entities. (The next page could then present the Core Competence Chart shown in Figure 1 or Appendix 2.1).

Specifically, communication networks and their components appear to be provided to these general groups of customers:

Long distance	Local	Internet	Wireless
Small business	Medium-sized corporations	Large corporations	
Non-profit organizations			

Based upon your examination of the chart on the next page, please consider your answers to following questions. I will contact you soon for your responses:

1. To what extent do you agree or disagree that these seven categories are the elements of your firm's core competence? Would you add or remove any? Particularly, to what extent do you agree or disagree concerning the specific core phenomenon, product/service technologies and sub-technologies, product/service classes, and skills? Would you add any or remove any?
2. What is likely to change in these categories over the next few years? What will be the dominant core phenomenon, product/service technologies and sub-technologies, product/services classes, and skills over the next five years?
3. What specific product and services arise from this core competence? Which customer segments do they serve? As the core competence changes over the next few years, how will these product and services change? How will the customer segments they serve change?

THE ROLE OF EMOTIONAL INTELLIGENCE IN ENVIRONMENTAL SCANNING BEHAVIOR: A CROSS-CULTURAL STUDY

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Matthew R. Marvel, Western Kentucky University

ABSTRACT

This study examines the relationships of emotional intelligence of supervisors—empathy and social skills—to the effectiveness of their environmental scanning behavior. Data was collected from 1,184 dyads in four countries (U.S., Bangladesh, Greece, and China). Employed MBA students completed a questionnaire about their supervisors' emotional intelligence and a colleague of the MBA student, who worked for the same supervisor, completed a questionnaire about the effectiveness of the supervisors' environmental scanning behavior. Results show that empathy was a full mediator of the relationship between social skills and the effectiveness of scanning in the U.S., Bangladesh, and Greece but a partial mediator in China. Findings suggest in individualistic and moderately collectivist cultures empathy fully mediates the relationship between social skills and environmental scanning. However, for highly collectivist cultures there was evidence of only partial mediation. Implications for strategic decision markers and directions for future research are discussed.

INTRODUCTION

In the rapidly changing global economy, scanning for environmental change is vital to organizational performance and viability. Changes in the environment result in new opportunities for wealth creation that decision makers use in strategy formulation and implementation. Environmental changes increase information processing needs within organizations because managers must detect and interpret problem areas, identify opportunities, and implement strategic adaptations (Hambrick, 1982; Culnan, 1983; Tushman, 1977). A strategic advantage rests upon management's ability to collect pertinent information and act on signals that others miss.

Executives are responsible for bringing together specialized information from various departments and functions (Daft, Sormunen, and Parks, 1988). Scanning involves formal and informal sources of information often gained through ad hoc human sources (Thomas, 1980; Hambrick, 1982). Most previous research on scanning has relied on self-report estimates of the frequency of one's search and the source of the information. While this approach has been useful

it does not take into account the intense social aspect of effective scanning behavior within firms. Decision makers must work among others to detect, communicate, and politicize information that enters the organization (Mintzberg, 1973).

The ability to effectively scan the environment has been linked to new venture creation (Fiet, 2007), reduced strategic uncertainty (Elenkov, 1997), and improved firm performance (Daft et al., 1988). Although these studies exemplify the positive outcomes associated with environmental scanning there is little understanding of *how* decision makers work among others to effectively scan information for opportunities and threats. If competitors have unequal abilities to bring about or transfer new information, then they differ in their abilities to formulate cogent responses to environmental changes (Hambrick, 1982). If unequal competencies exist in collecting or *socializing* information, then differences accompanying performance are attributable to the ability to implement a response, that is, to change or modify their strategy.

Research shows the transfer of key information is hindered when an arduous relationship exists between the source and the recipient (Szulanski, 1996). We argue a person's ability to exercise emotional intelligence (EQ) influences their ability to work across departments or functions to effectively scan the environment for new opportunities or threats within the social context of established firms. EQ has increasingly been linked to work outcomes and improved task performance (Lam and Kirby, 2002; Carmeli and Josman; 2006). However, little empirical work has examined emotion within the context of strategic management representing a gap in the literature. The present study is designed to make a contribution to the literature by drawing on existing EQ theory to examine how the dimensions of empathy and social skills explain management's ability to successfully scan the environment across different national cultures.

Not only must executives effectively bring together and make sense of new information but they must do so in an increasingly global economy. Such challenges have stimulated a strong interest in research that relates cross-cultural differences to these desired behaviors (Shane, Venkataraman and MacMillan, 1995). Since environmental scanning deals with the organization-environment interface, performance of the scanning function would be expected to differ for management across national cultures. Kim and Lim (1988) suggested further development of the field of strategic management through investigations of external validity of theories by testing them under different economic and cultural conditions. For example, national culture has been found to have effects on managerial styles and behaviors (Erez and Earley, 1993), with some cultures producing more innovation than others (Baumol, 1990). This raises the question of whether emotional competencies affect effective scanning differently across cultures.

In the present study, we assume organizations around the world must seek and make sense of environmental information to compete thereby requiring effective scanning within firms. However, we question whether the role of EQ will be equally effective in all cultural contexts. Our study contributes to the literature in a number of ways. First, we shed light on the emotional dimensions of effective environmental scanning within firms. We draw on extant EQ literature and

develop a theoretical model comprised of empathy and social skills and then test the model using data collected in four countries including the United States, Greece, China, and Bangladesh. Dyads were used (N=1,184) made up of MBA students and a colleague who both had the same supervisor. One colleague reported the emotional competencies of the supervisor and the other colleague reported the same supervisors' effectiveness in scanning the environment. The relationship between EQ and effective environmental scanning is examined paying special attention to Hofstede's (1980) national culture continuum of individualism and collectivism across the representative countries. We then draw implications for management in effective scanning.

The study unfolds along the following lines. In the next section, we review the literature surrounding EQ and the field of strategic management to develop a theoretical model. We then review the cultural value literature and summarize aspects salient to effective scanning behavior. An exploratory cross-cultural examination is then performed. A discussion follows and managerial implications are drawn for promoting environmental scanning across individualistic and collectivist cultures.

EMOTIONAL INTELLIGENCE AND STRATEGIC MANAGEMENT

Among the greatest challenges facing the field of strategic management is to comprehend the most appropriate combination of skill sets and competencies by which managers could understand their organizational world and translate information into actionable strategies (Sparrow, 2000). Strategic management has been said to be treated as two parallel worlds (Cassell, 1999), the actions of managers and the skills and competencies we assumed they needed. The first, and still dominating, is a rational model, in which strategic thinking is not impacted by emotions or feelings. From this view, efficient thought and behaviors tame emotion and organizations manage feelings, design them out, or remove them altogether (Fineman, 1996). The parallel world acknowledges emotionality by considering the role of stress, level of satisfaction, trust, commitment, and the psychological contract. Positive discussion of emotion at work notes that organizations can and must generate feelings of excitement, personal engagement, and emotional contagion among employees. This divide in strategic decision making between rational and the emotional is eroding as the increasing emotional environment within which managers operate is recognized. The new approach suggests emotions cannot be separated from managerial thought, action, or the process of strategic change. Both the thought processes and the social processes that surround strategic decision making are indeed influenced by emotion (Daniels, 1999). The quality of the mental models that managers develop is influenced by their emotional state, which thereby determines the attention they give to information processing, the perceived opportunity and threats in the environment, and ability to recall information. If managers operate in a more emotional world, then the content of their thought processes become more emotional.

Recent theories of the mind suggest that there is not a single but multiple kinds of intelligence. Academic discussions of strategic management have recognized an increasingly emotional environment within which managers have to make strategic judgments (Sparrow, 2000). Gardner (1983, 1999) and Sternberg (1985, 2002) conceptualize intelligence in a way different from traditional measures such as the intelligence quotient (IQ). Increasing evidence suggests that EQ may be developed and distinct from personality (Law, Wong and Song, 2004). Gardner (1983) provided the basis for the conceptualization of intra- and inter-personal intelligences. Intrapersonal intelligence is the ability to be aware of and regulate one's own emotions (i.e., feelings, moods, and desires) whereas interpersonal intelligence is associated with one's ability to understand others' emotions and to induce desirable responses in them. The present study uses Gardner's conceptualization of interpersonal intelligence. Two components of this intelligence, empathy and social skills, have been described by Goleman (2001) as social competencies, "that is, knowing and managing emotions of others" (p. 29).

There is a growing body of support for EQ as a prerequisite for superior performance (Lam and Kirby, 2002; Young, Arthur and French, 2000: Carmeli and Josman, 2006). EQ refers to one's ability to be aware of one's own feelings, be aware of others' feelings, to differentiate among them, and to use the information to guide one's thinking and behavior (Salovey and Mayer, 1990). This definition consists of three categories of abilities: evaluation and expression of emotion, regulation of emotion, and using emotions in decision-making. Goleman (1998) provided a similar definition: "the capacity for organizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships" (p. 317). These and other definitions by Bar-On (1997), Boyatzis (2001), and others are complimentary. EQ encompasses a number of non-cognitive skills, abilities, or competencies that influence an individual's capacity to deal with environmental demands and pressures effectively. The term EQ was first discussed by Salovey and Mayer (1990) although rooted in Gardner's (1983) concepts of intra- and inter-personal intelligences, and in Thorndike's (1920) concept of social intelligence.

In his role as a consultant, Goleman (1998; see also Goleman, Boyatzis, and McKee, 2002) found that EQ is twice more important than technical skills and IQ for jobs at all levels. He also reported that EQ plays an increasingly important role at the highest levels of a company. When he compared "Star performers with average ones in senior leadership positions, nearly 90% of the difference in their profiles was attributable to EQ factors rather than cognitive abilities" (Goleman, 1998, p. 108).

Components of EQ

Some scholars have used the term EQ to include almost everything but IQ: emotional awareness, accurate self-assessment, self-confidence, trustworthiness, conscientiousness, adaptability, innovation, and so on (i.e, Bar-On and Parker, 2000; Goleman, 1998), but this

framework stretches the conceptualization of intelligence way beyond acceptable limits (Hedlund and Sternberg, 2000). As suggested by a number of scholars (e.g., Salovey and Mayer, 1990; Rahim and Psenicka, 2005) there should be a more restrictive model of EQ based on ability and distinguished from personality. We do this by defining the two dimensions of interpersonal intelligence selected for the present study as follows:

1. Empathy refers to one's ability of understanding others and taking active interest in them, recognizing and responding to changes in their emotional states, understanding their feelings transmitted through verbal and nonverbal messages, to provide emotional support to people when needed, and to understand the links between their emotions and behavior.

2. Social Skills is associated with one's ability to induce desirable responses in others, dealing with problems without demeaning those who work with him or her, to not allow own or others' negative feelings to inhibit collaboration, and to negotiate and manage affective conflict with tack and diplomacy.

Studies on EQ in the strategic management literature are limited and much of the work has concentrated on leadership effectiveness (e.g., Bass, 2002; Hesselbein, Goldsmith, and Beckhard, 1996; Sosik and Megerian, 1999). Less scholarly work is available on EQ in the context of opportunity scanning within organizations although recently scholars have encouraged such endeavors (Sparrow, 2000). Cross and Travaglione (2003) conducted a qualitative study examining the use of emotion by Australian entrepreneurs. They concluded each entrepreneur showed high levels of EQ compared to workplace norms. Shepherd (2004) proposed educating students on how to manage their emotions to avoid failure and encouraged the examination of emotion to benefit organizations wishing to behave more entrepreneurially. We investigate the relationships of two components of EQ—empathy and social skills—to effectiveness of environmental scanning behavior. Some evidence suggests that empathy mediates the relation between social skills and leadership role (Rahim and Psenicka, 2005). We take this view and argue the effects of social skills on outcomes become more effective when social skills are used via empathy. In other words, empathy mediates the relationship between social skills and effectiveness of scanning behavior (i.e. Social skills → Empathy → Effective Environmental Scanning). Therefore the hypothesis for the study is as follows:

H1: Empathy mediates the relationship between social skills and the effectiveness of environmental scanning.

Our literature review suggests that aspects of EQ may be associated with effective environmental scanning. However, numerous studies have shown that differences exist in behaviors

and managerial styles across cultures (e.g., Baumol, 1990; Erez and Earley, 1993). Consequently the effective use of emotion may be unequal across different national cultures. In the next section, we review the cultural literature salient to strategic behavior.

CULTURAL VALUES AND STRATEGIC BEHAVIOR

Research has shown significant variations in behavior across societies and identified national culture as a critical contextual variable conditioning behavior (England, 1975; Hofestede, 1980; Earley, 1994). Fundamental changes in the global business environment have stimulated a strong interest in research that relates cross-cultural value difference to strategic behaviors. National culture can be interpreted as a logic by which members of a society view the environment, other individuals, organizations, and their relations to one another. In turn, scholars have surmised that national culture is likely to yield important effects on "the process by which the environment is known and responded to" (Schneider, 1989, p. 152).

As members of national societies, managers not only contribute to the collective formulation of cultural norms and views, they experience social reinforcement pressures which bring their individual-level assumptions and preferences into close alignment with those of their native culture (e.g., Berger and Luckmann, 1967; Van Maanen and Laurent, 1993). In fact, research has shown that the differing views and assumptions embedded in national culture are reflected in managerial attitudes and beliefs (e.g., Lodge and Vogel, 1987) as well as their behaviors and actions (Jackofsky and Slocum, 1988; Shane, 1995). Of particular importance, cultural values play a central role in shaping managerial views of the environment and appropriate responses to change (e.g., Schein, 1985). Consequently, they are posited to influence the strategy formulation process and its outcomes (Hambrick and Brandon, 1988; Schneider, 1989).

Recently, scholars have begun to explore the link between national culture and strategic decision making. In a study of 20 countries, Geletkanycz (1997) found culture affected executives' adherence of existing strategy. Culture had an important impact on executive mindsets, as differing cultural backgrounds were not equally open to change in organizational strategy. The conceptual work of Hambrick and Brandon (1988) as well as Schneider (1989) suggests that variation in executives' strategic actions may be attributable to the different values embedded within national cultures. Culture reflects a societal understanding of the environment, individuals, and interrelationships. Cultural values capture the salient dimensions of this understanding together with broad societal preferences surrounding issues of organization and adaptation (Hofstede, 1991). Managers, whom have been socialized from an early age to cultural orientations, bring aspects to their roles and responsibilities, including strategic decision making (Hambrick and Mason, 1984). These scholars theorize that cultural values will be reflected in executives' strategic actions. They suggest that cultural values will not only help to shape executives' view of the external contingencies they face, but in the way they work with others to achieve desired goals. In the

present we explore this linkage by examining the impact of cultural values across a sample of managers across four nationalities paying close attention to the cultural dimension of individualism-collectivism.

Individualism-Collectivism

The cultural value dimension of individualism versus collectivism has shown to be particularly resilient compared to other cultural dimensions such as power distance and uncertainty avoidance which were more likely to shift over time. For example, mainland Chinese and Taiwanese entrepreneurs were found by McGrath et al. (1992) to have similar collectivistic values, even though these two groups have been exposed to very different ideologies and lived under different economic systems over the last 50 years. Lodge (1975) claimed that individualistic cultures tend to seek out more information compared to collectivist cultures because of a willingness to take on new ways of doing things and take greater risks. Individualism–collectivism has been used to predict differences in such activities as preferences for organizational equity (Bond, Leung and Wan, 1982), social loafing (Earley, 1989), preferences for organizational structure and job satisfaction (Lincoln, Olson and Hanada, 1978) and championing strategies (Shane and Venkataraman, 1996).

Traditionally conceptualized as a continuum, individualism–collectivism has received considerable attention from sociologists and social psychologists (Earley, 1989; Hofstede, 1980; Triandis, McCusker and Hui, 1990). Individualism refers to a self-orientation, and emphasis on self-sufficiency and control, the pursuit of individual goals that may or may not be consistent with in-group goals. Individualism involves a willingness to confront members of the in-group to which a person belongs, and a culture where people derive pride from their accomplishments. In an individualistic environment people are motivated by self-interest and achievement of personal goals. They hesitate to contribute to collective action unless their own efforts are recognized, preferring instead to benefit from the efforts of others. On the other hand, collectivism involves the subordination of personal interests to the goals of the larger work group, an emphasis on sharing, cooperation, group harmony, and hostility towards out-group members. Collectivists believe that they are an indispensable part of the group, and will readily contribute without concern for advantage being taken of them or for whether others are doing their part. They feel personally responsible for the group product and are orientated towards sharing group rewards.

In the present study we examine the relationship between managers' EQ and their environmental scanning behavior for assessing opportunities, threats, or problems in four different national cultures. Sayles (1964) and Mintzberg (1973) first discussed environmental scanning in terms of one of the roles management performs. McCall and Sergist (1978) built on this work and empirically measured these roles by defining specific behaviors that characterize various roles managers perform. Tsui (1984) used 40 of the 46 McCall and Sergist items to further investigate

these roles and on the basis of factor analysis proposed managerial effectiveness in terms of six different roles (leader, spokesperson, resource allocater, entrepreneur, environmental monitor, and liaison). Tsui's (1984) environmental monitor uses Mintzberg's (1973) and Hambrick (1982) view of seeking and receiving information to understand opportunities and threats. We selected effectiveness of environmental monitor, or environmental scanning, as the criterion variable.

While strategic scanning behavior exists in firms, it is bounded by social values, norms, and history. Ignoring the role of these cultural values in shaping behavior within an organization leads to an undersocialized understanding of the phenomena (Granovetter, 1985). Therefore, we empirically examine the role of empathy and social skills in facilitating effective environmental scanning behavior across four different countries including the United States, Greece, China, and Bangladesh. On the individualism–collectivism dimension, the United States is extremely individualistic among the countries studied by Hofstede and Bond (1988). Bangladesh is moderately more individualistic compared to the world average and Greece is moderately more collectivist. China is an extremely collectivist national culture. Given the cultural difference among these countries, we explore whether the mediating effect on the relationship between social skills and environmental scanning behavior differs between these cultures.

H2: The mediation effect will vary according to the national culture continuum of individualism and collectivism.

RESEARCH DESIGN

Sample and Procedure

Data were collected from 1,182 dyads composed of an MBA student and a colleague who each worked for the same supervisor. Dyadic data was collected across four countries including the U.S. (n = 373), Bangladesh (n = 204), Greece (n = 240), and China (n = 365). The EQ data were collected from MBA students and the scanning data collected from their colleague who worked for the same supervisor in order to make the samples as comparable as possible. The average age of respondents across the four countries ranged between 24.42–31.19 (SD = 3.95–7.66). Respondents' average full-time work experience ranged in years from 2.39–5.54 (SD = 1.62–10.17). The percentage of male respondents across the four countries ranged from 64%–86%.

Data on EQ and effectiveness of environmental scanning were collected from each of the four countries. MBA students filled out the EQ instrument, and their colleagues (who had the same supervisor) completed the questionnaire about the supervisors' scanning behavior. The data for each dyad—MBA student and his or her colleague—were matched. It is expected that this procedure will overcome the problems of common method biases (i.e., variance due to the measurement method rather than the constructs the measures represent).

Common Method Variance

Davis, Stankov, and Roberts (1998, p. 1013) warned about the potential dark side of popularizing a construct before it is carefully conceptualized, operationalized and rigorous empirical studies are completed. Previously used self-report measures of EQ (e.g., Bar-On, 1997; Boyatzis and Goleman, 2001; Cooper and Sawaf, 1997; Law et al., 2004; Mayer, Caruso, and Salovey, 2000) and criterion variables may have resulted in common method variance. This occurs when data are collected from the same respondents, with the same measures, and at the same time. The EQ instruments developed by Law, Wong, and Song and by Mayer, Caruso, and Salovey have been found to be psychometrically sound and it is expected that they will be resistant to common method variance (cf. Spector, 1987).

Another issue in organizational studies is that supervisors are often asked to assess their own managerial skills, but studies by Kruger and Dunning (1999) and Shipper and Dillard (2000) reported that unsuccessful supervisors overestimate their skills compared to successful supervisors. Also three studies reported that under-estimators of their managerial skills are likely to be more effective than over-estimators (Atwater and Yammarino, 1992; Church, 1997; Van Velsor, Taylor, and Leslie, 1993). As a result, if supervisors are asked to self-assess their EQ, some of them will probably provide misleading information. In the present study, an attempt was made to overcome some of the limitations of the existing self-report measures of EQ by using a new measure which involved asking observers (e.g., MBA students and their colleagues) to assess their common supervisor's EQ and environmental scanning. The MBAs and their colleagues assessed their supervisor's EQ and effectiveness of scanning, respectively.

Measurement

Emotional Intelligence

The two components of supervisory EQ were measured with Rahim and Psenicka's (2005) EQ instrument referred to the EQI. The EQI is composed of 16-items but unlike self-report instruments, items measure subordinates' perceptions of their supervisors' empathy and social skills. The instrument was developed by Rahim and Psenicka (2005) from repeated feedback from respondents and experts in the field. The scale underwent a rigorous and iterative process of exploratory and confirmatory factor analyses of various items in the countries included in our study. After factor analysis, the items that loaded less than .50 and/or loaded on an uninterpretable factor were dropped or rephrased. The EQI uses a 7–point box scale (7 = Strongly Agree . . . 1 = Strongly Disagree) for ranking each of the items and a higher score indicates a greater EQ for the representative supervisor. Sample items for the two dimensions include: "My supervisor understands the feelings transmitted through nonverbal messages," "My supervisor understands the links

between employees' emotions and what they do" (empathy) and "My supervisor confronts problems without demeaning those who work with him or her," "My supervisor handles emotional conflicts with tact and diplomacy" (social skills).

Environmental Scanning Behavior (ESB)

This was measured with 5 items of the effectiveness of an environmental monitor role scale adapted by Tsui (1984) from the McCall and Sergist (1978) instrument. The respondents were asked to rank each item on a 7–point box scale (7 = Strongly Agree . . . 1 = Strongly Disagree). The subscale was computed by averaging the responses to its items. A higher score indicates greater effectiveness of environmental scanning. Tsui provided evidence of convergent and criterion validities of the instrument. Sample items for this subscale are: "Scans the environment for opportunities," "Keeps up with market trends" and "Learns about new ideas from outside units".

Translation

Items were translated from English by bilingual professors from each representative country outside the United States (i.e., Bangladesh, Greece, and China). Changes to the items were made based on suggestions from a group of bilingual experts who translated these scales back to English. The final version was developed after accommodating their feedback.

RESULTS

To report the results we first examine the psychometric properties of the EQI and ESB measures. Then, in the second part of our analysis, we test the two hypotheses.

Factor Analysis

Emotional Intelligence

Factor analysis with SPSS 14 was undertaken using principal component analysis and varimax rotation. Confirmatory factor analysis was also undertaken using LISREL 8. The EQI items supported the two independent dimensions of EQ—empathy and social skills— in each of the four countries. The fit indexes for LISREL analysis were satisfactory in each country (RMSEA = .07–.11, NFI = .82–.95, GFI = .88–.94). These indexes ranged from moderate to high.

Environmental Scanning Behavior

Exploratory factor analysis (principal component analysis and varimax rotation) with SPSS 13 and confirmatory factor analysis with LISREL 8 were computed on the 5 items of ESB. Results confirmed a significant factor representing effectiveness of environmental scanning in each of the four countries. The fit indexes for LISREL analysis were satisfactory in each country (RMSEA = .06–.10, NFI = .87–.91, GFI = .87–.94). These indexes ranged from moderate to high.

Reliability and Social Desirability Bias

Table 1 presents the means, standard deviations, internal consistency reliability coefficients, and Pearson correlations between empathy, social skills and environmental scanning behavior. The internal consistency reliability coefficients of the two EQ scales, as assessed with Cronbach α, ranged between .72 and .87 across the four countries (see Table 1) and found satisfactory (Hinkin, 1995).

Table 1: Descriptive statistics, correlations between EQ and environmental scanning behavior and Cronbach αs for variables

Predictor variable	Environmental Scanning Behavior			
	U.S.	Bangladesh	Greece	China
Empathy				
r	.44*	.37*	.62*	.56*
Cronbach α	.86	.78	.87	.83
Mean	4.87	5.14	5.06	4.76
SD	1.26	1.10	1.08	1.26
Social skills				
r	.32*	.34*	.59*	.56*
Cronbach α	.82	.74	.87	.72
Mean	4.96	5.16	5.12	4.68
SD	1.25	1.14	1.13	1.15
Environmental scanning behavior				
r	-	-	-	-
Cronbach α	.88	.87	.85	.91
Mean	5.19	5.28	5.21	4.94
SD	1.21	1.03	.75	1.11
Age				
Mean	24.42	31.15	30.67	31.19
SD	7.66	3.79	4.37	3.95

Table 1: Descriptive statistics, correlations between EQ and environmental scanning behavior and Cronbach αs for variables				
Predictor variable	Environmental Scanning Behavior			
	U.S.	Bangladesh	Greece	China
Work experience with present supervisor (in years)				
Mean	3.28	2.39	2.47	5.54
SD	10.17	1.62	5.32	4.16
N (dyads)	373	204	240	365
* $p < .001$. (two-tailed)				

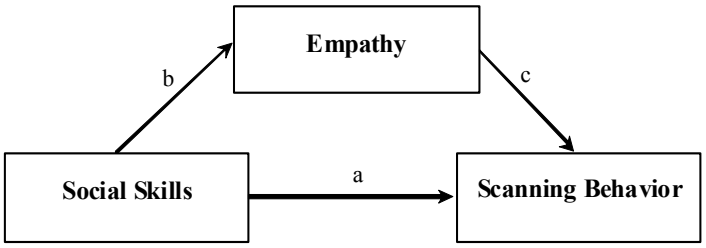
Validity

The average variance extracted by items loading on a given factor measures convergent validity. All items loaded on their respective factor at .50 or above and thus considered to measure the constructs of interest (Hinkin, 1995). A test of discriminant validity is that the squared correlations between factors should be less than the average variance extracted for each factor, the average R^2 (Fornell and Larcker, 1981). In this sample there is a lack of discriminant validity between empathy and social skills. This is attributed to the high correlation between the two subscales which ranged from .80 to .87.

Test for Mediation Effect

To test our hypotheses we use Baron and Kenny's (1986) test for mediation. Baron and Kenny (1986) outline four steps in establishing mediation as follows. (Figure 1):

Figure 1: Empathy as a mediator of the relationship between social skills and environmental scanning behavior in four countries



Path (a): First, show that the initial variable (Social skills) is correlated with the outcome (Environmental scanning). Use a regression equation to estimate and test path (a). This step establishes that there is an effect that may be mediated.

Path (b): Second, show that the initial variable (Social skills) is correlated with the mediator (Empathy). Use Empathy as the criterion variable in the regression equation and Social skills as a predictor to estimate and test path (b).

Path (c): Third, show that the mediator, Empathy, affects the outcome variable, Environmental Scanning. Use the criterion variable in a regression equation and Social skills and Empathy as predictors to estimate and test path (c).

Finally, to establish that Empathy completely mediates the Social skills–Environmental Scanning relationship, the effect of Social skills on Environmental Scanning, controlling for Empathy, should be zero. If these four steps are met, then the data are consistent with the hypothesis that Empathy completely mediates the Social skills-Environmental Scanning relationship. If the first three steps are met but Step 4 is not, then partial mediation is indicated.

Three regression analyses were computed for each country. Each analysis was performed with the two subscales of the EQI—social skills and empathy—as the independent and mediating variables, respectively, and the effectiveness of environmental scanning as the dependent variable. Table 2 shows the results of three regression analyses to satisfy the first three steps.

Table 2: Regression analyses of empathy, social skills, and environmental scanning behavior in four countries

Equation Regressed	U.S.		Bangladesh		Greece		China	
	β	R^2	β	R^2	β	R^2	β	R^2
(a) SS → ESB	.21*	.05	.30*	.09	.40*	.16	.55*	.30
(b) SS → EM	.81*	.67	.72*	.52	.88*	.78	.80*	.64
(c) EM → ESB	.30*	.08	.24*	.12	.29*	.18	.15*	.31
SS → ESB	-.04		.12		.14		.43*	
N (dyads)		373		204		240		365

* $p < .001$
Note: SS = Social skills, EM = Empathy, ESB = Environmental scanning behavior.

Equation a: Social skills was positively associated with effectiveness of environmental scanning in each country.
Equation b: Social skills was positively associated with empathy in each country.
Equation c: Empathy, after controlling for social skills, was positively associated with the effectiveness of environmental scanning in each country.

Equation c shows that there is full mediation in the U.S., Bangladesh, and Greece. In the U.S. the β for social skills changed from .21 ($p < .001$) in Path (a) to –.04 (*ns*) in Path (c). Similarly, there was full mediation in Bangladesh as the β for social skills changed from .30 ($p < .001$) in Path (a) to .12 (*ns*) in Path (c). In Greece there was also full mediation as the β for social skills changed from .40 ($p < .001$) in Path (a) to .14 (*ns*) in Path (c). Unlike the other countries, there was only partial mediation in China as the β changed from .55 ($p < .001$) in Path (a) to .43 ($p < .001$) in Path (c). In sum results suggest that empathy is a full mediator of the relationship between social skills and effectiveness of environmental scanning in the U.S., Bangladesh, and Greece but empathy was a partial mediator of this relationship in China.

DISCUSSION

This study investigated how differences in EQ relate to the effectiveness of environmental scanning behavior using 1,182 dyads in the four countries. Results provide sound evidence of convergent and criterion validities as well as internal consistency reliability coefficients of the measures of EQ and effectiveness of scanning behaviors within firms. Overall the results of our analysis indicate subordinates' perceptions of managerial EQ are associated with the effectiveness of managers scanning behavior across countries, however, nuances exist in mediation. Using Hofstede and Bond's (1988) continuum of individualism and collectivism, the United States is most individualistic, followed by Bangladesh. On the other hand Greece is slightly more collectivist compared to other countries and China is an extremely collectivist culture. In the individualistic and moderately collectives cultures (U.S., Bangladesh, and Greece), empathy fully mediates the relationship between social skills and effectiveness of environmental scanning. Therefore to effectively scan the environment in individualistic and moderate collectivist countries both social skills and empathy are required. On the other hand, in highly collectivist cultures (China) there was evidence of only partial mediation. In other words, in more collectivistic countries social skills and empathy can independently influence environmental scanning behavior. Whereas a manager with high social skills but not empathetic in an individualistic culture cannot be effective in a strategic scanning role they can be effective in more extreme collectivist cultures. In highly collectivist cultures a manager with social skills alone can be effective in performing an environmental scanning role. However, a manger in this culture with high social skills and empathy will be more effective than others who have social skills or empathy alone.

Implications for Management

The results of our study provide evidence that managers and decision makers alike need to consider the ability to exercise emotion—especially in environments where working with others to scan the environment for opportunities and threats is desired. Managers or expatriates in individualistic and moderately collectivist cultures need to acquire and exercise social skills and empathy competencies to enhance their ability to detect and interpret problem areas, identify opportunities, and implement strategic adaptations. In these national cultures, managers with high social skill competencies will not be as effective in bringing about strategic change unless they use empathy competences as well. For transnational firms wishing to bring about external intelligence and new opportunities for wealth creation special consideration may be needed in selecting managers and expatriates according to their ability to exercise EQ. In highly collectivistic cultures, managers need to acquire and use social skills and/or empathy competencies to enhance their ability to effectively scan the environment for information necessary to formulate strategy. Overall, the challenge for the global organization is to enhance social skills and empathy of their managers. Appropriate interventions may be needed to enhance these social competencies that involve education and specific job-related training (Cherniss and Adler, 2000; Goleman, 1998). Managers should also be encouraged to enhance their skills through continuous self-directed learning. Goleman (1998) suggests that such training should "focus on the competencies needed most for excellence in a given job or role" (p. 251). The contemporary transnational firm wishing to effectively scan information for strategic decision making should provide positive reinforcements for learning and improving managers' essential emotional competencies for brining about such change. In addition to providing education and training for the existing managers to improve their EQ, organizations may better behave opportunistically by adopting selection practices of identifying manages with an aptitude for exercising emotion. While the opportunity to select managers with appropriate emotional intelligence exists, organizations must also consider the aptitude for development of such competencies. Those firms who are better able to develop appropriate emotional competencies may have distinct advantage in bringing about higher performance based upon their strategic scanning behavior.

Directions for Future Research

Further research is needed to enhance our understanding of the relationships of EQ to other strategic behaviors. Promising criterion variables for future research include managements' ability to formulate and implement strategies. Strategic management involves executives' ability to work with others to communicate information as well as adapt and champion strategies within firms. Therefore, strategy involves social processes which have received less attention compared to other areas within strategic management. Another important area of future research concerns carefully

designing and evaluating the effects of training in EQ in enhancing the aforementioned criterion variables. Field experiments are particularly useful in evaluating the effects of EQ training on individual and firm outcomes. There is also need for scenario-based and laboratory studies that control some of the extraneous variables to better understand the effects of supervisors' EQ. Also it would be useful to investigate the differences in the perceptions of subordinates regarding the firm performance of executives with low and high EQ.

Strengths and Limitations

One of the major strengths of this study is that the independent and dependent variables were collected from separate respondents, which overcome the problem of common method variance. The presence of common method variance may inflate correlations between independent and criterion variables. Another strength is that the data were collected from employed MBA students and their colleagues from each country. Therefore, sample characteristics are comparable across countries. Limitations of this field study should be noted. Data were collected from convenience samples that might limit generalizability of the results. Although the sample sizes for the individual countries were satisfactory, we did not have large samples to perform split-sample tests for the traditional and LISREL analysis, but the results seem to support a consistent cross-cultural pattern.

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STRATEGIC HUMAN RESOURCE MANAGEMENT IN SMALL AND GROWING FIRMS: ALIGNING VALUABLE RESOURCES

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ABSTRACT

Human capital (i.e., the knowledge, skills, and abilities of employees) is one of the primary factors a business can rely on to differentiate their products or services and build a competitive advantage; however, few studies directly guide managers of small and growing firms through the people management issues that they will face through the lifecycle(s) of their business. This manuscript is designed to contribute to the body of research focusing on strategic human resource management within small and growing businesses in two meaningful ways. First, the authors present the results of two studies designed to examine the selection, training, and compensation practices currently utilized by a national sample of small business managers (N = 1503) across a wide range of industries. Second, the authors present an evidence based framework to guide owner/operators of small and growing firms through the important decision points to be considered when developing their human resource strategy to ensure that it aligns with, builds upon, and supports their business strategy.

INTRODUCTION

When entrepreneurs and business executives develop a business plan, they recognize that a great line of products or services helps a company achieve, and maintain, a competitive advantage in the marketplace (Porter, 1980). For instance, the founder of Coyote Logistics (based in Lake Forest, Ill) based his business model around the practice of back-hauling (filling trucks with cargo from other clients for return trips) so that fewer of his trucks traveled with underutilized cargo space (Inc, 2010). This unique service has caused Coyote Logistics to have a 13,846.8% growth rate since being founded in 2006. Similarly, W.L. Gore and Associates (based in Newark, NJ) base the majority of their products (ranging from dental floss to guitar strings) on their innovative fluoropolymer material. This unique product has helped position the company as a market leader in diverse industries ranging from rugged outdoor equipment to high-end transfer cables for electronic equipment. Finally, Zappos.com (based in Henderson, NV) provides another example

of a company that has relied on a unique service/product line to grow from a small web-based shoe retailer to the largest on-line shoe retailer within 5 years of being founded (Durst, 2007).

The leaders at these businesses, and any other successful venture, clearly recognize the importance of identifying a unique product or service. Furthermore, successful managers also recognize the importance of efficiently managing their employees and developing their human resources. For example, CEO Jeff Silver credits Coyote Logistics success to an intensive two-month training program followed by a six-month mentorship program that is required for all new employees (Inc, 2010). Additionally, W.L. Gore and Associates has consistently been ranked as one of the top 100 places to work in *Fortune* magazine's annual rankings by focusing on valid human resource management practices to identify and prepare associates to develop innovative uses for their fluoropolymer materials. Furthermore, throughout Zappos.com's rapid growth, the leaders consistently focused on designing training programs to help employees deliver quality customer service (Chafkin, 2009). These firms clearly linked their human resource management practices to their competitive business model. When business leaders are able to align a strong competitive strategy with a well designed and strategically focused human resource system, it has the necessary foundation that brings customers in the door (or to their website) initially and gets them to come back for repeat business (Cascio & Boudreau, 2008; Ulrich & Brockbank, 2005).

The recognition that human resource issues are important to small and growing firms is not new. For instance, Hess (1987) presented data that suggested that small business owners rank human resource related issues as the second most important management activity after general management. Further, Karami, Jones, and Kakabadse (2008) suggested that the majority of CEO's in their sample believe that human resource practices have a substantial impact on firm performance. Additionally, Dunn, Short, and Liang (2008) presented results suggesting that sound hiring practices and training programs are considered important by small business owners who have 10 or more employees.

In light of the growing recognition that the human resource issues faced by small and growing firms are different from their larger counterparts and that the quality of a company's human resources play an important role in building a successful firm, recent theoretical (Cardon & Stevens, 2004) and empirical (e.g., Carlson, Upton, & Seaman, 2006; Dunn, Short, & Liang, 2008; Karami, Jones, & Kakabadse, 2008; Messersmith & Guthrie, 2010) work has begun to examine the specific human resource management practices employed by small and entrepreneurial firms. This prior research has clearly established a link between employee knowledge, skills, and abilities and maintaining a competitive edge in small and entrepreneurial businesses (Deshpande & Golhar, 1994). Given the important role of human resource management in building a competitive advantage, it is important to develop a more complete understanding of the role that human resource practices play in the performance of small and entrepreneurial firms (Heneman, Tanksy, & Camp, 2000).

Therefore, the current paper aims to make a contribution to the literature by highlighting the recruitment, selection, training, and compensation practices commonly utilized by a national sample of independent small business owners and by presenting a strategic human resource management model based on the operating needs of small and growing businesses. In the text below, the authors will: (1) further discuss how strategically focused human resource management practices can lead to important organization level outcomes; (2) present the results of a study designed to examine the human resource practices typically utilized by small and growing firms, and (3) develop and present a model that outlines several steps that organizations can use to successfully implement strategic human resource programs that complement, and build upon, their competitive strategy.

HUMAN RESOURCE MANAGEMENT PRACTICE

Human resource management represents the design, development, and implementation of interrelated people management practices that influence how well an organization can attract job applicants, retain motivated and successful employees, and ultimately impact job performance and organizational effectiveness (Noe, Hollenbeck, Gerhart, & Wright, 2007). Effective human resource management practices, including properly developed employee recruitment and selection plans, training and development programs, and compensation and reward systems have been linked to higher employee performance and adding value to the corporation (Pfeffer, 1994). Prior research clearly links effective human resource management practices to valuable business level outcomes, such as product innovation, customer satisfaction, and financial performance (Dooney, 2005; Huselid, 1995; Phillips, 1998; Pfeffer & Veiga, 1999).

While important and useful, most of the extant research (and associated "best practices" models) are based on data gathered from large businesses – businesses that often have more available capital than their smaller and growing counterparts (Welsh & White, 1981). For instance, prior research has clearly demonstrated that small businesses and entrepreneurial firms are fundamentally different than larger firms - in terms of resources available, number of employees, and employees with human resource training (Barber, Wesson, Roberson, & Taylor, 1999). Therefore, it has been difficult to understand how strategically designed human resource management practices can be generalized to small and entrepreneurial firms (Cardon & Stevens, 2004; Tocher & Rutherford, 2009). Furthermore, small businesses have a more difficult time recruiting employees (Williamson, Cable, & Aldrich, 2002) and may face a difficult time developing sustainable human resource systems and policies (Barber et al., 1999; Cardon & Stevens, 2004). Additionally, Rutherford, Buller, and McMullen (2003) demonstrated that human resource needs change across the growth/life cycle of the firm.

In the text below, the authors present the more widely recognized aspects of a human resource system and tie them, where possible, to important individual and business level outcomes

(e.g., innovation, employee productivity, motivation, etc.). Consistent with prior research (Golhar & Deshpande, 1997; Sels et al., 2006), the current review focuses on a limited number of components of the total human resource system including recruitment, selection, training and development, and compensation. These areas are highlighted because prior research has demonstrated a positive link between selective hiring practices, extensive training, strategic compensation plans, and overall firm performance in small and growing firms (Cardon & Stevens, 2004; Dess & Lumpkin, 2003; Rutherford, Buller, & McMullen, 2003).

Employee recruitment and selection

Employee recruitment and selection practices are focused on attracting talented applicants to a business, identifying the applicants that are most qualified, and ultimately making the hiring and placement decisions. Due to the general importance of finding capable and motivated employees, both recruitment and selection practices have received attention within the relevant literature (Cardon & Stevens, 2006). However, some authors (e.g., Barrett & Mayson, 2007) argue that recruitment and selection are areas where growing businesses typically rely on poorly structured practices that exhibit a lack of strategic planning (Mayson & Barrett, 2006). This lack of strategic focus and formal planning is particularly troubling because growing firms often compete with more established, larger firms for employees (Heneman & Berkley, 1999) and because many growing firms are not considered to be an employer of choice (Williamson, 2000).

Recruitment involves all the activities carried out to identify and attract potential employees (Barber, 1998). Recruitment strategies include sources designed to identify qualified internal (e.g., performance records, customer satisfaction ratings, job postings, etc.) or external job candidates (e.g., public or private employment agencies, job fairs, advertisements, employee referrals, etc.). While there are a variety of effective recruitment strategies available to small and entrepreneurial firms, the extant research suggests that, by in large, small employers tend to rely on recruitment methods that are inexpensive, convenient (e.g., newspaper ads and signs encouraging walk in applications), and controlled by the employer directly (Heneman & Berkley, 1999; Hornsby & Kuratako, 1990). These recruitment methods do tend to bring applicants in the door; however, data suggest that they do not necessarily attract the most skilled and qualified applicants (Heneman & Berkley, 1999).

While recruitment is primarily focused on building a qualified applicant pool, employee selection involves the process where organizations make decisions about who will be allowed to work for the organization (Noe, Hollenbeck, Gerhart, & Wright, 2009). The most valid selection procedures help a business consistently and accurately evaluate whether a job applicant has the knowledge, skills, and abilities that align with the core competencies a business relies on to create a competitive advantage. The typical selection methods utilized by most small and growing firms would be characterized as informal including face to face unstructured interviews, reference checks,

and job previews (Deshpande & Golhar, 1994; Kotey & Slade, 2005). Unfortunately, these methods rarely provide employers with enough useful information to compare each candidate's job/organization related credentials in a way that allows him or her to consistently identify the best candidate from the applicant pool.

Employee training

Employee training and development programs represent an organizations planned effort to enhance an employee's job related knowledge, skills, and abilities in an effort to improve job performance (Noe, Hollenbeck, Gerhart, & Wright, 2009). As companies grow, so do their product or service lines and training is the primary tool a business can use to help increase the knowledge and skills of their employees. Furthermore, data presented by Gundry (1991) suggests that an entrepreneurial firm's investment in training for their employees helps build technical expertise and facilitate innovation.

Training programs can involve formal class-based training sponsored by professional organizations, systematic on-the-job training, or informal methods such as mentorship programs or peer feedback regarding job performance. As such, training is another important component of human resource management activities; however, the literature in this area is very limited. Training in small and growing businesses has been described as informal and primarily focuses on the use of "on-the-job" training (Kotey & Slade, 2005) or training provided by the raw material suppliers that businesses rely upon. This focus on on-the-job training is believed to be driven by two primary factors (Storey & Westhead, 1997). First, the cost of other forms of training (formal education, training by professional organizations, etc.) are perceived as prohibitive. Second, many business owners fail to see how training costs (both direct and indirect) lead to improved performance.

Employee compensation

Compensation practices are one of the most important tools an organization can use to help attract, retain, and motivate key talent in small growing firms (Cardon & Stevens, 2004). If firms cannot pay applicants enough, then they will not be able to recruit strong applicants or retain the employees with the core knowledge and skills necessary to compete in the marketplace. Compensation decisions focus on establishing a pay structure that fairly represents the local market (external pay equity) and creates a pay system that clearly differentiates among performance within the firm (internal pay equity) so that more valuable employees are recognized for their contribution. Additionally, incentive plans that tie compensation to important individual level (job performance) and company level (market share, profit) metrics provides an important communication device that helps employees recognize which job related behaviors are expected and rewarded (Kerr, 1999). Prior research has indicated that pay incentives, such as profit sharing and goal-based pay, are very

effective in small entrepreneurial ventures and can positively impact job performance, teamwork and cooperation, improved decision making, and organizational effectiveness (Heneman & Tansky, 2002; Huselid, 1995).

In addition to pay structure and incentive pay systems, benefits also represent an important compensation tool for businesses to help establish employee commitment and loyalty. Prior research does not clearly link employee benefits (health insurance, vacation time, etc.) to enhanced job performance (e.g., Carlson, Upton, & Seaman, 2006); however, extant evidence does suggest that benefits practices are related to employee commitment (Noe et al., 2009). This makes sense due to the fact that individual job performance does not impact the typical employee benefit plan; however, it can directly influence the amount of incentive compensation received and the growth rate of a business.

HUMAN RESOURCE PRACTICE AND FIRM PERFORMANCE

In a recent series of studies, Collins and colleagues reported that the effective implementation of human resources practices (including recruitment, selection, training, and compensation) in small firms was linked to 22.1% higher revenue growth, 23.3% higher profit, and a 66.8% reduction in employee turnover (Collins & Allen, 2006). Furthermore, Sels et al. (2006) demonstrate that effective implementation of various human resource management practices helps small firms improve their financial performance and the individual productivity of employees. Additionally, a growing body of evidence demonstrates how effective human resource practices impact important organization-level (e.g., survival rate, profit, market share, and long term business success) and individual level outcomes (e.g., turnover, motivation, etc.) for small and growing firms (Chandler & McEvoy, 2000; Hayton, 2003; Huselid, 1995; Huselid & Becker, 1997). Further, Welbourne and Andrews (1996) demonstrated that that the value a company placed on developing it's human resources and how the company structured it's reward program were significant predictors of firm survival even after statistically controlling for other important factors that impact business success, such as industry, company size, and profit. Rauch, Frese, and Utsch (2005) also found that the value and quality employees (centrally determined by human resource management practices) are important predictors of future business growth. In fact, research by Dunn and Bradstreet (2001) suggests that managerial incompetence in the area of human resource management is one of the primary causes of failure in smaller firms.

When implemented effectively, human resource management practices can create these profound individual and business level effects because each independent practice (i.e., selection, training, compensation, etc.) is designed to enhance organizational performance by developing skilled workers with a vested interest in the company's success. The logic behind focusing on human resource management as a way for a firm to build a competitive advantage lies in the

resource based view of management and the practice of *strategic human resource management* (Mayson & Barrett, 2006) both of which are described below.

Effectively Aligning Resources: The Role of Strategic Human Resource Management

The resource based view of management suggests that various forms of capital (e.g., financial, physical, human, etc.) create a consistent source of competitive advantage if they fulfill four distinct criteria (Barney &Wright, 1998). First, capital must add value to the business. Second, capital should be unique to the firm or rare within competing firms. Third, each form of capital should be difficult to imitate or duplicate. Finally, each form of capital should be difficult to substitute with other available products or services.

The resource based view of management relates to *human resources* (i.e., the knowledge, skills, and abilities of employees within a firm) by suggesting that a firm will be most successful when they cumulatively evaluate the human resource practices and strategies that enable the business to remain competitive. Utilizing the resource based view to understand the importance of a firm's human resources, employees are considered a source of competitive advantage when their: knowledge and skills add value; are rare and difficult to imitate; and cannot be substituted by technology or other resources.

The practice of *strategic human resource management* builds off of the resource based view of management and focuses on how businesses should structure, implement, and sequence their human resource management practices in an effort to build their *human capital*. This process provides businesses with a framework to improve how well the company can react to their competitive environment by aligning key aspects of their human resource systems (such as recruitment and selection, training and development, and reward systems) with a focus on the central business strategy. In this sense, strategic human resource management focuses on internally aligning each component of a human resource management system so that each part seamlessly feeds into other components of the human resource system. More specifically, this approach encourages managers to think of how each independent human resource practice (e.g., recruitment, selection, training, etc.) impacts every other practice (e.g., compensation, performance evaluation, employee retention). Thus, this approach focuses on internally aligning independent human resource *practices* in a way that maximizes the capabilities of the human *resources* (i.e., the employees) so that they contribute to firm performance and longevity.

Furthermore, implied in the notion of strategic human resource management, is the focus on building a competitive advantage through external alignment. That is, not only should the independent human resource practices be internally aligned, but these practices should individually and collectively support the broader purpose of the business. Huselid, Jackson, and Schuler (1997) suggest that strategic human resource management is focused on designing and implementing a coordinated set of human resource practices that are all focused toward accomplishing the firm's

strategic goals and objectives. Examples of externally aligned human resource management practices include such things as incentive pay or reward plans, employee participative decision making, and employee involvement plans (Huselid, Jackson, & Schuler, 1997; Tocher & Rutherford, 2009). These practices are all focused on trying to help the employee see how his or her performance ties into company objectives and helps the company maintain a competitive advantage.

At the heart of both the resource based view and strategic human resource management is the focus on proactive planning and use of resources in a way that aligns with the strategic direction of the firm. The extant literature suggests that when strategic human resource management is implemented appropriately the firm's position in the marketplace is improved and individual performance within the firm is enhanced (Chandler & McEvoy, 2000; Welbourne & Andrews, 1994). In fact, some authors have suggested that strategic human resource management practices are even more important for small firms because they do not have the resources that more established firms have (Cardon & Stevens, 2004; Tocher & Rutherford, 2009).

Zappos.com provides an excellent example of the appropriate application of strategic human resource management (selective hiring, extensive training, incentivized pay) so that their human capital *adds value*, *is difficult to imitate*, and *cannot be substituted by other firms*. More specifically, Zappos.com's founding leaders recognized that one of the primary difficulties with running a shoe store on-line is that customers do not have the opportunity to try on shoes and have the shoes available immediately. Rather than letting this hurdle adversely impact their business, the management designed training programs to help employees understand the importance of excellent customer service *and* how their specific job impacted the company's bottom line (Chafkin, 2009). Thus, it is important for organizations to realize that they must continuously develop and grow their human capital through three primary mechanisms – selectively hiring capable employees, developing skills that complement the competitive strategy of the business, and retaining the best employees by focusing on compensation and work environment (Dess & Lumpkin, 2003; Rutherford, Buller, & McMullen, 2003).

In contrast to the deliberate, and proactive, structuring of human resource management practices according to the resource based view and strategic human resource management, as reviewed above, most frequently the human resource systems in place in small businesses are considered informal (at best) or non-existent (Cardon & Stevens, 2004; Mayson & Barrett, 2006). Furthermore, prior research has indicated that small business owners and managers are less likely to focus on administration issues, such as human resource management, unless something appears to be a serious issue (Tocher & Rutherford, 2009). Additionally, Kotey and Slade (2005) noted that the implementation of human resource management policies and practices lags behind other operational decisions. As such, we must develop human resource management practices that focus on the needs and operating issues faced by smaller firms (Barber, Wesson, Roberson, & Taylor, 1999).

In the next section of the manuscript we highlight a descriptive study that is designed to examine the current human resource management practices in a national sample of organizations. Following this, the authors present a model developed to help guide businesses through the critical decision points of implementing a strategic human resource management plan.

METHOD/DATA COLLECTION

We utilized two archival data sets collected by the *National Federation of Independent Businesses* (NFIB) to examine the human resource management practices typically implemented in small firms in the United States. In both cases, the NFIB conducted interviews with a stratified random sample of "small employers" (employers with 250 or less employees) across the United States, which were drawn from the data files maintained by Dunn & Bradstreet Corporation.

The data focused on employee recruitment, selection and training were collected from a total of 752 owners or managers who operated businesses across a wide variety of industries. The four largest industries were retail trade (13.7% of sample), professional/technical services (11.4% of sample), food services (11.4% of sample), and construction (8.9% of sample). The majority of interviewees had some form of higher education or technical training (79%) and was male (77%). Additionally, the majority of businesses (76.5%) had been in operation for over 6 years (average = 16.89 years) and 87.1% of the sample reported an increase in real volume sales over the last two years. It is important to note, that during the interviews, approximately half of the sample (N=368) was asked to report on their "most skilled" position while the other half of the sample reported on their "most common" (N=384) employee. For instance, considering a restaurant, the most skilled position would likely be the chef. However, the most common employee would likely be the waiters or waitresses.

The data focused on the compensation and benefit practices were collected from a total of 751 owners or managers who operated businesses across a wide variety of industries. The four largest industries were retail trade (18% of sample), professional/technical services (11% of sample), manufacturing/mining (9.4% of sample), and construction (8.1% of sample). The majority of interviewees had some form of higher education or technical training (76.4%) and was male (82.5%). Additionally, the majority of businesses (72.7%) had been in operation for over 6 years and 65.6% of the sample reported an increase in sales over the last two years.

RESULTS

Employee Selection and Recruitment

The majority of small business managers who hired employees over the last two years (50.5%) indicated having a difficult time recruiting and hiring qualified employees. As indicated

in Table 1, small employers typically require minimal levels of formal education for both the most skilled and the most common employees.

Table 1

Think of the employees who fill the most common/most skilled job. On a scale of one-to-five, where 1 means the employee MUST have such job skills when hired and 5 means you expect the employee to learn them on the job, what skills do you expect the employee to have when hired? If they do not need a skill for the job, just say so. How about … ?

	Most Skilled Employee					
Human Resource Practice	1	2	3	4	5	6
1. Level of Education	18.5%	36.5%	21.3%	13.4%	6.8%	2.5%
2. Require Prior Experience	50.8%	27.7%	8.2%	12.5%	0.8%	NA
3. Management Skills	14.9%	25.5%	32.2%	11.4%	12.7%	3.3%
4. Knowledge of Operating Procedures for Business	21.0%	15.8%	23.7%	12.5%	25.9%	0.8%
5. Knowledge of goods/services	23.9%	16.6%	23.9%	11.7%	20.7%	3.0%
6. Occupation Specific Skills	30.1%	14.9%	14.9%	8.4%	19.5%	10.3%
7. Good Work Habits	65.5%	12.1%	5.4%	5.4%	11.1%	0.5%
8. Leadership Ability	16.8%	26.4%	32.9%	8.7%	12.0%	3.0%
9. Social/Interpersonal Skills	36.7%	25.0%	22.3%	6.5%	7.3%	1.4%
10. Ability to Follow Direction	62.6%	13.8%	6.8%	5.4%	11.4%	0.0%
	Most Common Employee					
Human Resource Practice	1	2	3	4	5	6
1. Level of Education	27.3%	45.8%	14.0%	8.9%	1.6%	0.8%
2. Require Prior Experience	30.5%	26.6%	17.5%	24.8%	0.5%	NA
3. Management Skills	11.3%	17.6%	36.2%	14.2%	16.5%	4.2%
4. Knowledge of Operating Procedures for Business	15.1%	9.9%	24.7%	15.1%	33.1%	1.6%
5. Knowledge of goods/services	15.4%	15.1%	21.6%	11.7%	32.3%	3.6%
6. Occupation Specific Skills	15.6%	14.1%	23.4%	8.1%	23.7%	13.8%
7. Good Work Habits	62.8%	14.4%	4.7%	4.7%	13.1%	0.3%
8. Leadership Ability	8.1%	16.8%	38.3%	15.2%	16.3%	5.2%
9. Social/Interpersonal Skills	34.7%	18.3%	27.4%	7.6%	8.9%	3.1%
10. Ability to Follow Direction	60.6%	13.6%	6.8%	6.8%	12.0%	0.3%

NOTE: Recruitment/Selection Practices percentages based on # of respondents who indicated that these factors were required upon being hired. Occupational Specific Skills = represents the types of skills necessary to perform the job on the first day (e.g., cooking techniques for chef; appropriate tools for carpentry). **Level of Education:** 1 = No education; 2 = High School/GED; 3 = Trade/AA/Apprentice; 4 = 4 year College Degree; 5 = Post Graduate Degree; 6 = Other. **Require Experience:** 1=Yes; 2 = Yes, Generally; 3 = No, Generally; 4 = No; 5 = DK/Refuse. **All Other Variables:** 1 = Yes, required upon hiring; 5 = Learn on the job; 6 = Don't need the skill.

For the most skilled positions, 18.5% require no formal education while 36.5% require no more than a high school education. In terms of experience, 50.8% required prior experience for their most skilled workers. Certain specialized skills, such as management skills, knowledge of business operation procedures, and leadership ability were not emphasized in making hiring decisions with only 14.9%, 21%, and 16.8% of the sample indicating these skills were required for their most skilled hires (see Table 1), respectively. However, other skills such as occupation specific skills, social/interpersonal skills, good work habits and attitudes, and the ability to follow direction were emphasized with 30.1%, 36.7%, 65.5%, 62.6% of the sample indicating these skills were required for their most skilled hires (see Table 1).

For the most common employee, 27.3% require no formal education while 45.8% require only a high school diploma. In terms of experience, 30.5% require experience for the most common employee. Good work habits and attitudes (required by 62.8% of the sample) and the ability to follow direction (required by 60.6%) and strong social/interpersonal skills (34.7%) were the skills that were most heavily relied upon for making selection decisions regarding the most common employee (see lower half Table 1).

Training

Given the relative informality of selection criteria used to predict success on the job, it is perhaps no surprise that many small businesses rely on training programs to help prepare their staff for the demands of the job or that it takes a long period of time before employees are fully prepared for the job. In terms of training, 61.6% of the employers sampled suggest that the most common method of training their most skilled employee is to have someone in the firm work with the new employee and another 13.5% report allowing employees to learn through actually performing the job (on-the-job performance). An additional 11.3% of the sample utilizes outside vendors for training their most skilled workers (see Table 2). For the most common workers, 75.6% of employers relied on someone within the firm to teach new employees how to perform their job. Another 14.2% reported using on-the-job training for their most common employee (see Table 2). As indicated in Table 3, 43.3% of the sample reported that it took their most skilled employee between 3 months and a year to get their skills to a satisfactory level while 35.4% of the sample indicated that it took their most common employee between 3 months and a year. Additionally, for 14.3% (most skilled sample) and 8.7% (most common sample) it took over a year for their employees to be fully prepared for the job. Finally, as indicated in Table 4, 35.4% of the most skilled sample indicated spending between $1,000 and $9,000 on training while 32.8% of the most common sample indicates spending a similar amount.

Table 2: Training and Development:		
How do you most often training your most skilled/most common employee or otherwise help them obtain needed skills? Do you …?		
	Most Skilled	Most Common
1. On the job/learn by doing	13.5%	14.2%
2. Self-help materials	3.3%	2.6%
3. Have someone in the firm teach skills	61.6%	75.6%
4. Bring in an expert	1.9%	0.3%
5. Use outside firm	11.3%	3.9%
6. Take on-line course	2.2%	1.0%
7. Other	3.3%	0.5%
8. Nothing	1.1%	0.3%
9. Don't Know/Refuse	1.6%	1.6%

Table 3: Training and Development		
When considering your most skilled/most typical employee, how long does it typically take to bring such a person's skills up to a satisfactory level?		
	Most Skilled	Most Common
1. Two weeks or less	13.8%	20.3%
2. Two weeks up to one month	18.6%	16.8%
3. One month up to three months	10.0%	18.6%
4. Three months up to one year	43.3%	35.4%
5. Over one year	14.3%	8.9%

Table 4: Training and Development		
What are your typical annual per employee, out-of-pocket costs to train your most skilled employees?		
	Most Skilled	Most Common
1. Less than $500	9.9%	11.5%
2. $500-$999	7.5%	8.9%
3. $1,000-$4,999	25.4%	22.8%
4. $5,000-$9,999	9.9%	10.7%
5. $10,000-$24,999	7.7%	8.4%
6. $25,000 or more	5.0%	2.1%
7. Don't Know/Refuse	34.5%	35.6%

Compensation and Benefits

Just over half of the sampled employers (56.4%) reported paying their full-time employees a salary (23.2%) or a fixed hourly wage (33.2%). Additionally, about half (52.4%) of the sampled employers reported paying their part-time employees a salary (3.8%) or an hourly wage (48.6%). Additionally, 51.6% stated that full-time employees receive periodic bonuses or profit sharing based on the overall performance of the business. With regards to benefits, 40.6% of employers indicated that they target their full- and part-time employees when constructing their benefits package rather than primarily targeting their full-time employees (targeted by 28.3%), their most valuable employees (targeted by 7.7%), the long-serving employees (targeted by 4.4%), or the owners and their families (7.9%). As specified in Table 5, businesses rely on benefits packages that include paid vacations, health insurance, and job related education benefits to attract, retain, and motivate their key talent.

Table 5: Compensation and Benefits

Benefits Offered	Yes	No	DK/Refuse
1. Paid Vacations	75.3%	24.1%	0.6%
2. Paid Sick Leave	57.8%	40.8%	57.8%
3. Life Insurance	28.7%	70.3%	1.1%
4. Health Insurance	60.5%	38.6%	0.9%
5. Dental Insurance	23.5%	75.6%	0.9%
6. Pension/Retirement Plan	29.5%	69.4%	1.1%
7. Education Reimbursement	38.5%	59.8%	1.7%
8. Flexible Spending	11.6%	84.7%	3.8%

DISCUSSION

When implemented correctly, human resource management practices can play a significant role in business success (Chandler & McEvoy, 2000; Hayton, 2003). The results generated from the samples in this manuscript are consistent with prior research examining the practices typically used by small growing firms (cf. Cardon & Stevens, 2004; Mayson & Barrett, 2006). More specifically, we found that while there were human resource systems in place they were largely informal and did not necessarily reflect strategic implementation or a focus on building human capital as a source of competitive advantage. Thus, as noted by Mayson and Barrett (2006), the literature is relatively clear with regards to the types of practices typically implemented.

However, there is still no consistent guideline for how to implement independent human resource systems in a strategic manner. Thus, in the text that follows, the authors develop a framework to help guide owners and managers of small and growing firms through the people management practices that will help them build a competitive advantage and hopefully build their status as employers of choice (See Figure 1).

Strategic Framework for Human Resource Management: A "Best Practices" Guide

It is important to realize that human resource management practices are best thought of as tools that can be used to help support the mission, vision, and purpose of an organization. Thus, as specified in Figure 1, the first thing that business managers need to do is develop a clear plan for how their business is going to compete in the marketplace. This competitive strategy could be based on a low-cost model (where a business owner decides to try to build a customer base by offering a quality product/service for a lower price than competitors), on a differentiation strategy (where a business owner competes based on identifying how their product/service is more unique and useful), or on some form of hybrid strategy. It is important to note that the business strategy should be in-line with the operating environment (i.e., the local marketplace). As noted by the bi-directional arrows in Figure 1, the human resource system (and the resulting knowledge, skills, and abilities of the workforce) should also impact the type of strategy that a business should pursue. For instance, without a skilled and knowledgeable workforce a business cannot effectively pursue a differentiation strategy.

Once a realistic business strategy has been identified, the owner should turn their attention to creating human resource systems that adhere to the principles of the resource based view of management and strategic human resource management (see Step 2 in Figure 1). The first thing that a business owner wants to focus on is the concept of external alignment. External alignment focuses on the connection between the business objectives, in this case the strategic mission, and the major human resource initiatives (employee selection, training, etc.). For example, if a business owner wants to compete using a cost framework, he or she will need to develop recruitment, selection, and compensation strategies that encourage employees to work efficiently in an effort to contain costs. Additionally, when developing human resource management practices, it is important to pay attention to internal alignment – or aligning each human resource practice with one another to establish a structure that is mutually reinforcing. For instance, using the above example, managers would want our training programs to teach employees to work efficiently (quickly with minimal waste) and we would want to develop a compensation system that rewards (at least to some degree) these behaviors. In contrast, if a manager wants to pursue a differentiation strategy, he or she would need to create a training program to teach employees the competitive business strategy and then reward them for generating new and unique ideas based on the business model. This approach is

used by a number of businesses that compete based on a differentiation strategy including 3M, Google, and W.L. Gore and Associates.

In terms of recruitment and selection practices, our sample tended to rely on non-technical factors (e.g., ability to follow instruction, strong interpersonal skills, good work habits and attitudes) when recruiting and selecting employees. This finding makes sense because, as noted by Cardon and Stevens (2004), small firms frequently consider non- skill based factors when making hiring and staffing decisions. Often, they focus on person-organization fit or the degree of value alignment between a job applicant, the owner, and the current staff. Focusing on person-organization fit has several benefits for small business owners. First, it allows business owners to actively create a business culture that is in line with his or her mission and vision and consistent with the values he or she desires for the business. Second, focusing on employee value fit also helps small businesses create a consistent culture which helps employees understand the patterns of behavior that are expected and rewarded in the business and it also helps customers learn what to expect from a business. In fact, Collins and Allen (2006) note that small employers that use a person organization fit strategy (rather than a person-job fit strategy) had a 7.5% higher revenue growth, 6.1% higher profit growth, and 17.1% lower turnover.

In addition to focusing on person-job fit, there are some other practical issues that small employers need to consider when developing their selection and recruitment strategies. As indicated in the literature review, small employers often have a very difficult time structuring their recruitment and selection plans. One of the primary problems seen in small business selection is the overreliance on strategies that have limited validity, such as the informal interviews. Job interviews represent one of the most common, and least expensive, methods of employee selection and evidence suggests that interviews can be structured in a way that improves the validity and reliability of selection decisions (Noe et al., 2009). However, an informal interview (where each applicant is asked different questions) makes it impossible to compare applicants based solely on their person-organization and person-job fit.

Another way to avoid making a bad hire is to rely on public employment agencies. Any individual currently receiving unemployment compensation is required to register with their local state employment agency. Employment agencies collect information from unemployed individuals about their prior work experience and their skills. Employers can register their job vacancies with their local state employment office and the agency will try to find a suitable candidate from its inventory of local unemployed individuals at no charge. Another useful training and selection tool is working with college or university career placement services that can help screen applicants based on qualifications and other factors. Additionally, during the recruitment process, another cost effective method to improve outcomes is to provide job applicants with a realistic preview of the job duties and functions they will perform. Research has demonstrated that realistic job previews during the interview and selection process do tend to increase the time it takes to hire an employee;

however, it also significantly reduces employee turnover which is a significant problem with most small businesses (Noe et al., 2009).

The employers in our sample spent a great deal of time and money training employees for their jobs. In fact, the data suggest that it takes somewhere between three months and a year for most of their employees to be fully functioning in their jobs. Given the limited budgets that most small and growing firms have, it is important to focus on cost-effective training programs. Most of the businesses sampled are already utilizing cost effective methods of training: On-the-job training and peer training. When choosing the trainer it is important for managers to make sure that the appropriate behaviors (i.e., no bad habits) are being trained. Thus, it is important for the managers and trainers to focus on the *key behaviors* that help improve performance on the job.

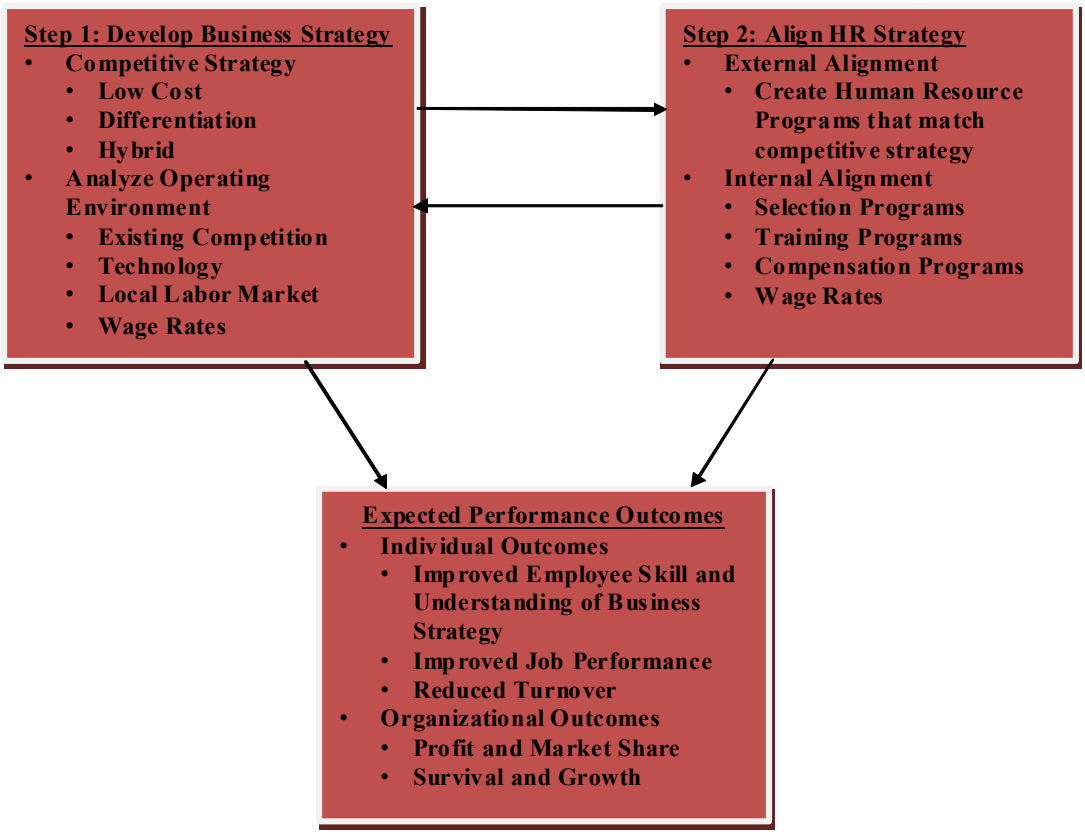
As reviewed above, training programs are solely designed to build capabilities that improve job performance and the only way to make a lasting behavior change that is translated to long term job performance is to recognize effective behavior through feedback. When done well, on the job training can lead to improved functioning on the job by providing new employees with the opportunity to successfully perform new and difficult tasks or what are called "mastery experiences". Training programs that provide individuals with the opportunity to master the key behaviors required for job performance provide individual and organization level benefits. Prior data suggest that organizations that utilize resources (time, money, etc.) on well designed training programs focused on key behaviors not only improve individual level job performance, but also build employee commitment to company success, and reduce employee turnover (Noe, 2008).

Compensation programs are designed to help attract qualified applicants and to reward employees for effort that leads to improved organizational functioning and performance. While the managers sampled in this study did report using incentive based pay and profit sharing plans based on company level performance, the employers in our sample relied primarily on fixed salary and wages. While pre-established wages (hourly and salary) do help attract talented employees, they are not structured in a way that maximizes individual performance or effort (Carlson, Upton, & Seaman, 2006; Kerr, 1999). Kerr (1999) argues that one of the most important aspects of reward programs is to encourage and recognize behaviors that are in line with the corporate strategy. Piece-rate pay plans that reward employees for a specific unit of output provide a good example of incentive pay plans that reward certain behaviors (output). However, it is important to recognize that by rewarding certain behaviors (output), managers may accidentally create other problems. For instance, consider the situation where call center employees are rewarded for the number of calls answered during a shift. While this reward program will clearly lead to an increase in the call volume for customer service representatives, it will also likely increase reports of unresolved calls. Thus, often the best compensation programs include fixed pay and incentive pay that focuses on both short-term and long-term metrics (Kerr, 1999).

It is important to note, that properly developing strategic selection, training, and compensation programs takes time and financial resources. However, these short-term costs are

almost always balanced by long term gain because the quality and caliber of employees (or human capital) within the firm improves (see "Expected Outcomes" box in Figure 1). The improved caliber of employees and enhanced effort almost always has a positive financial impact for the organization (Collins & Allin, 2006). For instance, Welbourn and Andrews (1996) demonstrate in their study of IPO firm performance that firms that had a high human resource value scores were more likely to survive long term. However, consistent with other research, they found that there were short-term costs associated with this (Sels, et. al, 2006).

Figure 1: Strategic Human Resource Framework



Note: This model is based on the data presented in this paper and the growing body of research focusing on human resource management practice in small and growing firms (e.g., Cardon & Stevens, 2004; Collins & Allen, 2006; Mayson & Barrett, 2006). This model is not intended to represent all possible human resource activities nor all possible outcomes.

CONCLUSION

The goal of this manuscript was to highlight the common human resource management practices implemented across the nation. Consistent with prior research, we found that most businesses did actively engage in human resource management practice; however, the systems were not necessarily implemented strategically or in a manner that would help build a competitive advantage. Strategic implementation of human resource initiatives requires managers to think about two forms of strategic alignment: internal alignment (between each independent human resource initiative) and external alignment (between an entire human resource system and the firms overall competitive strategy) and how these forms of alignment help create employees that are capable of fulfilling their essential job duties in a way that helps the firm develop a strong competitive advantage. It is important to recognize that there are other common human resource management systems that were not covered in this manuscript, such as compensation and reward systems and performance appraisals and feedback. These areas represent an important part of a complete human resource management system, but this manuscript focused on specific areas where the research is beginning to converge so that the authors could more fully provide practitioners will valuable guidance.

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INFORMATION TECHNOLOGY DISASTER RECOVERY PLAN: CASE STUDY

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ABSTRACT

Computerized data has become critical to the survival of an enterprise. The number of organizations that rely on computerized systems to perform daily operations and assist in the decision making process has grown at a rapid pace recently and still continues to grow. Companies must have a strategy for recovering their data in the event that fires, hurricanes or other natural disasters destroy their primary data centers. Planning for recovery from a disaster is quickly becoming recognized as a necessity. In the aftermath of Hurricane Katrina in New Orleans and surrounding areas, many businesses were forced to implement an effective Information Technology (IT) Disaster Recovery plan (DRP) to help protect their business data so as to ensure their survival.

This paper describes the concepts of a disaster recovery plan and data replication; discusses the assessment, planning, implementation, and testing of the Disaster Recovery solution used by Houston Community College (HCC); and finally, examines the testing procedures of an actual extension of the plan in the face of a real-life disaster. The HCC plan, which costs $576.000 annually, or about $1.92 per member of the HCC family, has proven to be one of the most effective and efficient Disaster Recovery Plans implemented in the wake of Hurricane Katrina in August, 2005.

Keywords: Data replication, Business contingency planning, Disaster recovery, Data centers

INTRODUCTION

Webster's Dictionary defines a disaster as "a sudden calamitous event bringing great damage, loss, or destruction; a sudden or great misfortune or failure." In a contemporary IT context, disaster is an event that shuts down a computing environment for more than a few minutes, often for several hours, days or even years. A disaster can wipe out a company's normal business day or even its entire IT infrastructure. While not different from other kinds of outages, the outage of a company's IT infrastructure spreads over a wider area, and affects more components. It is no longer a question of whether disaster will occur: it will. Thus, establishing reliable disaster recovery (DR) capabilities are critical to ensuring that an organization will be able to survive significant events.

Understanding when to initiate DR procedures during an event is critical to achieving expected DR outcomes (BEC Technologies, 2008).

The devastation wrought by Hurricane Katrina in New Orleans forced businesses and universities to seriously reevaluate their DR Plans. Many businesses could not operate because they did not have plans in place. Entire IT infrastructures were crippled by the flooding that resulted from the storm, and many organizations did not have a DR site outside the affected area, which left them without a way to immediately move forward. Disaster recovery is becoming an increasingly important aspect of enterprise computing. As devices, systems, and networks become ever more complex, there are increasingly more things that can go wrong. Consequently, recovery plans have also become more complex (Toigo, 2002). A disaster recovery plan establishes how a company or organization can reinstate its IT systems and services after a significant large-scale interruption.

The principles of Disaster Recovery and Business Continuity Planning are quite straightforward: creating a remote DR center is the first step in developing a well-organized plan, and this will directly affect the recovery capabilities of the organization. The contents of the plan should follow a logical sequence and be written in a standard and understandable format. Effective documentation and procedures are extremely important in a disaster recovery plan. In the wake of Hurricane Katrina, the Houston Community College (HCC) in Houston, Texas, has played a pioneering role in developing a DR plan, and continues developing its systems for the future. The objective of this study is to discuss the Information Technology Disaster Recovery Plan at HCC.

Statement of Problem

The flooding that resulted from Hurricane Katrina in New Orleans, Louisiana, in 2005 compelled most businesses and universities in vulnerable areas to reevaluate their Disaster Recovery plans. Several businesses were crippled because they lost records and information spanning several years. Concerned about their ability to operate if disasters of similar magnitude recurred, managements developed DR plans that describe the IT mechanisms for the purpose of bringing a functioning system back online (Robb, 2005). These plans also help organizations reinstate their IT systems and services after a significant large-scale interruption with a minimal time lag. Without a DR plan in place most businesses run the risk of crippling data loss.

DR solutions are expensive, but with a little planning and foresight DR does not have to be an all-or-nothing proposition (Robb, 2005). Costs can vary tremendously, depending on the needs of each organization, the assessment of the threat, and the level of security one seeks. For most small to midsize institutions, one of the most affordable DR solutions would consist of the remote location for storing tape backups. However, for larger organizations, this method would be unacceptable, although the larger potential for data loss, and steep costs could compel managements to scale down DR plans so that they protects only the most critical applications.

Statement of the Objective

Modern organizations recognize that success increasingly depends on their ability to provide information on demand to customers, suppliers, employees, and other stakeholders. This reality has forced managers to seek better ways to protect their information assets and to prepare for quick recovery in case of a disaster. A business's definition of a disaster varies according to its business model, geographic location, and other factors. System, component, network, and application failures that result in downtime, data loss, and serious financial impact can also be defined as a disaster, whether or not caused by a natural disaster (Greyzdorf, 2007).

However it may define disaster, an organization owes its customers the ability to continue business after a disaster (Lewis, 2006). HCC management realized that the tape backup system in use during Hurricane Katrina would not help in the event of a disaster. The HCC management goal was to create a Disaster Recovery Plan that would have the IT infrastructure operational within 12 hours after a disaster and the business operations up and running within 24 hours at minimum cost.

REVIEW OF LITERATURE

In a moderately short time frame (roughly half a century) disaster response and recovery has been approached from a number of diverse perspectives, including structural functionalism (Bates & Peacock, 1987), and conflict and symbolic interaction (Nigg, 1995). In the process, it has also evolved through at least two distinct paradigms: hazard and vulnerability. The earliest body of research, which began to emerge as recognizable research literature in the 1960s, framed the environment as an agent of disaster or hazard. Accordingly, risk and disaster are embedded within the natural environment, technology, or the built environment. Inherent to this paradigm is the conviction that individuals, businesses and communities are victims of extreme events and dependent on outside or professional assistance for their recovery. Later research acknowledged the role of social vulnerability, manifested through preexisting social structures and conditions, in the explanation of the impacts and responses to disasters. Like the hazard paradigm, this perspective discounts the capacity of local communities to respond appropriately and constructively to disaster. More recently, as disaster research evolved along with other social science research, researchers are acknowledging the importance of both the hazards and vulnerability paradigms (Tootle, 2007).

Most researchers now recognize that both environmental and social processes affect the impacts of disaster and the disaster recovery process. However, Meta Group research (2003) found only 20% of Global 2000 organizations have effective business continuity plans (BCP) to help them in the case of disaster. The study shows this lack of preparation is due to the fact that many of them have failed to distinguish between BCP and DR plans. In fact, an adequate BCP should include human resources, facilities, management as well as the executive board (Susanto, 2003). Meta Group (2003) also said that IT as one of the main business functions should be managed along with other

components as an overall BCP. Kenneth Hewitt explains the failure of many organizations to establish a viable BCP by suggesting that the voices of active participants in the recovery process are mostly missing in the long-term recovery process (Tootle, 2007).

Since the terrorist attacks on September 11, 2001, more enterprises have moved BCP from a "complimentary" to a "compulsory" status for the organization. However, many are still unable to correctly identify all the points that should be considered. BCP is often regarded as the IT organization's DR plans. This assumes that business continuity can be simply guaranteed by having a good backup system for the computer network. While this assumption is not unreasonable, since IT systems are gaining ever greater prominence in the overall structure of many corporations, the following issues related to BCP should be considered (Susanto, 2003):

- *Premises and geographic issues:* When a disaster has destroyed or damaged an organization's premises, the company manager's first task is to find an emergency site to continue operations while the original site is being repaired. This ensures that the operations are not completely shut down. Selecting an emergency site requires a careful plan which stresses that minimal time is spent allocating temporary authority to initiate recovery action (Savage, 2002). Geography can sometimes cause uncertainty about an organization's ability to continue. Compromise between accessibility and safety is often necessary: while a backup site near the original site means high accessibility, it may be less secure in the event of a bigger disaster (Susanto, 2003).

  Suggested solution: Analyse business needs and explore the possibility of establishing multiple backup sites. More resources can be dedicated to data communication channels, i.e., developing a backup site at a distance that can communicate as fast as the one next door.

- *IT issues*: The importance of IT issues has made many people confuse BCP with IT recovery (DRP). Fortunately, many businesses are well prepared for this issue. Some have allocated a certain amount within their budget specifically for IT and the DRP system. The plan should also include details of a communication method, network infrastructure, and third-party vendors; all should be carefully documented within BCP along with external storage/data. An appropriate strategy determined by the significance of IT matter within the business can be chosen from the following: full replication, vendor parallel/semi-parallel or relocation. Many third-party vendors will provide protection ranging from the widely-used tape backup system to state-of-the-art "high availability solutions" which will simultaneously backup all incoming and outgoing data from the system (Susanto, 2003).

  Suggested solution: A business should choose the appropriate IT recovery plan; this is not always the expensive "top of the line" option. A well-suited DR plan will maximize all IT

resources and capabilities to allow a business to survive a disaster. This plan should be reviewed and adjusted as the business grows (Susanto, 2003).

- *Customer service issues:* It is important to keep customers informed about effects of the disaster which may cause the disruptions of production or service, and the progress of recovery; customers must also be informed as soon as the business is back online. Keeping customers informed will build trust in the business relationship (Susanto, 2003).

  Suggested solution: A customer is the most important entity in any business. Provide them with honest information and immediate solutions, and keep them informed with the progress of business recovery (Susanto, 2003).

- *Human resources issues*: A major disaster will most immediately affect the employees and possibly their families. It is the organization's responsibility to keep employees informed, and to organize the handling of the process including emergency contact information and keeping in touch with all the employees. Bigger organizations are now also concerned with all their senior management located on the same floor or even in the same building (Susanto, 2003). For them, losing a little convenience will not be as unpleasant as losing the whole business structure. Splitting resources to more than one location will enable the company structure to exist even if one building is destroyed.

  Suggested solution: The solution may vary depending on the size of the business. Multiple-site businesses should consider splitting company resources to different locations or different parts of the building/office (Susanto, 2003).

- *Documents*: BCP should also consider the existence of crucial documents including BCP itself, printed stationary, emergency contact details, location and document accessibility. These are to ensure that the inbound and outbound communication can be initiated soon after the disaster to avoid worse cases (Susanto, 2003).

  Suggested solution: Create an offsite office storage area where the company can keep extra stationary, i.e., letterhead, business cards, etc., as well as copies of the BCP document for emergencies (Susanto, 2003).

Disaster Recovery: Business Continuity Plan (BCP) Life Cycle

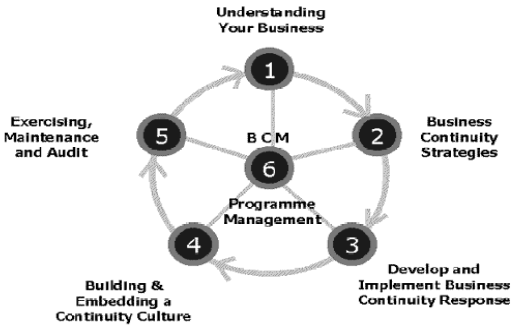
No organization can have complete control over its business environment. It is therefore essential for companies to have a business continuity management (BCM) capability, in case of

crisis or disaster. BCP is a complex plan and sometimes causes confusion about when, where and how to start developing it. The Business Continuity Institute (BCI) has developed a roadmap which is called BCM/BCP life cycle (Susanto, 2003).

Forrester Research and the *Disaster Recovery Journal* have partnered to field a number of market studies in business continuity and disaster recovery in order to gather data for company comparison and benchmarking and to guide research and publication of best practices and recommendations for the industry. This is the first study, and it is focused on gathering a baseline of company DR preparedness (Balaouras, 2007).

The BCI principles and frequently asked questions have been drawn together to create the BCP life cycle, an interactive process tool to guide the implementation of an effective BCP process. There are six points in BCM life cycle process as shown in Figure 1.

Figure 1: BCM Life Cycle



Each organization needs to assess how to apply the 'good practice' contained within the guidelines to its unique situation. It must ensure that the BCM competence and capability meets the nature, scale and complexity of the business, and reflects the individual culture and operating environment (BCI, 2003).

METHODOLOGY

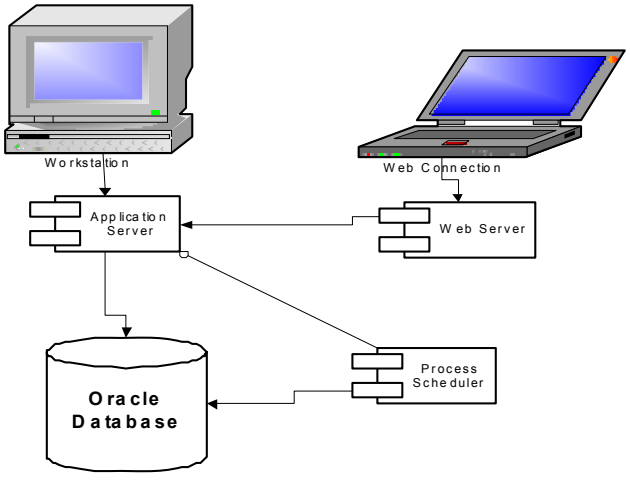
The primary objective of DR planning is to protect the organization in the event that its operations or computer services are rendered unusable. Preparedness is the key. The planning process should minimize the disruption of operations and ensure some level of organizational stability and an orderly recovery after a disaster. A DR plan is a comprehensive statement of consistent actions to be taken before, during and after a disaster. The plan should be documented and tested to ensure the continuity of operations and the availability of critical resources in the event of

a disaster. Most businesses depend heavily on technology and automated systems, and their disruption for even a few days could cause severe financial loss and threaten survival. The continued operations of an organization depend on management's awareness of potential disasters, its ability to develop a plan to minimize disruptions of critical functions and the capability to recover expediently and successfully. HCC chose a solution developed by Oracle's Data Guard to administer the DR plans. With Oracle's Data Guard features, HCC will be able to utilize database logs shipping to maintain a primary and standby database.

Production Environment

The production environment for HCC consists of a 3-teir PeopleSoft System and a Vignette Application all running on Oracle databases sitting on UNIX operating platforms. The systems running are PeopleSoft (Finance, Human Resource and Campus Solution) with each having a web server, application servers and process schedulers to make up the PeopleSoft 3-teir environment. The Operating System platforms are UNIX Solaris and Windows 2000. Figure 2 below is an example of a PeopleSoft 3-teir environment with the process scheduler for reporting, application server and web server:

Figure 2: PeopleSoft 3-tier Environment



As shown in Figure 2, every component connects to the oracle database. At HCC, the databases are Oracle versions 9i and 10g databases. The databases reside on a Solaris operating system running

on the UNIX platform. The database is the most important piece for ensuring little to no data loss to the remote database. In the main data center the production database is referred to as the primary production database and the production database in the remote data center is referred to as the secondary production database or standby database. This setup allows for multiple DR centers which can also have multiple remote production database copies.

Remote DR Center: CyrusOne

The DR data center is usually at a location that is considered safe. The HCC Data Center building was created to endure rain and wind. It is also equipped to cope with power outages. The remote DR center that HCC uses is called CyrusOne. CyrusOne is a stand alone, single tenant building, that protects systems from many natural and man-made causes of outages. Each component of the CyrusOne datacenter is designed to ensure maximum availability in all conditions.

CyrusOne gives 100% protection or 100% compliance, specializing in the most cutting edge DR configurations and solutions. The hardware located at this datacenter duplicates the production hardware. To ensure that performance is not compromised, the hardware in both datacenters should be identical.

Data Replication

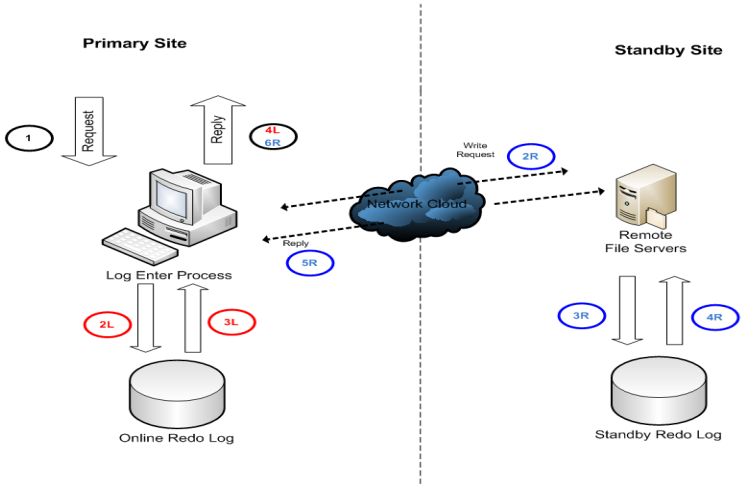
Replication is the copying of data from one system to another system. The end result is two consistent and equally workable data sets in multiple physical locations. The primary database is the online production database that is used for everyday business. The primary database is located in the main data center. The standby database is the offline production database used to duplicate production data and it is located at CyrusOne, the remote DR center (see Figure 3).

Oracle application Data Guard is used to help manage data replication. HCC has also created a manual management process for data replication. The process was designed using Oracle's Data Guard log shipping. Log shipping allows high availability of the data to the remote site with limited loss of data. This method also allows recoveries to be performed independently of the database location, which means that if the primary database crashes for any reason, the standby database can recover data and transfer it to the primary database when it becomes available. The recovery method is designed to allow for load balancing in all situations of a highly available database, during normal processing, takeover and online self-repair.

Oracle Log shipping occurs at the database level rather than at the server level, which means that if something happens to the server it does not affect the database. One of the disadvantages of Oracle log shipping is that it is network dependent (see Figure 3). As a result, there is some latency involved from the primary to standby database. The network infrastructure plays a major part in the speed and size of the logs being shipped. Because of the uncertainty of the network traffic, Data

Guard is set up to ship the log files based on size and time of the last log shipped. This means that the log shipping parameter is set to ship logs when the log size reaches 20 kb or the time when the last switch was greater than 30 minutes. This also helps control data loss. With these parameters set in Data Guard, the management expectation of having only 30 minutes of data loss in the case of a disaster is being achieved. There are no built-in failover capabilities for log shipping, which means that some downtime has to be incurred in the switch to the standby server. This also means that a maximum of 30 minutes of data loss may occur.

Figure 3: Data Guard Log Shipping



Testing the DRP is the key to ensuring its success. HCC has two system level testing dates per year to ensure that the data replication is accurate. The testing plan includes interrupting the production system and connecting to the remote data center. The network is re-routed to the remote site and all application is activated at the remote data center.

Configuring the Primary Database

To setup the Oracle log shipping the following parameters need to be setup in the primary database:

- *Archive log mode* – This allows every transaction in your database to be captured in the log files. To setup a remote standby database archive log mode has to be turned on.

- *Force Logging* – This forces the database to record every transaction that happens in the database. If a structural change happens to the database force logging will make the database

write it into the log files. Without force logging if a structure change happens on the primary database the standby database would have to be rebuilt.

- *Networking Components* – This allows the primary database to communicate to the standby database. In the tnsnames file located on the primary server, create a net service name that the primary database can use to connect to the standby database. Also on the primary host server, create a net service name that the standby database when running on the primary host, can use to connect to the primary, when it is running on the standby host.

- *Initialization Parameters* - Most of the configuration options for primary and standby servers are implemented with a normal database creation for any Oracle instance. Since our primary and standby host servers are identical (memory, disks, CPU, etc.), the initialization file for both databases is almost identical, with the exception of four key parameters. The parameters that are important for a successful standby database configuration to be set on the primary database are:

  - log_archive_start
  - remote_archive_enable
  - remote_login_passwordfile
  - service_names
  - standby_archive_dest
  - standby_file_management

These parameters allow the production database to be configured to be replicated. Now using a backup of the primary production database a standby database can be created. Using either a cold or hot (online) backup of the primary database, a standby database is created to resemble the primary database. A key step to all of this is to remember to also copy all of the archived redo logs from the primary database in order to bring the standby database to a consistent state.

Configuring the Standby Database

There are two types of standby database, logical and physical. The main different between the two is that the logical standby database can be opened read/write, even while it is in applied mode. This is mostly used to run reports so that there is not a load on the production server. A physical standby database is an exact copy of the primary database. Oracle uses the primary database's redo log to recover the physical database. A physical standby database can only be opened in read only mode. Once the log files are received, the Manage Recovery process automatically

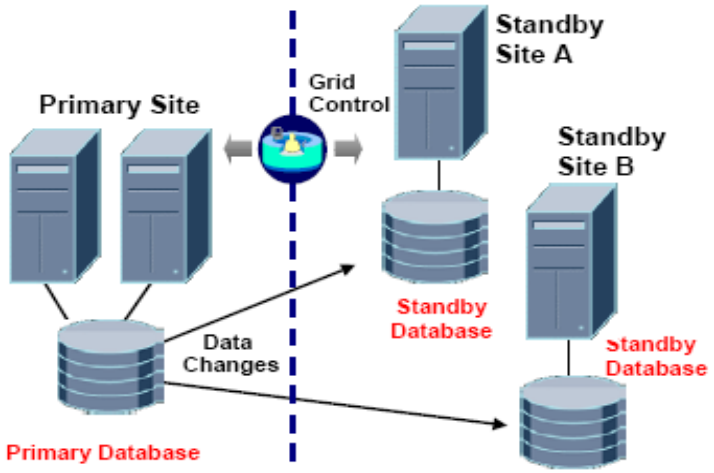
applies the transactions to the database. Oracle log requires the following parameters has to be set in the standby database:

- *Archive log mode* – This allows every transaction in the database to be captured in the log files. This is not required on the standby database.

- *Networking Components* – This allows the standby database to communicate to the primary database. On the standby host server, create a net service name that the standby database can use to connect to the primary database. Also on the remote host server create a net service name that the primary database, when running on the remote host, can use to connect to the standby database when it is running on the primary host. This is only needed on the remote if the roles of primary and standby will be switch. Initialization Parameters – This file will not exist on the standby server. It can be created from a copy from the primary server with the following parameter changes: The four parameters that need to be set on the standby database and differ from the primary database are:

  - FAL_CLIENT – defines the primary database
  - FAL_SERVER – defines the standby database
  - LOG_ARCHIVE_DEST_2 – defines the location on the remote server to place the log files
  - LOG_ARCHIVE_DEST_STATE_2 – defines the log file states

Figure 4: Data Guard Grid Control



Once the standby database has been created and configured, the standby has to be put in listening mode. This is also referred to as "STANDBY MODE" by Oracle (see figure 4). This can be completed using the following commands from a database prompt:

- SQL> startup nomount
  ORACLE instance started.
- SQL> alter database mount standby database;
  Database altered.

At this point the completion of the standby database must occur. The next step is to synchronize the standby database with the primary database by applying the log files as they are being shipped to the remote serve. To do this, execute the following command:

- SQL> **alter database recover managed standby database disconnect from session;**
  Database altered.

Once everything has been setup, verify that database modifications are being successfully shipped from the primary database to the standby database. This can be done by checking the existing archived redo logs on the standby database. Archive a few logs on the primary database, and then check the standby database again to make sure they have been shipped to the standby server.

Implementing Failover Operations

Remember, there is no built in failover capabilities for Oracle failover in a disaster situation, which means that some downtime must be incurred. The failover operation will transition the standby database to the primary role in response to a failure or disaster on the primary database. During a failover operation, the standby databases will become the primary database and the old primary database is considered to be lost. This is usually the case when the primary database is unavailable and there is no possibility of restoring it to service within a reasonable amount of time. A failover can be performed after all or most of the data was last propagated to the standby database after the primary database became unavailable. Once a standby database has been activated, it cannot be put on standby recovery mode; this is because an implicit reset log is performed upon activation. A few steps need to be completed to bring the standby database online. These include:

- Verify that the Primary Database is unavailable

- Cancel managed recovery
- Activate standby database
- Restart database
- Open Database
- Add the Temporary Tablespace
- Modify the TNSNAMES file so that outside connections could be made

Once the database is open, make sure that all transaction logs from the primary database have been restored on the standby server. Once the database has been brought online, all applications will need to change their connections.

Cost Analysis

A survey conducted by Forrester/*Disaster Recovery Journal* in October 2007 revealed that 45% of respondents spend less than $500,000 annually on disaster recovery, whereas 20% send between $500,000 and $1.49 million. Exactly how closely these numbers correlate with the annual budgets of the companies is unknown. Spending, however, generally increases with company revenue, which is not surprising; the higher a company's revenue is, the more that company is willing to spend to protect revenue from probably causes of operational downtime (Forrester Research and *Disaster Recovery Journal*, 2007).

HCC has a student and staff population of approximately 300,000, and a total annual operating budget of $213,132,222 million, of which approximately $ 7,725,700 million are allocated to IT operations. Of the IT allocation, HCC spends $576,000 annually on disaster recovery (see Table 1). Thus, on disaster recovery, HCC spends $1.92 annually per student and staff member, which is approximately 7.46% of its annual IT budget, and 0.27% of its total annual budget. While these figures are consistent with conservative budgetary principles, it must be noted that as a not-for-profit educational institution, the budgeting priorities of HCC may not always translate to a fruitful strategy at a for-profit institution.

Table 1: Cost estimates for data backup and storage per annum for HCC	
Parameter	HCC
Backup Tapes	$15,000
Offsite Data Storage	$5,000
Hardware maintenance	$6,000
Software maintenance	$500,000
Software Purchase for safeguarding the data	$50,000
Number of employees and students the data storage can serve	300,000
Total	$576,000

CONCLUSIONS/RECOMMENDATION

Disasters are unavoidable and come with the likelihood that important data maintained by business and universities will be irretrievable. Identification of critical data and a clear plan for recovering and restoring the data is essential. Establishing the necessary steps to take place after a disaster will allow businesses and universities to enter a disaster state with confidence and direction.

On September 13, 2008, Houston was ravaged by Hurricane Ike, the third most destructive hurricane in U.S. history. With winds gusting to 100mph, the 600-mile wide storm caused widespread power outages. The power outage at HCC disrupted the college's primary data centre. However, HCC's system was equipped to cope with such a situation; the college immediately shifted the Internal Protocol (IP) address of the primary data centre to the secondary data centre, and the operations thus continued with minimum disruption.

HCC's implementation of the Disaster Recovery Plan using Oracle DataGuard to the CyrusOne Data Center ensured that the goal to replicate data and IT processes and procedures of critical applications was successful. The DRP implementation helped reach the goal of having the IT infrastructure operating within 12 hours after a disaster, and day-to-day business operating within 24 hours after a disaster. With Oracle DataGuard, the amount of data loss is limited; the data replication capability is more efficient, less expensive, and better optimized for data protection and disaster recovery than traditional tape backup solutions. Due to the successful testing result; management has been forced to look into implementing a Business Continuity Plan for the entire college system.

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